

INFORMATION TECHNOLOGY PANEL

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INTRODUCTION

Q. Would the members of the Information Technology (IT) Panel (Panel) please state your name and business address?

A. Our names are Jeannine Haggerty, Manoj Chouthai, Allisyn Glasser, James Prettitore, Mikhail Falkovich, Thomas Langlois, Frank LaRocca, Aleksandra Pooley, and Denise Reid, and our business address is 4 Irving Place, New York, NY 10003.

Q. By whom are the panel members employed?

A. We are employed by Consolidated Edison Company of New York, Inc. (Con Edison" or the Company) in the IT area.

Q. Please explain your educational backgrounds, work experience, and current general responsibilities.

A. **(Haggerty)** I hold a master's degree in Energy Management from New York Institute of Technology and a bachelor's degree in Finance & International Business from Manhattan College. I have been employed by Con Edison since 1991, holding various positions of increasing responsibility in Utility Shared Services, Corporate Shared Services, and Electric Operations. In July 2019, I was promoted to Vice President of IT, Business Systems Delivery (BSD), which is responsible for application development and support for the Company's approximately 450 applications.

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1 **(Chouthai)** I hold a Master of Science from New York
2 University's Courant Institute of Mathematical Sciences and a
3 Master of Business Administration degree from New York
4 University's Stern School of Business. Prior to joining Con
5 Edison in 2019, I was the Senior Vice President and Group CIO
6 of Reliance Industries Limited (RIL), India (2014-2018),
7 responsible for all IT Platforms across central and line of
8 business IT organizations. Prior to that, I was the Vice
9 President and Chief Information Officer, Public Service
10 Enterprise Group (PSEG) (2003-2012), responsible for all IT.
11 I joined Con Edison as the Vice President of IT Engineering
12 and Operations, responsible for cybersecurity, IT
13 infrastructure (network/data centers/servers), Enterprise
14 Architecture and IT strategic planning.

15
16 **(Glasser)** I hold a Bachelor of Science degree in Management
17 Information Systems in 1998 from the University of Connecticut
18 and a Master of Business Administration degree in Project
19 Management from DeVry University in 2007. I have been
20 employed by Con Edison since 1998, holding positions of
21 increasing responsibility in Finance, Treasury, Shared Service
22 Administration, Orange and Rockland Utilities, Inc. (O&R)
23 Operations, and IT. I am currently the Director of Enterprise
24 Architecture and Digital Platforms responsible for Enterprise

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1 Architecture, Cloud Services, Integration Services, Analytics
2 Center of Excellence and Digital Factory.

3
4 **(Prettitore)** I hold a Bachelor of Arts in Economics from the
5 University of Rhode Island and a Master of Business
6 Administration in Strategy and Finance from New York
7 University's Stern School of Business. I have been employed
8 by Con Edison since 1991, holding positions of increasing
9 responsibility in Finance, Supply Chain, System Operations,
10 and IT. I am currently the Director of IT Strategy
11 responsible for strategic planning. My responsibilities
12 include developing long-range strategic plans for IT
13 investment and overseeing our rate case filings.

14
15 **(Falkovich)** I hold a Bachelor of Science and Master of
16 Engineering from Cornell University. I have been employed in
17 the electric utility industry for the last 20 years, holding
18 positions of increasing responsibility in IT, Engineering,
19 Legal, and Information Security. I was hired by Con Edison as
20 Director of Information Security in May 2016 and currently am
21 the Chief Information Security Officer. I am responsible for
22 the Company's cybersecurity initiatives, including threat and
23 risk management, Cybersecurity Engineering, and cybersecurity
24 compliance.

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1
2 **(Langlois)** I hold a Bachelor of Science and Master of
3 Science in Electrical Engineering from Manhattan College. I
4 have been employed by Con Edison since 2006 and have held
5 various positions in Distribution Engineering and
6 operations, and the Advanced Metering Infrastructure (AMI)
7 implementation team prior to assuming the Director role for
8 BSD. In my current role, which started in July 2021, I
9 focus on Outage Management Systems (OMS), Geographic
10 Information Systems (GIS), and Control Center systems.

11
12 **(LaRocca)** I hold a Bachelor of Science in Computer Science
13 from St. John's University. I have been employed at Con
14 Edison since 2008 and held positions in Finance and IT. I
15 am currently a director in BSD responsible our managed
16 service provider relationship in supporting our outsourced
17 application portfolio. I also support our Shared Services
18 applications for Con Edison and O&R. Prior to joining Con
19 Edison in 2008, I spent 20 years in KeySpan Energy in the
20 Information Technology organization and, most recently, the
21 VP of Information Technology and CIO.

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1 **(Pooley)** I hold a Bachelor of Science in Computer Science from
2 Oakland University and a Master of Science in Computer Science
3 from Oakland University. I have been employed by Con Edison
4 since 2014 holding positions of increasing responsibilities in
5 IT. I am currently the Director of Infrastructure and
6 Operations responsible for the operations of our IT Network,
7 Voice and Data Telecommunications, Servers, Storage, Data
8 Centers, End User Services, Network Operations Center, and
9 Service Desk.

10
11 **(Reid)** I hold a Bachelor of Administration in Information
12 Systems and a Master of Business Administration in Accountancy
13 from Baruch College. I have been employed by Con Edison since
14 1990, holding positions of increasing responsibility in
15 various departments in IT (BSD, IT Planning, Quality
16 Assurance) and in Auditing. I am currently a Director in BSD
17 responsible for Work Management Solutions for Con Edison and
18 O&R.

19 Q. Have any panel members previously submitted testimony or
20 testified in a proceeding before the New York State Public
21 Service Commission (PSC or the Commission)?

22 A. Ms. Glasser submitted testimony on behalf of the Company in
23 Cases 14-E-0493 and 14-G-0494 (2014 O&R Rate Case), Cases 19-
24 E-0065 and 19-G-0066 (2019 Con Edison Rate Cases), and for O&R

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1 in Cases 21-E-0074 and 21-G-0073 (2021 O&R Rate Cases). Mr.
2 Falkovich and Mr. LaRocca submitted testimony in the 2019 Con
3 Edison Rate Cases and 2021 O&R Rate Cases.

4 The other Panel members have not previously submitted
5 testimony or testified before the Commission.
6

7 **PURPOSE OF TESTIMONY**

8 Q. Please explain the purpose of this testimony.

9 A. This Panel's testimony presents an overview of Con Edison's IT
10 investments and initiatives over the next several years and,
11 in particular, over the proposed rate years. In working with
12 all corporate organizations, IT designs, develops, and
13 implements solutions to help the Company meet its key
14 corporate initiatives - operational excellence, safety, and an
15 enhanced customer experience. The proposed IT projects
16 position the Company to meet customer, stakeholder, regulator,
17 and employee expectations.

18 Q. Please explain how the testimony is structured.

19 A. This testimony is structured as follows:

- 20 • a discussion of the Company's overall IT organization,
21 its core function, IT strategy, IT investment tiers, IT
22 governance process, technology trends, and overall
23 capital and O&M request.

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- 1 • an explanation of the requested projects, starting with
2 enterprise-wide major technology projects, followed by IT
3 projects in the tiers described in the IT overview
4 section.
- 5 • an overall discussion of IT projects in other areas
6 throughout the Company, supplemented by the business
7 justification in associated whitepapers and/or the
8 associated witness or panel testimony, explaining the
9 project.

10 Q. Does this testimony include all Company IT-related projects?

11 A. Yes, except for the customer service-related projects included
12 in the Customer Operations Panel testimony. IT is a key
13 partner in those projects, but they are discussed by the
14 Customer Operations Panel because they are so closely tied to
15 other customer issues discussed by that panel.

16 Q. For what period is the Company requesting funding?

17 A. The Company seeks a one-year rate plan for the twelve-month
18 period ending December 31, 2023 (Rate Year or RY1). As
19 discussed by the Accounting Panel, the Company is open to
20 discussing a longer rate plan in settlement negotiations.
21 Therefore, we present information for the twelve-month periods
22 ending December 31, 2024 (RY2) and December 31, 2025 (RY3).

23 Q. What are the requested expenditures for IT projects that the
24 Company is including in this filing?

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A. The Company has included \$1.460 billion in requested capital and \$117.1 million Operating and Maintenance (O&M) expenditures for IT-related projects over the three-year period. As noted earlier, this includes all IT projects, except for the projects discussed by the Customer Operations Panel.

	Capital & O&M			
	Total Annual Request (\$000)			
	2023	2024	2025	Total
Capital	\$470.2	\$558.5	\$430.9	\$1,459.7
O&M (Incremental to test year)	\$75.0	\$24.5	\$17.6	\$117.1
Total	\$545.2	\$583.0	\$448.5	\$1,576.8

IT OVERVIEW

Q. Please provide a summary of this section.

A. In this section, we explain the role and structure of the IT organization, IT investment tiers, and IT governance process; discuss technology trends; and explain the requested capital and O&M costs.

IT Organization

Q. Please explain the role of the IT organization.

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1 A. The IT organization provides the Company with the information
2 technology products, services, and cybersecurity required to
3 perform its business.

4 Q. How does IT meet this role?

5 A. IT invests in four technology tiers:

6 First, IT builds and operates the Company's foundational IT
7 infrastructure (e.g., data centers that host the servers,
8 databases, routers, firewalls, etc.). This IT infrastructure
9 provides the basic computing, telecommunications, and
10 networking needs for the various applications that are used to
11 provide critical Electric, Gas, and Steam to our customers as
12 well as our administrative and other back-office groups.

13 Second, IT implements software platforms, such as data and
14 analytics, mobility, cloud, customer relationship management,
15 which are deployed on top of the foundational infrastructure.
16 These software platforms are the building blocks for
17 applications (see fourth item below) used throughout the
18 Company.

19 Third, IT provides cybersecurity protection for all technology
20 assets (Information Technology (IT) and Operational Technology
21 (OT)) across the enterprise.

22 Fourth, IT implements specialized applications to meet
23 business needs, enable value, and allow employees to perform
24 their jobs in a safe, secure, resilient, and efficient manner.

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1 These applications are required for all Company functions,
2 including electric, gas, and steam operations, customer
3 service, Finance, Supply Chain, Human Resources, Law,
4 Auditing, Facilities, and many others.

5 Q. Please provide an example of a project using the above tiers.

6 A. As explained later, we have a platform called C3.ai, which is
7 part of the larger Enterprise Data and Analytics platform
8 (EDAP). C3.ai is a cloud-based platform. We build various
9 analytics applications using the C3.ai platform.

10 Hot Sockets is an example of a specialized application on
11 EDAP. Hot Sockets leverages AMI meter data to identify meters
12 with potentially dangerous temperature conditions to improve
13 situational awareness and reduce safety risks, for both the
14 public and employees. We are looking to build additional
15 specialized applications on top of C3.ai.

16 Q. What types of projects does IT work on?

17 A. IT works on both Company-wide projects and on projects for
18 individual business and functional groups. Some of the
19 Company's largest capital investments in recent years have
20 been IT investments, including AMI, the outage management
21 system (OMS), the Gas Work & Asset Management system, mobile
22 apps along with the new customer service system (new CSS), and
23 the new Graphical Information System (GIS). In each case, IT

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1 worked closely with the relevant group to implement the
2 system.

3 Q. Can you give some examples of Company-wide IT projects?

4 A. Yes. Past Company-wide IT projects include implementing SCADA
5 and OMS (IT/OT), Work and Asset Management Systems (WMS), Case
6 Management for new business, and Enterprise Resource Planning
7 systems (ERPs – i.e., Payroll Systems, Finance, Accounting,
8 Supply Chain systems) and Business Intelligence and Analytics
9 platforms (BI).

10 Q. Can you give some examples of business-group specific IT
11 projects?

12 A. Business-group specific IT projects are wide ranging.
13 Examples of mobile applications include:

- 14 o OMS Site Safety and Damage Assessment, Outage Dashboards,
15 Feeder Status, Gas Plumber App, and Public Hazards
- 16 o Control Centers: Metropolitan Transportation Authority
17 (MTA) Dashboards
- 18 o Construction and Environmental Health and Safety

19 Other projects address reporting needs using tools like
20 Tableau and Power Business Intelligence.

21 Finally, IT provides support for incidents on an immediate
22 basis, such as pandemic related applications, including
23 dashboards, and mobile applications.

24 Q. How is the IT organization structured?

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1 A. IT is divided into two groups, Business System Delivery (BSD)
2 and Engineering and Operations (E&O).

3 Q. What areas fall under Business System Delivery?

4 A. BSD has four areas: Customer, IT/OT (Information
5 Technology/Operational Technology), Work & Asset Management,
6 and Shared Services.

7 Q. Please describe each area.

8 A. The Customer area focuses on projects that improve the
9 customer experience, such as the Digital Customer Experience
10 (DCX), new Digital Assistance, new analytical tools, and our
11 new Customer Billing System (aka new CSS).

12 The IT/OT area supports Supervisory Control and Data
13 Acquisition (SCADA), Control Center applications that serve
14 Electric, Gas & Steam, our core and ancillary suite of Outage
15 Management Systems (OMS), Graphical Information Systems (GIS),
16 our AMI platform and Clean Energy initiatives.

17 Under the Work and Asset Management area, we are implementing
18 one Work and Asset Management platform for numerous
19 departments within Con Edison and O&R.

20 Finally, the Common area focuses on our back-office
21 departments such as Human Resources, Finance, Auditing, Supply
22 Chain, Training, Facilities, Law, and Project Management.

23 Several BSD projects, including Work and Asset Management,
24 Outage Management, and Oracle Human Resource and Finance

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1 systems, are discussed in the Major Enterprise System section
2 in this testimony.

3 Q. What areas fall under Engineering and Operations?

4 A. Engineering and Operations has four areas of work: Enterprise
5 Architecture and Digital Platforms, Cybersecurity,
6 Infrastructure and Operations, and IT Strategy.

7 Q. Please describe each area.

8 A. Enterprise Architecture is a standard IT methodology for
9 analyzing, planning, designing, and implementing IT solutions.
10 It is the equivalent of Distribution Engineering or Central
11 Engineering for IT. Key deliverables are architecture and
12 design documents across various IT domains, including
13 security, networks, applications, and infrastructure.

14 Digital Platforms enhances the Company's capabilities in areas
15 like mobile application development, data and analytics, and
16 the cloud.

17 Cybersecurity is responsible for cybersecurity operations and
18 policy.

19 Infrastructure and Operations maintains IT and communications
20 infrastructure, including data centers, networks, and end user
21 computing environments.

22 The IT Strategy group is responsible for IT strategic
23 planning.

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1 Q. Before moving on, what are the benefits of Enterprise
2 Architecture?

3 A. Some benefits of Enterprise Architecture are:

- 4 • Improved application portfolio management to reduce the number
5 of applications, costs, and risks.
- 6 • Improved technology and risk management to reduce complexity
7 and resolve security vulnerabilities, and compliance issues.
- 8 • Clearly documented architecture and standards to meet future
9 business goals.
- 10 • Reduced delivery times to keep up with a fast-changing
11 business environment.

12 Q. How many applications does IT support?

13 A. IT supports approximately 450 applications.

14 Q. Does IT maintain the approximately 450 applications IT
15 manages, by itself?

16 A. No. In 2020, the Company contracted out much of its
17 maintenance and support work to a managed service provider,
18 Cognizant. Most corporations of our size use managed service
19 providers, including many utility companies.

20 Q. Why did Con Edison decide to use a vendor?

21 A. To allow IT to scale its operations to support the increased
22 demand for IT services. IT work is increasing with no decline
23 in sight. The demand for IT systems, data, and infrastructure
24 has grown tremendously. As a result, the Company has
25 recognized IT as our "4th Operation" alongside electric, gas,

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1 and steam. This is also evident with the doubling of our IT
2 Capital portfolio from 2019 to 2020. In 2020-2021, IT
3 executed our capital portfolio of \$350 million to improve
4 business processes and bring value to our customers.

5 Q. What is the scope of services provided by Cognizant?

6 A Cognizant performs support services for IT infrastructure,
7 including our network operations center and service desk.
8 Cognizant also provides maintenance and support for more than
9 300 applications. Part of the transition included
10 implementing ServiceNow as our new IT ticketing and work
11 management system. This allows us to track IT assets and
12 service tickets in one system and will allow us to perform
13 analysis on incident and service level trends.

14 Q. Has IT implemented other general changes?

15 A. Yes. We have moved to cloud-based technology.

16 Q. Why?

17 A. Many of our software vendors have either stopped or advised
18 they will stop offering their software for installation in our
19 "On-Premises" data centers. They will only offer their
20 products on the "cloud." We expect this trend to continue.
21 As explained later, moving to the cloud increases O&M
22 spending, as subscriptions are required. With subscriptions,
23 the Company receives regular upgrades and patches to systems

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1 directly from the vendor, instead of having to upgrade or
2 patch the product ourselves.

3
4 **IT Strategy**

5 Q. What is IT's strategy to address the myriad of projects along
6 with the changing IT environment?

7 A. We have developed a three-pronged strategy, "Our Way of
8 Working," to guide our work. The three prongs are:

- 9 • Operational and project excellence
- 10 • Customer empowerment
- 11 • Unified enterprise architecture

12 Q. Please discuss the first element of IT's strategy, Operational
13 and Project Excellence.

14 A. IT focuses on operational excellence. IT is focused on
15 reaching zero safety and cyber incidents, zero operating
16 errors, and zero quality defects.

17 Q. How does this enhance the service IT provides to internal
18 organizations?

19 A. Because most Company operations rely on IT infrastructure, our
20 focus on operational excellence supports safe, reliable, and
21 resilient service to customers. For example, the operation
22 and control of our systems depend on secure networks and
23 telecommunications infrastructure provided by IT. Key IT
24 business applications are critical for core company functions,

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1 such as SCADA, outage restoration, gas leak response, and
2 customer care and billing.

3 Q. Please discuss the second IT strategy element, customer
4 empowerment.

5 A. The second element of the IT strategy is developing platforms
6 and technologies to help our customers connect with the
7 Company. Using technology to improve the customer experience
8 and enable personalization (including personalized
9 recommendations and views) is a priority.

10 Q. Please discuss the third IT strategy element, unified
11 enterprise architecture.

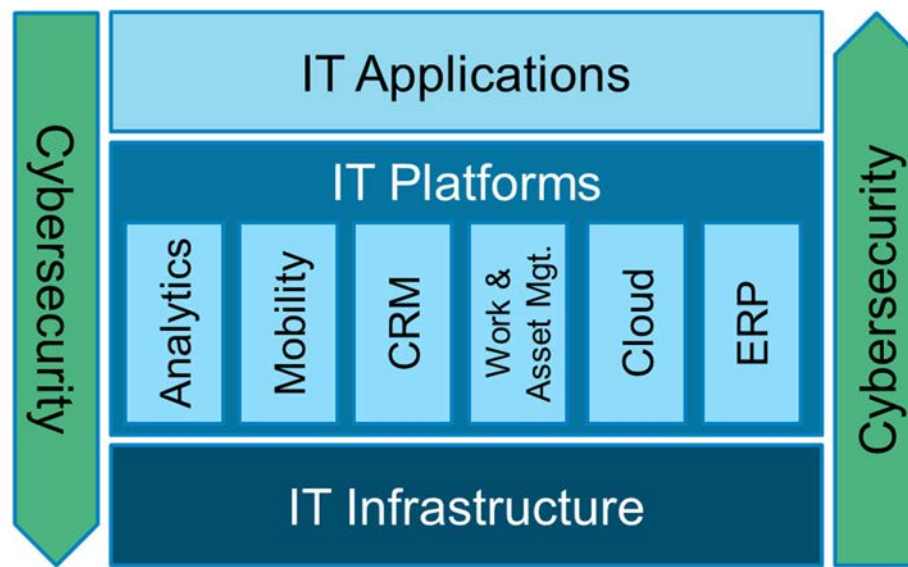
12 A. The third element creates standard enterprise architectures,
13 across all IT functions, that simplify the application and
14 infrastructure portfolio while taking a proactive role in
15 bringing new, innovative technology in a secure and reliable
16 manner.

17
18 **IT Investment Tiers**

19 Q. What are IT investment tiers?

20 A. Investment tiers are the different categories of IT work
21 required by a project. IT systems are built using four tiers:
22 Foundational IT Infrastructure, IT Platforms, Cybersecurity,
23 and Applications.

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Q. Please explain.

A. The first investment tier is Foundational IT Infrastructure, which is the equipment upon which applications are built. Foundational IT Infrastructure includes investments in hardware and software, data centers, cloud, colocation facilities, and networks. It also includes the assets needed to run and house systems, such as: real estate/space for equipment, routers, WiFi, cable, internet, LAN/WAN equipment, databases, firewalls, routers, and HVAC.

Q. Why is it necessary to make investments in Foundational IT Infrastructure?

A. These investments are necessary to allow basic computing, networking, and telecommunications technology to be hosted, deployed, and managed in a safe, secure, reliable, and resilient manner. Investments are essentially deemed as a cost of doing business and are focused on providing security,

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1 reliability, and resiliency for the overall infrastructure,
2 systems and applications.

3 Q. What is the second category of investments?

4 A. IT Platform investments.

5 Q. Please explain what this category includes.

6 A. IT Platform investments enable enterprise business functions
7 to effectively engage with customers, stakeholders, and
8 employees. Platforms enable large-scale deployment of
9 applications, which enable additional functions, such as
10 Analytics, Mobility, Customer Relationship Management, Work
11 and Asset Management.

12 Q. How does platform investment help our customers?

13 A. Our customers benefit by leveraging the scale efficiencies the
14 platform provides. For example, a Customer Relationship
15 Management (CRM) platform provides a single unified customer
16 experience. If a customer is inquiring about their bill,
17 energy efficiency programs or a requesting an appointment,
18 they will have the same look and feel. The goal of the tool is
19 to provide ease of use and a streamlined experience. The same
20 goes for internal applications. Despite the commonalities,
21 this platform still allows individual organizations to create
22 unique applications to meet business needs.

23 Q. What is the third area for IT investment?

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1 A. Cybersecurity investments to protect the Company's computing
2 assets, both IT and OT, from malicious and ransomware driven
3 cyber attacks.

4 Q. Please discuss the fourth investment category, IT
5 Applications.

6 A. IT Applications are IT systems that are built or purchased to
7 assist the business group with an overall or specific need.
8 They support key business processes across the Company, for
9 example, customer interaction, outage management and
10 restoration, energy system monitoring and control, finance,
11 supply chain, and HR/Payroll. These investments are
12 prioritized based on expected value and managed via an IT
13 Technology Governance board (i.e., the IT Board or ITB).

14 Q. Please provide some examples of IT Applications.

15 A. Examples of IT include the outage management system (OMS)
16 which allows operators to monitor customer outages and
17 subsequent restorations; the Customer Service System used to
18 manage customer accounts and billing; and the Oracle E-
19 Business Suite (EBS) system used for finance, accounting, and
20 budgeting.

21

22 **IT Governance Process**

23 Q. Please describe the governance process for IT investments.

24 A. IT investments, including those proposed by this Panel, are
25 under the oversight of the IT Board (ITB), which consists of

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1 executives from across the Company. The ITB is responsible
2 for managing the IT portfolio, authorizing funding releases
3 and requests, and selecting a final portfolio of projects each
4 year. ITB meets at least quarterly. ITB also holds monthly
5 project meetings to review projects.

6 Q. How are IT projects selected?

7 A. Through an optimization process. The Company's goal is to
8 select a capital portfolio of projects that align with
9 Corporate and IT strategic goals and drive high-value
10 initiatives, which deliver safety, operational excellence, and
11 improved customer experience. Capital projects are rated for
12 the purposes of alignment with Company strategic goals.
13 Optimization scenarios are approved by the ITB. Once the ITB
14 approves a portfolio, it is included in the following year's
15 capital budget.

16
17 **Technology Trends**

18 Q. Does IT consider technology trends?

19 A. Yes. The Company, in general, and IT, specifically, looks to
20 transform and continually improve the way we do business. We
21 are constantly looking at new and evolving technology to
22 determine opportunities to improve IT's products and services.

23 Q. Please explain.

24 A. Technology is advancing at a rapid pace and changing the way
25 businesses operate. For example, Cloud technology was not

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1 available just a few years ago. Cloud fosters data analytics,
2 resiliency (data centers in different regions), and the
3 ability to more quickly deliver server environments needed for
4 IT projects. Other items like quantum computing, artificial
5 intelligence, virtual reality, and machine learning are
6 quickly evolving. We must stay abreast of new developments to
7 maximize efficiency and provide our customers the best service
8 possible.

9 Q. What are the key trends shaping the IT organization's
10 strategy?

11 A. Cyber security, Cloud Computing, Artificial Intelligence (AI)
12 and Machine Learning (ML), Internet of Things (IoT), 5G
13 Communications and Connectivity, Digital Transformation, and
14 Technology Modernization. These IT trends inform business
15 strategy, as they may indicate new ways to unlock value across
16 the organization. The Company has considered these trends in
17 developing its budget and the components of this filing.

18
19 **Capital and O&M Investment**

20 Q. Please describe the forecasted capital request for each rate
21 year and its main drivers.

22 A. The 2023 capital request is \$401 million, a \$85 million
23 increase from 2022. The main drivers for the increase in 2023
24 are the Oracle EBS ERP Cloud Migration (\$51 million), the eGIS

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1 Implementation (\$35 million), and the Technology Modernization
2 Program (\$32 million).

3 The 2024 capital request is \$476 million, a \$75 million
4 increase from 2023. The main drivers for the 2024 increase
5 are the Oracle EBS ERP Cloud Migration (\$66 million), the eGIS
6 Implementation (\$60 million), and the Technology Modernization
7 Program (\$29 million).

8 The 2025 capital request is \$386 million, a \$90 million
9 decrease from 2024. The main drivers are the Oracle EBS ERP
10 Cloud Migration (\$65 million) and the eGIS Implementation (\$15
11 million).

12 Q. Before explaining the Company's O&M request, please explain
13 the categories of costs in the O&M category.

14 A. IT O&M requests fall into two main categories. First, most IT
15 projects start out as capital projects in the development and
16 implementation stage. Once the system moves into production,
17 there are operating costs associated with running the system
18 or application, including subscription costs, support costs,
19 upgrade costs and the like. This is referred to as the O&M
20 tail or carrying cost for capital projects. For example, once
21 a large IT capital project, such as AMI, is implemented, O&M
22 is required to cover recurring costs, including vendor
23 software maintenance, subscriptions for cloud services known

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1 Software as a Service (SaaS), and labor costs for employees or
2 contractors to provide support.

3 Second, incremental O&M is required for the increasing
4 maintenance, and subscription contracts for overall IT
5 infrastructure, including cloud, and communications. For
6 example, maintenance costs have increased for infrastructure
7 equipment, such as servers and network switches, consistent
8 with our inventory growth. We have enhanced our remote
9 connectivity capability since our last rate filing, increasing
10 maintenance and support costs for the underlying hardware and
11 software needed to support remote work. We continue to make
12 capital investments to modernize and improve the security for
13 our data centers, resulting in increased maintenance and
14 support for data center infrastructure. Our mainframe
15 environment is necessary to support several important
16 applications, such as new CSS and billing interfaces for our
17 AMI systems. We are seeking incremental O&M to offset
18 software and hardware maintenance increases from mainframe
19 vendors, such as IBM. Another example is the growing
20 dependence on mobile devices for many key business functions,
21 resulting in increased telecommunications costs.

22 Q. Please describe the O&M request and the main drivers for the
23 O&M request.

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1 A. For O&M, we are requesting \$75 million in incremental
2 expenditures in RY1, an additional \$24 million in RY2, and
3 another additional \$18 million in RY3. The main drivers for
4 the request are the increase in capital projects and the
5 associated O&M tail and the continued expansion of our
6 cybersecurity efforts and Oracle Software licensing. There
7 are additional O&M incremental costs related to various
8 Foundational IT Infrastructure services, such as hardware and
9 software maintenance, increasing maintenance costs for our
10 mainframe environment, and increasing telecommunications costs
11 due to device growth.

12 Q. Has the Panel developed an exhibit, entitled IT O and M White
13 Papers, to explain the requested O&M funding?

14 A. Yes. An exhibit was prepared under the Panel's direction and
15 supervision.

16 MARK FOR IDENTIFICATION AS EXHIBIT __ (IT-8)

17 Q. Has the Panel developed an exhibit to explain the requested
18 O&M for increased hardware and software maintenance?

19 A. Yes. An exhibit was prepared under the Panel's direction and
20 supervision.

21 MARK FOR IDENTIFICATION AS EXHIBIT __ (IT-1)

22 Q. Do both the capital and O&M requests include additional
23 personnel?

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A. Yes. Various projects require additional personnel. In total, our headcount will increase by 58 employees. They are broken down into the following Foundational IT Projects and are generally discussed in the exhibits accompanying each project.

	Staffing Level Changes			
Foundational IT Projects	2023	2024	2025	Total
Cybersecurity	4	2	2	8
Foundational IT Infrastructure	15.5	2	1	18.5
IT Platforms	19	3	3	25
Applications	6.5	0	0	6.5
Total	45	7	6	58

IT PROGRAMS AND PROJECTS BY CATEGORY

Q. Please identify the categories used for organizing IT projects.

A. We have organized the projects using the following categories: Major Enterprise Projects, Foundational IT, Common, Electric, Customer Energy Services (CES), and Gas. Projects are discussed in testimony, exhibits, and/or the Business in the exhibits.

MAJOR ENTERPRISE PROJECTS

Q. What are the most significant Major Enterprise Projects the Company is proposing?

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1 A. The most significant are Work and Asset Management, eGIS,
2 Distribution Control Center Resiliency, OMS, and Oracle
3 upgrades for Human Capital Management, and Enterprise Business
4 Systems. As mentioned earlier, the Customer Operations Panel
5 discusses other projects, including the New Customer Service
6 System and the Customer Relationship Management System.

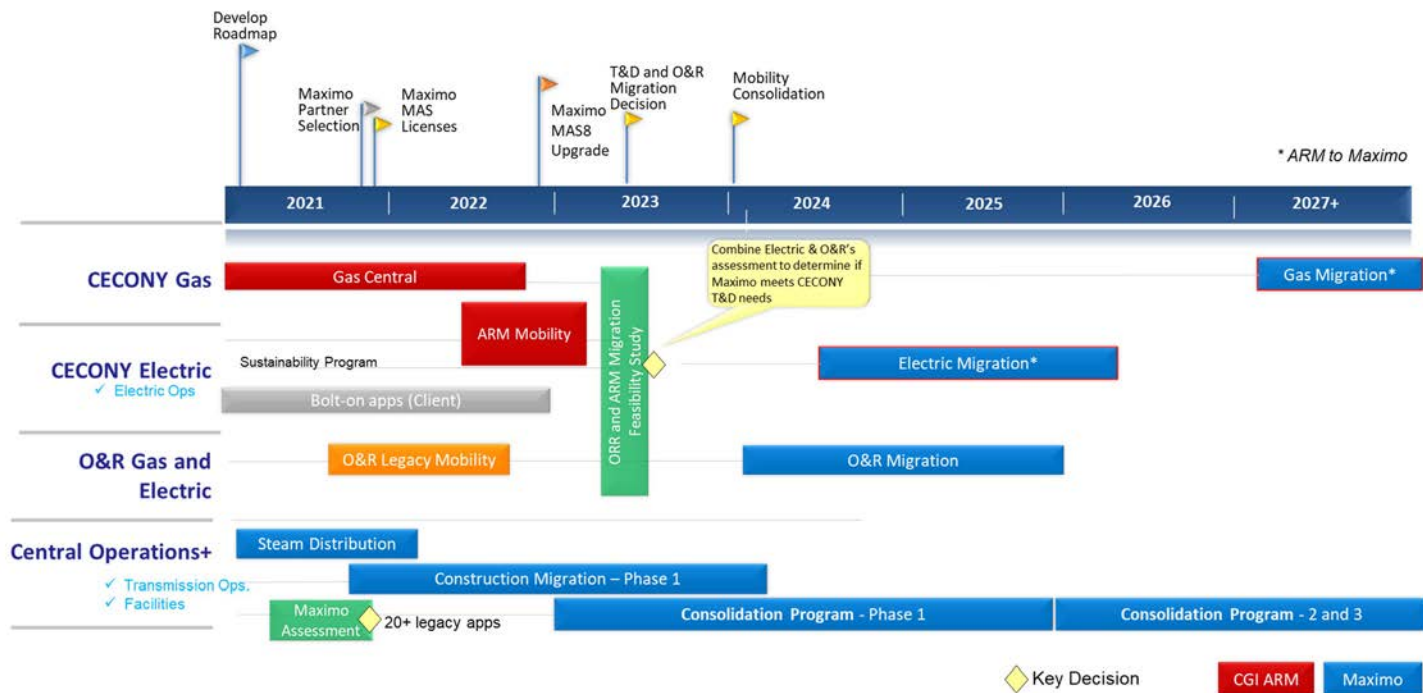
8 **Work and Asset Management**

9 Q. Please explain the Work and Asset Management project.

10 A. Different Company organizations currently use four work
11 management programs. The Company is requesting \$186 million
12 to develop a "One Enterprise" Work and Asset Management
13 solution for all groups with appropriate customizations.
14 Seven projects account for 89 percent of the requested \$186
15 million. The following explains the overall roadmap:

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1

2 Q. Please identify the seven major projects.

3 A. The chart below sets forth the projects and their costs.

4

Work Management	2023	2024	2025	Sum - 3 years
Maximo Consolidation Program Phase 1	\$15,492,700	\$24,955,800	\$18,070,600	\$58,519,100
Electric - ARM Replacement	\$0	\$23,750,000	\$23,750,000	\$47,500,000
Construction Migration (Contractor Payment System Work Tracking)	\$10,377,000	\$10,094,000	\$0	\$20,471,000
WMS Sustainability Project	\$3,750,000	\$3,750,000	\$3,750,000	\$11,250,000
Gas Work & Asset Management New Functionality	\$3,375,000	\$3,375,000	\$3,375,000	\$10,125,000
Substation Technology Improvements Program	\$5,000,000	\$3,000,000	\$2,500,000	\$10,500,000
Protective Relay Settings Repository	\$5,000,000	\$3,000,000	\$0	\$8,000,000
Total	\$42,994,700	\$71,924,800	\$51,445,600	\$166,365,100

5

6 Q. Have the whitepapers associated with these projects been

7 developed under the Panel's direction and supervision?

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1 A. Yes, they have.

2 Q. Have they been assembled into one exhibit, entitled Work
3 Management System?

4 A. Yes. Please see the exhibit for additional detail.

5 MARK FOR IDENTIFICATION AS EXHIBIT __ (IT-1)

6 Q. Please describe the benefits of one overall system.

7 A. One overall system will transform the current Work and Asset
8 Management application landscape into a consolidated,
9 streamlined, efficient, reliable, and robust solution. The
10 program will address the functional limitations of the
11 current legacy systems, technology obsolescence, and mitigate
12 cyber risks, enabling Con Edison to realize the full benefits
13 and synergies of a true enterprise solution across all
14 business areas: common platform, streamlined workflows, single
15 consolidated data source, "center of excellence" support, best
16 of breed work and asset management functionalities,
17 scalability, performance, enhanced security, and the ability
18 to meet current and growing business needs. For example, the
19 existing electric Work and Asset Management system runs on an
20 older platform (CGI ARM) and experiences limitations in
21 meeting the current and growing business needs.
22 To gain these benefits, the Company will migrate disparate
23 legacy Work and Asset Management applications into the

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existing, highly configurable IBM Maximo Work and Asset management enterprise platform.

Q. Why undertake this project?

A. This project standardizes the different applications into one common software platforms and modernizes our work management application portfolio. In addition, there are several disparate (20+) legacy work management systems running on obsolete technologies. Some of these systems will soon present a cyber risk unless addressed. Others lack functionality and need to be migrated to an enterprise solution to leverage new and advanced capabilities, consolidated application and platform support, and realize efficiencies and accommodate growing business needs in the future.

eGIS

Q. Is the Company developing an enterprise-wide mapping system?

A. Yes. The current rate plan allows the Company \$90 million to implement an enterprise-wide mapping system in three phases. Phases 1 and 2 were included in the prior rate plan, phase 3 was not.

Q. Please explain Phases 1 and 2.

A. In 2019, the Company began its multi-phased effort to update its outdated mapping systems by implementing the eGIS project and establishing a single mapping platform for the Company.

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1 Phase 1 includes the distribution system and the mains and
2 services for electric and gas operations. Phase 2, started in
3 2020, includes establishing the primary (feeder) mapping
4 system and the Staten Island mapping system. Phases 1 and 2
5 are expected to be completed by the end of 2022.

6 Q. Please discuss Phase 3.

7 A. Phase 3 consists of developing the conduit and composite
8 plates. The Company will complete the distribution class (120V
9 to 33kv) cables during Phase 1 and Phase 2. The Company plans
10 to complete the conduits that house the cables in Phase 3,
11 which is expected to begin in 2023 and be completed in 2025.
12 This includes the over 14,000 combined conduit plates and
13 composite feeder plates.

14 Q. When do you plan to start Phase 3?

15 A. We cannot commence working on Phase 3 until Phases 1-2 are
16 complete. Phase 3 will take approximately three years because
17 the Company will manually re-draw most of our conduit and
18 composite plates onto the new platform.

19 Q. What is the Company requesting in this filing for eGIS?

20 A. Con Edison is requesting \$140 million to complete Phase 3 of
21 the project between 2023-2025. Without this funding and work,
22 our migration to the eGIS platform will not be fully complete
23 and we will still rely on legacy mapping systems for mapping
24 of certain assets.

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1 Q. Is there a document that explains Phase 3 and ongoing eGIS
2 work?

3 A. Yes. An exhibit was developed under our direction and
4 supervision.

5 MARK FOR IDENTIFICATION AS EXHIBIT __ (IT-1)

6 Q. Is Con Edison on track to realize the benefits described in
7 the eGIS Business Case included in the Company's 2019 rate
8 filing?¹

9 A. Yes. Con Edison is on track to realize these benefits.
10 First, the eGIS project cost avoidance will be realized upon
11 elimination of legacy applications and the associated
12 maintenance and support. This will occur when the Company
13 achieves the go-live milestone in all boroughs and regions
14 associated with Phase 1 and Phase 2 and Phase 3. The
15 anticipated cost savings include custom support agreements for
16 obsolete software, non-IR supported eGIS related applications,
17 avoided system failure, and alleviating the need to develop
18 new eGIS like applications.

19 Q. Please continue.

20 A. Second, regarding the remainder of the benefits, the new
21 mapping system will improve efficiency by eliminating the need

¹ See Case 19-E-0065, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Electric Service*, 2019 CECONY Electric Rate Case Exhibits Vol. 3, filed January 31, 2019.

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1 to map the same structure on multiple maps and reduce costs.

2 In addition, having all Company maps including all commodities
3 on a single platform will increase the efficiency of creating
4 work packages that require layouts. Once we integrate Phase
5 3, we will recognize all the benefits outlined in the business
6 case. The Business case filed in 2019 (named "eGIS Business
7 Case 2019.docx") is included in Exhibit __ (IT-1). An updated
8 BCA (named "eGIS BCA.xls") is included in our workpapers.

9 Q. How will eGIS facilitate Distributed Energy Resource (DER)
10 integration and support operational resilience?

11 A. Con Edison's eGIS will support the achievement of the State's
12 Climate Leadership and Community Protection Act (CLCPA) goals
13 in several ways. eGIS will facilitate the adoption of DER
14 through increased accuracy of hosting capacity maps, a
15 foundational component for the Company's Distributed Energy
16 Management System (DERMS), as explained by the CES Panel.
17 Moreover, the GIS mapping system is foundational for
18 developing a DERMS system.
19 Further, in the face of more frequent and severe storm events,
20 the eGIS will improve storm recovery efforts through improved
21 accuracy of outage counts in the Outage Management System.
22 eGIS will also facilitate damage assessment and restoration of
23 customer outages during normal blue-sky events as well as
24 major storms. In addition, the eGIS will integrate asset

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1 information and flood maps to facilitate evaluation and
2 planning for flood risks to Con Edison assets.

3 **Distribution Control Center Resiliency Project**

4 Q. Please describe the Control Center Resiliency project.

5 A. The Distribution Control Center (DCC) data networks can
6 immediately sever the connection to the Corporate data
7 networks to operate independently, if needed, in an emergency.
8 Severing the connection isolates and protects the critical
9 infrastructure and applications that the Distribution Control
10 Centers need to operate efficiently and safely.

11 However, as designed, the current process makes operating in a
12 severed situation difficult in two areas. First, once
13 severed, the distribution control centers must resort to
14 manual processes to perform necessary work. Moreover, the
15 current configuration of the network has our Outage Management
16 System within the Distribution Control Center network,
17 thereby, limiting access to OMS for other key users.

18 Q. What will this project do?

19 A. Initially, this project will establish a new separate
20 dedicated network for outage management systems, allowing work
21 functions to continue.

22 The Company will phase in applications in the OMS ecosystem
23 during the rate period so that the functionality mirrors a
24 normal day in incremental steps. For example, the initial

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1 project focus is on customer calls and providing data to
2 outage maps and regulatory staff while islanded.

3 Q. Please explain the benefits of this project.

4 A. This project will provide redundancy and resiliency to operate
5 in an "islanded" state.

6 The project includes process improvements, improved incident
7 response, and streamlined IT environments (simplifying
8 existing environments and leveraging reusable centralized
9 services).

10 Q. What funding is the Company seeking for this project?

11 A. The Company forecasts capital costs of \$8 million in each of
12 RY1 through RY3. We expect to complete the project in 2026.

13 Q. Has the Panel developed an exhibit to more fully explain this
14 project?

15 A. Yes. An exhibit was prepared under the Panel's direction and
16 supervision.

17 MARK FOR IDENTIFICATION AS EXHIBIT __ (IT-1)

18
19 **Outage Management System Projects**

20 Q. Does the Company have any projects related to outage
21 management?

22 A. Yes. We are proposing two projects: Outage Management System
23 - Phase Four (software) and OMS System Hardening Project
24 (hardware). The Company's capital forecast for OMS Phase 4 is
25 \$9.2 million in RY1, \$5.7 million in RY2 and \$5.2 million in

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1 RY3. The Company's capital forecast for OMS System Hardening
2 is \$3.9 million in RY1, \$4 million in RY2 and \$4.2 million in
3 RY3.

4 Q. Please describe the Company's current outage management
5 system.

6 A. The Outage Management System (OMS) is the primary means of
7 reporting outage information for internal and external
8 stakeholders during and after a storm event. Through the
9 hardware and software implementing the system, OMS manages,
10 tracks, and resolves customer outages on the electric
11 distribution system.

12 The software supporting OMS is the Oracle Network Management
13 System (NMS), an industry leading outage management system.

14 The system has multiple sources of input including, but not
15 limited to the following: customer outage reports, damage
16 assessment, SCADA, AMI, and manual user input.

17 Currently, the hardware driving OMS is older hardware, which
18 is approaching end of life.

19 Q. Has the Panel developed an exhibit containing two whitepapers
20 associated with these two projects?

21 A. Yes. They were prepared under our direction and supervision.

22 MARK FOR IDENTIFICATION AS EXHIBIT __ (IT-1)

23 Q. Please describe the Outage Management System - Phase Four
24 project.

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1 A. This project will upgrade the Oracle Network Management System
2 (NMS) software to the latest version. The project promotes the
3 "One Enterprise" approach as both Con Edison and O&R will
4 simultaneously upgrade to the NMS 2.5 version.

5 Q. Why perform this project?

6 A. The current version of the software has transitioned to
7 Extended Support. As a result, no new enhancements will be
8 made on the current version of the product line. Oracle's
9 Extended Support for this product ceases in November 2024.

10 Q. Please explain the enhancements from this project.

11 A. The enhancements include operator ease of use and additional
12 automation capabilities. This upgrade will also introduce a
13 new OMS mobile platform, with damage assessment, crew
14 management and Estimated Time of Restoration (ETR) field
15 update capabilities. The upgrade also improves availability
16 and reliability at local and remote sites, allows for faster
17 routine patching and improved disaster recovery, enables
18 Oracle's recent and upcoming enhancements offered, and
19 receives vendor support (e.g., service packs and patches).

20 Q. Turning to the hardware component of upgrading OMS, please
21 describe the OMS IT System Hardening project.

22 A. This project will improve the operational performance and
23 resiliency of our critical outage management systems and
24 supporting infrastructure, including underlying OMS

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1 technologies, OMS system architecture, data optimization, and
2 end-to-end testing capability.

3 Storms of increasing severity and intensity require investment
4 in a robust, modernized, high availability architecture that
5 supports increased customer outage reporting and AMI outage
6 data integration to the OMS. Investments in end-to-end testing
7 will also focus on additional automation capabilities, testing
8 tool modernization, and expanding testing coverage.

9 Q. Why undertake this project?

10 A. This program addresses recent storm issues. The proposed
11 enhancements will both correct current technical gaps as well
12 as set the building blocks for future integrations,
13 enhancements, and testing.

14 Q. Please explain the project benefits.

15 A. The upgrade will replace end-of-life hardware and enable High
16 Availability (HA) architecture mitigating the need for
17 prolonged maintenance outages for software patching. We
18 expect process improvements and reduced overhead through the
19 reduction of unplanned OMS outages through system stability
20 improvements, improved incident response, and reduction in
21 future project cost by streamlining current IT environments
22 (simplifying existing environments and leveraging reusable
23 services), and implementing better testing strategies
24 (automating testing). Additionally, as noted below, we will

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1 develop a testing Center of Excellence, allowing the Company
2 to automate and standardize our testing practices.
3

4 **Oracle ERP Projects**

5 Q. Please describe the Oracle EBS Supply Chain and Finance (EBS)
6 and Human Capital Management (HCM) Cloud Migration projects.

7 A. These projects will move our existing on premises Oracle EBS
8 and HCM systems to Oracle's cloud platform.

9 Q. Please explain the Oracle EBS project.

10 A. Oracle EBS provides the Company's finance and supply chain
11 functions. This project will migrate our existing EBS system
12 to the latest Oracle version, which is on Oracle's Cloud. The
13 Company is in the process of a Phase Zero study for this
14 migration. We plan to start the project in 2023 and would
15 complete it in 2025. The Company is seeking \$50.6 million in
16 RY1, \$66.5 million in RY2 and \$1.4 million in RY3.

17 Q. Please describe the Oracle HCM Cloud Implementation project.

18 A. This project replaces the legacy versions of our Oracle
19 Peoplesoft Human Capital Management (HCM) and Customer
20 Relationship Management (CRM) applications (the HR Payroll and
21 myHR Connection systems), consolidates disparate HR systems to
22 a single platform, develops advanced and predictive workforce
23 analytics, and stores payroll history for record retention
24 purposes. This project began in 2021 and is expected to be

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completed in 2024. The Company is seeking \$19.4 million funding in RY1 and \$1.5 million RY2 to complete the project.

Q. Why is the Company upgrading and moving both these projects to the Cloud?

A. Oracle intends to move all on-premises solutions to its cloud platform and is devoting most of its development resources to producing cloud versions of its software. Because of Oracle's strategic direction, Con Edison is moving EBS and HCM operations to the cloud to avoid the potential risk of facing delays in enhancements, security fixes, and costly upgrades to maintain the legacy on-premises software. Additionally, moving HCM, Supply Chain, and Finance systems to Oracle's cloud will modernize our portfolio.

Q. Is there an exhibit that explains these projects in more detail?

A. Yes. The Panel had an exhibit prepared under its direction and supervision.

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FOUNDATIONAL IT PROJECTS

Q. Please explain what is included in the Foundational IT projects Section.

A. The Foundational IT Projects section includes strategic IT investments in four categories: Foundational IT

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Infrastructure, IT Platforms, Cybersecurity, and Applications.

These categories are discussed earlier.

Q. What is the total requested capital investment for Foundational IT projects?

	Capital - Total Annual Request (\$ millions)			
	2023	2024	2025	Sum - 3 years
Foundational IT Infrastructure	\$74.3	\$115.3	\$96.2	\$285.9
IT Platforms	\$24.5	\$22.3	\$21.1	\$67.9
Cybersecurity	\$21.7	\$21.2	\$23.6	\$66.5
Applications	\$53.7	\$49.3	\$43.8	\$147.0
Total	\$174.2	\$208.3	\$184.7	\$567.2

Foundational IT Infrastructure

Q. What Foundational IT Infrastructure projects is the Company proposing?

A. These nine projects modernize and upgrade our existing IT infrastructure. The following shows the projects and associated expenditures during RY1-RY3.

	Capital - Total Annual Request (\$ Millions)			
	2023	2024	2025	Sum - 3 years
Foundational IT Infrastructure				
XM10 Computer Equipment	\$23.9	\$25.9	\$27.9	\$77.9
CCTN Expansion and	\$20.0	\$20.0	\$20.0	\$60.0

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Modernization				
GridMod Communications	\$16.0	\$16.3	\$16.3	\$48.6
IT Hardware and Software/M365		\$29.8		\$29.8
XM 8 Communications Equipment	\$3.9	\$9.0	\$9.0	\$21.9
End User Computing	\$3.4	\$4.7	\$6.2	\$14.2
Operational Technology Network Phase II	\$1.0	\$1.0	\$0.5	\$2.5
Enterprise Architecture Modernization	\$0.6	\$0.6	\$0.3	\$1.5
Total – Foundational IT Infrastructure	\$74.3	\$115.3	\$96.2	\$285.9

1

2 Q. Has the Panel prepared a document that explains the nine
3 projects included in this category?

4 A. Yes. In the Exhibit entitled, Infrastructure, which was
5 prepared under our direction and supervision, there are nine
6 whitepapers.

7 MARK FOR IDENTIFICATION AS EXHIBIT __ (IT-2)

8 Q. Are there any projects the Panel would like to discuss?

9 A. Yes. While the foundational infrastructure category is a
10 building block for IT, we explain Corporate Communication
11 Transmission Network (CCTN), Grid Modernization
12 Communications, Data Center Improvements, two general
13 equipment categories that IT owns, XM-8 and XM-10, and

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1 Hardware and Software Maintenance, which includes Cloud
2 Computing, Azure and M365.

3 Q. Please discuss CCTN.

4 A. CCTN is Con Edison's fiber optic network communication system,
5 which securely carries the Company's corporate data, voice,
6 and Supervisory Control and Data Acquisition (SCADA) data.

7 CCTN provides a reliable, secure, and high-speed data network
8 that enables all critical operations locations to communicate
9 with each other. CCTN is comprised of Company-owned fiber
10 optical cables, optical equipment, and radio system backbone
11 network infrastructure components. The Company maintains over
12 120 locations hosting CCTN components.

13 Q. Before continuing, please explain the Company's SCADA system.

14 A. SCADA systems provide visibility and control of the Company's
15 transmission and distribution systems. These systems are
16 critical to the safe and reliable operation of the
17 distribution system.

18 Q. Please describe the CCTN project.

19 A. The CCTN project will continue replacing older fiber spans and
20 installing new technology and spans as needed to improve
21 reliability, resiliency, and security. Without this
22 foundational system, operational performance of critical
23 communications can be at risk.

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1 Q. Turning to the Rev-Grid Modernization project, please explain
2 what is meant by Rev-Grid Modernization.

3 A. The Company continues to invest in the design and operation of
4 the Distributed System Platform (DSP) that has enabled
5 functionality in key areas of Electric System (Grid). The DSP,
6 explained in the CES testimony, enables the foundation for the
7 requisite people, process, technology, and infrastructure
8 evolution that is required to meet the goals set forth in the
9 New York State Climate Leadership and Consumer Protection Act
10 (CLCPA).

11 Q. What is the GridMod Communications Project?

12 A. As Con Edison deploys sensors and systems to support Rev-Grid
13 Modernization, IT deploys communication networks to enable
14 these Rev-Grid Modernization systems. Accordingly, this
15 project installs network communications solutions to manage
16 the transport of the data generated by these systems. This
17 infrastructure expansion will span a twenty-year horizon in
18 alignment with Con Edison's Grid Innovation plan.

19 Q. Turning to your next investment, please explain the Data
20 Centers Improvement Project.

21 A. While we are reducing the size and number of our data centers
22 as our systems move to the cloud, we must maintain and upgrade
23 remaining centers so that they can host certain critical IT
24 assets and provide diversity and redundancy. The Data Centers

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1 Improvement Project enhances and upgrades end of life
2 equipment as it relates to power, cooling (HVAC), battery
3 (Uninterruptible Power Supply or UPS), cabling within the data
4 centers as well as other data center communications, and
5 network infrastructure that keep the data centers reliable and
6 redundant. The Company is also investing in appropriate data
7 center preventative maintenance and around the clock support
8 for any emergencies.

9 Q. Please explain the next investments, XM-8 and XM-10.

10 A. As described by the Shared Services Panel, the Company has
11 certain general equipment categories. IT is responsible for
12 managing and purchasing XM-8 and XM-10 equipment used
13 throughout the Company.

14 XM-8 provides communications equipment to support Company
15 telephone networks including voice over IP (VoIP), radio
16 systems, telecommunication equipment for voice circuits, and
17 conference room collaboration equipment. This allows employees
18 to communicate and access business systems, including the
19 Customer Service System, Outage Management systems, electric,
20 gas, steam monitoring and control systems, as well as other
21 financial, Human Resources, and legal systems.

22 XM-10 provides critical computing components including the
23 mainframe, servers, PCs, tablets, laptops, storage, network
24 equipment for Local Area Networks (LANs), internet-facing

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1 technology improvements to allow remote access, and
2 infrastructure needed for the Wide Area Network (WAN) as well
3 as wireless networks. Technology upgrades are required to
4 provide a reliable and accessible environment for critical
5 resources located in data centers and support server growth
6 from new business system projects.

7 Q. What benefits do XM-8 and XM-10 programs provide?

8 A. XM-8 and XM-10 equipment and associated upgrades promote
9 performance and security improvements. The programs under
10 these budgets support:

- 11 • Safety – private wired and wireless communications enable
12 Con Edison to respond rapidly to emergency situations and
13 critical incidents over secure and segmented channels.
- 14 • Operational Efficiency – the communication, data computing,
15 and networking infrastructure provides a stable and
16 efficient platform for the applications and processes used
17 by the various operating businesses to achieve and maintain
18 operational efficiency.
- 19 • Customer Enablement – the customer-centric applications and
20 voice communication systems used in the customer contact
21 centers.

22 Q. What is the next project?

23 A. Hardware and Software Maintenance.

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1 Q. Are there hardware and software maintenance contracts
2 associated with the investments discussed in this testimony?

3 A. Yes. To use foundational infrastructure investments provided
4 by others, we must agree via contracts to obtain and pay for
5 the hardware and software maintenance services.

6 In addition, over the past few years, the Company is
7 increasingly relying on cloud services, which equates to a
8 subscription contract.

9 The Company protects these investments through maintenance or
10 subscription contracts for the hardware, software, or cloud
11 services. The existing infrastructure, including our
12 mainframe, also requires similar support.

13 Q. Why do you need maintenance and/or subscription contracts?

14 A. We must engage in contracts for services, especially with the
15 increasing volume of work. The volume of these contracts
16 increases commensurate with the investment.

17 The services associated with these contracts keep the hardware
18 and software up to date, patch cybersecurity vulnerabilities,
19 replace hardware failures, maintain active cloud
20 subscriptions, and implement new release features within the
21 products. This allows sustainability and supportability of
22 the environment over time and increases reliability and

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1 availability of the network, business applications, and
2 infrastructure.

3 Q. Are there projects under IT Hardware and Software Maintenance
4 associated with cloud services subscription contracts?

5 A. Yes, our Microsoft suite of services. The Microsoft suite of
6 services provides foundational and innovative tools to support
7 the Company. The Microsoft 365 (M365) program is the
8 Company's major cloud services investment. M365's suite of
9 products includes Office, Azure, database and security tools.

10 Q. Please describe Cloud Computing in more detail.

11 A. Cloud computing is a network of remote servers hosted on the
12 Internet to store, manage, and process data in place of local
13 servers or personal computers. As Cloud technology matures,
14 companies extend, replace, or defer constructing their own
15 facilities, using this reliable option.

16 Q. Please describe Azure services.

17 A. Microsoft Azure is the Company's primary cloud provider,
18 providing our data and analytics platform as well as cloud
19 services known as Infrastructure as a Service (IaaS). IaaS
20 provides server and storage capacity, extending our data
21 center footprint. These services provide scalable solutions
22 which are designed to be provisioned quickly.

23 Q. Please describe services received under M365.

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1 A. M365 is the current corporate standard for desktop
2 productivity, collaboration, and security tools software. Its
3 business applications include Outlook, Teams, SharePoint,
4 OneDrive, and all other traditional Office products. It also
5 includes an advanced suite of security tools, such as Defender
6 and Active Directory. M365 helped us operate in a remote
7 environment, provides the ability to deploy applications
8 quickly and permits improved disaster recovery as applications
9 are accessible from anywhere.

10 Q. Has the Panel prepared an exhibit that discusses the capital
11 and O&M projects associated with IT foundational
12 infrastructure?

13 A. Yes. An exhibit was developed under our direction and
14 supervision.

15 MARK FOR IDENTIFICATION AS EXHIBIT __ (IT-2)

16
17 **IT Platforms**

18 Q. Please discuss the Foundational IT platform investments.

19 A. The Company is investing in foundational technologies that
20 provide the ability to improve existing business processes and
21 technical enhancements that increase software and hardware
22 capabilities. These technologies include Data Analytics,
23 Cloud Computing, and Mobility. When we implement these
24 programs, we standardize these new technologies to avoid
25 technology redundancies, reduce costs, embed cybersecurity,

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and enable quicker delivery of the technologies mentioned above.

Q. Has the Panel prepared an exhibit describing the projects and programs associated with IT Platform Technologies?

A. Yes, the exhibit entitled, IT Platform Technologies, consists of seven whitepapers and was prepared under our direction and supervision.

MARK FOR IDENTIFICATION AS EXHIBIT __ (IT-1)

Q. Are there different categories of IT Platforms?

A. As noted earlier, IT Platforms support projects for Data Analytics, Cloud Computing, Mobility, Customer Relationship Management, Work & Asset Management, and ERP. We explained Cloud Computing and our Work and Asset Management project earlier and the Customer Operations Panel discusses the Customer Relationship Management projects.

Q. Is there a capital and O&M request associated with these programs?

A. Yes.

	Capital - Total Annual Request			
	(\$ Millions)			
IT Platforms	2023	2024	2025	Sum - 3 years
Mobility-Digital Factory	\$13.8	\$13.8	\$13.8	\$41.3
Data Governance Program	\$4.7	\$4.6	\$2.3	\$11.7

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Data Integration Modernization	\$3.9	\$2.8	\$2.9	\$9.5
Analytics Center of Excellence - EDAP enhancements	\$1.2	\$1.2	\$1.2	\$3.5
Business Enablement (PACE – Digital Factory)	\$1.0		\$1.0	\$2.0
Total – IT Platforms	\$24.5	\$22.3	\$21.1	\$67.9

1

2

3 **Data and Analytics**

4 Q. Please describe Data and Analytics.

5 A. Analytics uses technology and mathematical techniques to
6 develop actionable insights from data to solve customer and
7 operational problems.

8 Q. Please provide an overview of the Company's proposed Data and
9 Analytics program.

10 A. Through partnerships with the business groups, the Company's
11 Data and Analytics program focuses on leveraging technologies
12 to enable and execute data-driven insights across the Company.
13 IT provides technology investments, reusable frameworks, and
14 governance best practice information to support business-
15 driven analytics, while business groups sponsor projects that
16 target specific departmental needs.

17 Q. Please discuss recent data and analytics projects and the
18 information produced.

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1 A. Since 2017, the Company has implemented analytics projects
2 across business groups that have improved public safety and
3 reliability. In the last rate case, the Company's analytics
4 efforts were focused largely on supporting its AMI rollout and
5 AMI network operations. The current projects expand the
6 existing analytics framework to provide Company-wide benefits.

7 Q. What are the Data and Analytics projects included in this
8 filing?

9 A. IT is sponsoring three Data and Analytics projects, as shown
10 in the table below:

- 11 • Analytics Center of Excellence – EDAP Enhancements
- 12 • Data Governance
- 13 • Data Integration Modernization

14 We note that, in addition to these Data and Analytics
15 projects, other Panels sponsor projects, including Customer
16 Operations Data Analytics, Distribution Engineering Grid Mod
17 Data Analytics Use Cases, and the Customer Operations Privacy
18 Readiness Program.

19 Q. Is there another data and analytics initiative that the
20 Company is working on?

21 A. Yes. The Commission requires the development of an Integrated
22 Energy Data Resource (IEDR). IT and other Company
23 organizations support this effort. We are working with Staff,
24 NYSERDA, and other utilities on developing the IEDR.

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1 Q. Has the Company developed exhibits that further explain the
2 three Data and Analytics projects sponsored by this Panel?

3 A. Yes. Under our direction and supervision, we have three
4 whitepapers explaining the projects.

5 MARK FOR IDENTIFICATION AS EXHIBIT __ (IT-2)

6 Q. Please describe the project identified as Analytics Center of
7 Excellence – EDAP Enhancements.

8 A. The Company's Enterprise Data Analytics Platform (EDAP) is our
9 central data repository and analytics platform. EDAP delivers
10 advanced analytics to the enterprise. The platform is
11 comprised of a suite of technologies, including C3.ai and
12 Azure technologies, to deliver enterprise analytics
13 capabilities, such as data processing, centralizing raw data,
14 building and sharing datasets, modeling and forecasting, and
15 self-service analysis and reporting.

16 This project will enhance EDAP's existing technical
17 capabilities including expanding functionality, providing
18 easier access to analytics tools and increasing data and
19 analytics accuracy. As the program grows and demand for near-
20 real-time operational analytics increases, the platform
21 requires expanded infrastructure to improve resiliency and
22 reliability, lower recovery time during an outage, accommodate
23 more ad hoc analytics, and enable self-service capabilities.

24 Q. Please describe the Data Governance Program.

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1 A. The Data Governance Program will develop and deploy a data
2 management framework to include an out-of-the-box technology
3 platform equipped with industry-standard data management
4 capabilities. The program will classify, control, secure, and
5 govern data assets as they are produced, processed, and
6 integrated with other assets and made available for
7 consumption across the enterprise. Data governance works in
8 conjunction with data integration processes that provide clean
9 data to downstream applications, business processes, and
10 analytic use cases.

11 Q. Are there other projects that will help to govern and
12 standardize data and data integrations?

13 A. Yes. Data Integration Modernization is also key in creating
14 standard and consistent data across various systems.

15 Q. Please describe the Data Integration Modernization project.

16 A. Data integrations allows multiple systems to share data
17 through standard processes and tools. It involves
18 combining data residing in different systems and providing it
19 to other business systems. Data integrations are implemented
20 using standard practices, architectural techniques, and tools
21 to produce consistent access to data in a secured, timely
22 fashion.

23 This project will implement tools that can scale, process
24 large data volumes, and transform and enhance the data where

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1 needed. Business use cases, such as asset maintenance,
2 electric/gas system monitoring, smart sensor programs, EDAP
3 and privacy, will rely on integration capabilities delivered
4 by the integration modernization project.

5 Q. Are these foundational platforms used to support business
6 projects?

7 A. Yes. As noted earlier, business groups request funding for
8 several projects. These projects include the Customer Data and
9 Analytics, Privacy Readiness, Central Operations Condition
10 Monitoring and Asset Health, and Grid Mod Data Analytics.
11 They target departmental outcomes that can be addressed by
12 analytics or the treatment of data. These projects seek to
13 unlock new insights and affect process change to enhance data-
14 driven decision-making that supports the Company imperatives
15 of safety, operational excellence, and customer experience.

16
17 **Mobility**

18 Q. What is Mobility?

19 A. Mobility is the adoption of digital technology through mobile
20 platforms. This technology allows employees and customers to
21 perform work tasks or customer-related tasks from anywhere, an
22 expectation from users in today's mobile world. Common goals
23 for Mobility implementations include improving efficiency,
24 value, and/or innovation.

25 Q. How is the Company implementing Mobility?

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1 A. The Company is currently planning two projects to enhance
2 digital capabilities. They are:

- 3 • Digital Factory - Mobility
- 4 • Digital Factory - Process Automation Center of
5 Excellence.

6 IT has two working groups, the mobile application development
7 group, and the Process Automation Center of Excellence (PACE)
8 to support Mobility.

9 Q. Has the Panel prepared an exhibit that explains these
10 projects?

11 A. Yes. An exhibit was developed under our direction and
12 supervision.

13 MARK FOR IDENTIFICATION AS EXHIBIT __ (IT-2)

14 Q. What is Digital Factory - Mobility?

15 Digital Factory is an IT mobile application development and
16 support group. By working collaboratively with business
17 areas, Digital Factory's development focuses on high impact
18 business processes and agile delivery of technologies that
19 promote operational and project excellence.

20 Q. Please provide examples of Mobility projects that have been
21 completed.

22 A. Some examples of Mobility Projects that have been completed
23 are the First Responder Tool (FRT), Environmental Resource
24 Application (ERA), Digital Splice Ticket (DST), Coded

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1 Component Library (CCL), Site Safety, and Public Hazards. Some
2 of these projects have planned enhancements based on business
3 requests and additional learnings.

4 Q. In addition to providing technology for Digital Factory, is
5 the Company requesting personnel to assist with this work?

6 A. Yes. We are requesting an increased headcount of two
7 resources for the Digital Factory - Mobility team, and six
8 resources for the Digital Factory - PACE team. Both teams will
9 leverage contractors as required for the scope of the project.
10 The increased headcount and contract resources will include
11 application developers, UI/UX designers, scrum masters, and
12 product analysts.

13 Q. What does Digital Factory's mobile application development
14 group plan to do in the future to enable the Company's
15 objectives?

16 A. Digital Factory plans on expanding its mobile applications
17 portfolio to different workstreams. We will promote
18 operational and project excellence by creating mobile products
19 that enhance data collection, provide better data availability
20 and analysis, and digitize processes. By promoting innovation
21 and implementing new technologies, Digital Factory aims to
22 provide a better customer and employee experience.

23 Q. Please provide some examples of expected work during the
24 upcoming three years.

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1 A. The Digital Factory will continue to enhance the existing
2 products mentioned above and deploy new mobile applications
3 for overhead line and underground electric crews, and
4 emergency response organizations.

5 Q. Please describe the Digital Factory PACE team.

6 A. The Digital Factory PACE Team is a development, support, and
7 governance team that manages SharePoint, PowerApps, and Blue
8 Prism Robotic Process Automation (RPA). This project looks to
9 expand the governance and support for these technologies by
10 creating a center of excellence to enable the business to also
11 develop its own applications. These technologies enable an
12 end user to develop with little to no programming knowledge.
13 This type of programming, known as citizen development,
14 requires a governance and training group to confirm standards
15 are met.

16 Q. What solutions has PACE implemented?

17 A. The PACE Team has built over 30 applications. As an example,
18 the team was able to quickly develop a Pandemic Case Tracking
19 system via SharePoint and RPA, while also deploying a Covid
20 application for field employees to report daily symptoms.

21

22 **Cybersecurity**

23 Q. Does the Company have an incremental request for its
24 cybersecurity program?

25 A. Yes. See the chart below.

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	Capital - Total Annual Request			
	2023	2024	2025	Sum - 3 years
Cybersecurity	\$21.7	\$21.2	\$23.6	\$66.5

Q. Please explain IT's Cybersecurity strategy.

A. Over the past few years, the risk of cybersecurity incidents has increased dramatically, as can be seen by multiple organizations experiencing impacts to their operations and losing confidential customer information. The Company works to mitigate the growing cybersecurity threat and maintain the confidentiality, integrity, and availability of our systems and data through implementation of a robust set of processes and internal controls. To accomplish this, we continue to focus on deploying new technology to mitigate new and evolving threats, expanding the capabilities and functions of the cybersecurity team, and implementing new procedures and policies to embed security throughout Company processes and systems.

Q. Does the Company have a cybersecurity program?

A. Yes. The Company has implemented a strategy that combines defense-in-depth (multiple security layers) with defense-in-breadth (multiple tools at these layers) concepts. As new risks are identified, and the capabilities of adversaries increase, the Company reassesses current security controls,

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1 implements new processes, and invests in new technologies to
2 maintain a secure posture and stay ahead of malicious actors.
3 Cyber-attack risks include operating failures of control
4 systems, damage to transmission and distribution (T&D) assets,
5 the loss of sensitive data, and employee and public safety.

6 Q. Does the Company work with others regarding cybersecurity?

7 A. The Company engages in collaborative defense efforts with
8 industry, federal, state, and local partners. We also work on
9 and participate in local, regional, and national level
10 cybersecurity drills. We benchmark with and share best
11 practices with peers within and outside the industry. Our
12 cybersecurity protection program relies on a strong framework
13 of Collective Defense and Collective Response.

14 Q. Are there other initiatives that affect the nature of the
15 Company's actions to address cybersecurity?

16 A. There are several initiatives/rules that affect our actions.
17 They include:

- 18 o Revisions, and additions to NERC's Critical
19 Infrastructure Protection (CIP) standards, which contain
20 cybersecurity rules for the bulk electric system
- 21 o Federal government security directives, including, for
22 example, Transportation Security Administration (TSA)
23 requirements, and

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1 o Other potential legislation and/or regulation at both the
2 federal and state level regarding cybersecurity and
3 privacy, including data breaches.

4 Q. How has the Company been addressing the cybersecurity
5 challenge?

6 A. The Company continues to address cybersecurity from three main
7 vantage points: (1) preventing and educating, (2) monitoring,
8 detecting, and alerting, and (3) responding to incidents,
9 including recovery/mitigation.

10 Q. What does the Company mean by prevention and education?

11 A. Prevention is aimed at avoiding any attacks on our system and
12 is achieved through risk management processes, appropriate
13 architecture and security reviews, and implementation of
14 multiple technologies at multiple security zones. Education
15 provides employees and partners with information on their role
16 in preventing cyber intrusions, awareness of cybersecurity
17 threats, and proper cyber hygiene protocols.

18 Q. Turning to the second step, detection, what does the Company
19 do?

20 A. The Company operates a 24x7 Cybersecurity Operations Center
21 (CSOC), which monitors our computing network to detect
22 threats, anomalies, and vulnerabilities. We partner with
23 external entities that provide the Company with intelligence
24 to help mitigate potential threats.

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1 Q. Please explain your third cybersecurity area: Incident
2 Response and Recovery/Mitigation.

3 A. The Company has segmented its network to minimize the impact
4 of a cyber attack. The Company has also developed plans and
5 procedures to respond to cyber-attacks and data breaches. This
6 includes the availability of cyber forensic experts, who
7 provide forensic analysis.

8 Q. Is there more work to do in the cybersecurity area?

9 A. Yes. Given the significant rise in the sophistication,
10 volume, and impact of cybersecurity threats, we must continue
11 to further grow and develop our capabilities, implement
12 technology, and enhance processes to further protect our
13 systems and data and improve detection, resiliency, and
14 recoverability.

15 Q. How are you addressing the continued work?

16 A. To stay ahead of the current and evolving threats, we must
17 have technology in place to prevent and detect threats and
18 upgrade these technologies as new or upgraded versions become
19 available. Staying ahead of the threats means continuing many
20 of the items discussed above. The Company will also continue
21 to work with others, partnering with law enforcement across
22 federal, state, and local agencies and benchmarking best
23 practices with our industry peers.

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1 Q. Please describe the forecasted capital request for each rate
2 year under the cybersecurity program.

3 A. To continue enhancing the Company's security posture, the
4 Company will invest in multiple cybersecurity efforts to
5 secure both the IT and OT (i.e., segments of our network that
6 support operational equipment, such as substations and
7 electrical switches). The total RY1 capital request is \$21.7
8 million, RY2 capital request is \$21.6 million, and RY3 capital
9 request is \$23.6 million. (i.e., \$66.9 million in total over
10 the period 2023-2025).

11 Q. Please summarize the Company's cybersecurity O&M request.

12 A. With the investments in cybersecurity technologies and
13 capabilities, the Company projects the associated incremental
14 maintenance cost to be \$11.5 million in incremental
15 expenditures in RY1, \$7 million in incremental expenditures in
16 RY2, and \$1.8 million in in incremental expenditures RY3
17 (i.e., \$20.3 million in total over the period 2023-2025).

18 A large portion of the O&M budget increase would be the
19 inclusion of advanced cybersecurity technologies, such as an
20 Identity and Access Management solution, a Virtual Private
21 Network (VPN) replacement solution, and a segmentation
22 solution.

23 The O&M request also includes maintaining contracts from past
24 capital implementations, such as Privileged Access Management

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1 and Microsoft security technologies. In addition, contractor
2 services are required to perform automation of cybersecurity
3 operations and increase the level of threat hunting,
4 penetration testing, and security assessments.

5 Q. Is there a document that further explains the Company's
6 cybersecurity program?

7 A. Yes. There is a confidential exhibit entitled Cybersecurity
8 and Cybersecurity Infrastructure, that was prepared at the
9 Panel's direction and supervision

10 MARK FOR IDENTIFICATION AS CONFIDENTIAL EXHIBIT __ (IT-7)

11 Q. Please describe this document.

12 A. This confidential document explains the Company's proposed
13 cybersecurity investments for the next five years. Note that
14 all IT related confidential exhibits are included in
15 CONFIDENTIAL Exhibit __ (IT-7).

16
17 **Applications**
18 Q. What is covered under the Applications category of projects
19 and programs?

20 A. As discussed earlier, the Company is continuously looking to
21 modernize, standardize our application portfolio so that the
22 applications are supported (avoid technology obsolesce/end of
23 life) as well as rationalize the portfolio which is
24 demonstrated by our One Work & Asset management System
25 initiative.

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1 Q. Will you discuss projects for each category?

2 A. Yes. We explain about modernizing our portfolio and discuss
3 the Technology Modernization project. Then, we turn to other
4 projects and discuss the Enterprise Unifier Software Project -
5 Phase 2, and IT System Testing Center of Excellence (COE).

6 Q. Has the Panel prepared a document that explains the projects
7 included in this category?

8 A. Yes. We have whitepapers describing the Application related
9 projects that were prepared under our direction and
10 supervision.

11 MARK FOR IDENTIFICATION AS EXHIBIT __ (IT-2)

12 Q. Regarding the first topic, how will the Company modernize the
13 portfolio?

14 A. The Company will continue to:

- 15 o consolidate and modernize business systems (as noted
16 above, we expect to retire over 100 applications after
17 GIS and new CSS is fully implemented)
- 18 o Continue to outsource certain maintenance and support
19 functions and leverage our providers automation tools to
20 reduce costs of support.

21 Q. Please discuss the Technology Modernization project.

22 A. IT manages a portfolio of approximately 450 applications in
23 support of our Electric, Gas, Steam, Customer Operations, and
24 Shared Services organizations. Over the next three years, IT

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1 plans to modernize, upgrade, replace, consolidate, and retire
2 applications within this portfolio. This project has two main
3 initiatives:

- 4 1. Retiring or replacing approximately 150 of the 450
5 applications over the next 3 years.
- 6 2. Consolidating applications to a single standardized
7 enterprise technology as discussed earlier and
8 demonstrated by our GIS project which will retire 30+
9 systems built over the past 25 years.

10 Q. What will this project achieve?

11 A. We will modernize and reduce our portfolio of systems. That
12 is, systems will be consolidated or retired as appropriate,
13 and upgrades will be performed to maintain current standards.
14 Our goal will be to upgrade/modernize approximately 50 apps
15 per year over the next 3 years (both insourced and
16 outsourced).

17 Q. What are the main drivers for this initiative?

18 A. The main drivers are increasing organizational efficiencies by
19 keeping applications functionally current, the reduction of
20 technology obsolescence to mitigate risks, and maintaining
21 vendor software support.

22 Q. Turning to the second category of application projects, what
23 is the Enterprise Unifier Software Project - Phase 2?

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1 A. The project improves the Company's project management
2 capabilities for capital construction projects by expanding
3 and implementing our project management software platform,
4 Primavera.

5 Q. Please explain the reason for this project.

6 A. Primavera supports improved schedule management, cost
7 management, contract management, project lifecycle governance,
8 and document management. The project supports enterprise
9 standard processes and procedures, which will foster improved
10 project management overall and lead to greater consistency and
11 efficiency in the Company's execution of capital projects.
12 This project is also consistent with our strategy of
13 standardizing on enterprise IT platforms for common business
14 processes.

15 Q. What is the IT System Testing COE project?

16 A. The Testing COE is a consolidated and centralized governance
17 model for application testing practices, which will be
18 implemented across IT. It is critical to test applications to
19 confirm they work as designed. There are difficult testing
20 cycles undertaken before an application moves into Production.
21 For example, there is functional testing (does application
22 meeting design) and performance testing (is application
23 working as designed under forecasted load). Our IT systems are
24 constantly receiving patching - whether it's for cyber

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1 security or enhancements - which requires testing for each
2 change.

3 Applications like our Outage Management Systems must scale
4 exponentially from the daily non-storm load within minutes to
5 handle a large storm event. Our public web site and external
6 outage Map (fed by our OMS) may have no one viewing the site
7 one minute and then thousands of views and creating outage
8 tickets within minutes. We must confirm the system's ability
9 to scale up so that that our customers are not negatively
10 impacted by processing delays. In addition, our upcoming or
11 in-flight major application initiatives require a centralized
12 governance model for a common sustained/repeatable process for
13 functional and performance testing, defect management, and
14 knowledge management.

15 Q. Why is the IT System Testing COE Project needed?

16 A. In short, to invest in both technology, processes and people
17 so that we have a robust and structured method for performing
18 all the various types of testing. Most notably, this will
19 improve our capability for outage management simulation
20 testing.

21 **PROJECTS IN OTHER AREAS**

22 Q. The Panel mentioned earlier that it included exhibits,
23 generally whitepapers, for IT projects for most other Company
24 organizations. How will these projects be addressed?

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1 A. This testimony and accompanying exhibits discuss the remaining
2 IT projects requested by other organizations, except for
3 Customer Operations. Some of these projects are enterprise
4 wide, some are specific to the organization, and they vary in
5 size and scope.

6 We have divided the projects into business organizations and
7 each business organization has an exhibit with their IT
8 related white papers. Some of the larger projects are
9 explained either in this testimony or in the organization's
10 testimony.

11
12 **COMMON IT PROJECTS**

13 Q. Please explain what IT projects are included in this section.

14 A. IT projects that support various Company organizations, such
15 as Human Resources, Supply Chain, Learning & Inclusion, Law,
16 Corporate Security, Environmental Health and Safety, Rate
17 Engineering, Accounting, and Auditing are included in this
18 section.

19 Q. What is the total requested capital investment for Common
20 projects?

21 A. Common total capital request for 2023-2025 is \$47.6 million:
22 \$14.9 million in RY1, \$17.9 million in RY2 and \$14.7 million
23 in RY3.

24 Q. Are there several large projects which represent most of the
25 requested capital investment?

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1 A. Yes. Two projects, the Oracle HCM and EBS projects, described
2 in the enterprise-wide section earlier.

3 Q. Please list the remaining Common IT projects.

4 A. The table below lists all Common IT projects with the
5 requested capital funding.

6

	Capital - Total Annual Request (\$ Millions)			
	2023	2024	2025	Sum - 3 years
Common IT Projects				
Learning and Inclusion Digital Learning Transformation	\$5.0	\$4.3	\$3.1	\$12.4
Budget System Enhancements	\$0.8	\$3.5	\$3.5	\$7.8
Phased Replacement of Legal Technology	\$1.4	\$3.0	\$2.7	\$7.1
Corporate Security NVR and DVR replacements	\$1.5	\$1.5	\$1.5	\$4.5
Rate Case Enhancements	\$1.3	\$1.3	\$1.3	\$3.8
Corporate Security - Company Wide Camera Rollout Program	\$1.2	\$1.2	\$1.2	\$3.6
Mobile EHS SME	\$1.0	\$1.0	\$0.2	\$2.2

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ERM - Archer Software	\$1.8	\$0.2		\$2.0
Third Party Risk Management		\$0.3	\$1.0	\$1.3
Sales and Use Tax integration Sabrix Vertex	\$0.5	\$0.7		\$1.2
Corporate Security - Cyber forensic equipment	\$0.3	\$0.3	\$0.3	\$0.8
Soft Tissue Injury Prevention Project	\$0.3	\$0.3		\$0.6
Obsolete Oracle GRC Software Replacement	\$0.1	\$0.4		\$0.4
Total – Common IT Projects	\$14.9	\$17.9	\$14.7	\$47.6

1

2 Q. Has the Panel prepared whitepapers describing the programs
3 noted above?

4 A. Yes. The Panel has had an exhibit prepared under its
5 direction and supervision.

6 MARK FOR IDENTIFICATION AS EXHIBIT – (IT-3)

7 Q. Will the Panel explain any of these projects?

8 A. The Panel will three projects discuss:

- 9 • Phased Replacement of Legal Technology
- 10 • Budget System Enhancement

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- Sales & Use Tax Oracle Add On

Q. Please describe the Phased Replacement of Legal Technology project.

A. This project is a phased approach to replace obsolete legal technology that is critical to the running of the Law Department. Specifically, there are two phases, Phase 1 starts with the implementation of cloud-based matter management and e-billing systems. Phase 2 is the implementation of a cloud-based document management system and will include the conversion of data from the existing out of date document management system to the new system.

Q. Please describe the Budget System Enhancements project.

A. This project represents an ongoing investment in the continuation of the Company's move from the legacy Hyperion Planning (HP) suite of planning and budgeting applications to the newer Enterprise Planning and Budgeting Cloud Service (ePBCS) technology platform. The system will provide more accurate planning forecasts for internal budget reviews and approvals and facilitates information for regulatory proceedings, such as rate cases.

Q. Please describe the Sales and Use Tax Oracle Add On.

A. This project is to add a Sales and Use Tax software program to the Oracle system, which will improve the process of

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1 calculating, collecting, and reporting of Sales and Use
2 Tax.

3 Q. Are there other descriptions of these projects?

4 A. Shared Services discusses Learning and Inclusion Digital
5 Transformation. Other projects are discussed in the exhibit.

6
7 **ELECTRIC IT PROJECTS**

8 Q. Please explain what Electric IT projects are included in this
9 section.

10 A. IT projects that support Electric Operations and Substations
11 are included in this section.

12 Q. What is the total requested capital investment for Electric
13 projects?

14 A. The total capital request for 2023-2025 is \$47.8 million:
15 \$20.8 million in RY1, \$15.2 million in RY2 and \$11.8 million
16 in RY3.

17 Q. What Electric projects will you describe?

18 A. We explain Grid Modernization Data Use Cases and the Customer
19 Business Intelligence and Decisioning project.

20 Q. Please describe the Grid Modernization Data Analytics Use
21 Cases project.

22 A. Using one of our Foundational IT platforms, Enterprise Data
23 Analytics Platform (EDAP), IT and Distribution Engineering
24 have partnered to series of modules on C3.ai. This project
25 enables Grid Innovation data analytics use cases to understand

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1 asset health, and improve safety and operations. For example,
2 one module developed, using AMI voltage data and Machine
3 Learning, identifies locations with high probability of an
4 open and defective neutral and ground conditions on customer
5 services. If a neutral is loose, corroded, or open, it has the
6 potential to cause, among others, dim or flickering lights or
7 electric shock. Another module leverages plant data to
8 automate identification of unit substation transformer
9 overloads to reduce the risk of equipment failure.

10 Q. Is this project evolving?

11 A. With each successful new module, Distribution Engineering and
12 IT prioritize new use cases. We already have a backlog of
13 several use case under review as well as potential projects
14 for 2023-2025.

15 Q. What are some of the use cases on the table?

16 A. During 2022, we are working on approximately five use cases,
17 including a transformer health risk score. During 2023-2025,
18 some potential use cases involve cable failure analytics, and
19 substation and feeder health risk scores. These modules will
20 help us better understand operating conditions and potentially
21 prevent failures.

22 Q. Please discuss the Customer Business Intelligence and
23 Decisioning project.

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

INFORMATION TECHNOLOGY PANEL

A. This project has developed our Virtual Assistant application, which enables a customer to cancel an appointment with our Energy Services groups through an automated process. Once the cancellation is made, the process we have developed automatically updates any affected systems to cancel and reschedule an appointment.

During 2023-2025, this project will look to make additional enhancements and automations, allowing employees to focus on more complex issues.

We already have several potential use cases, including understanding failed inspections through data analysis and developing training to assist contractors for better inspection results.

Q. Please list the remaining Electric IT projects.

A. The table below lists all Electric IT projects with the requested capital funding.

	Capital - Total Annual Request			
	(\$ Millions)			
Electric IT Projects	2023	2024	2025	Sum - 3 years
Grid Mod Data Analytics Use Cases	\$4.5	\$4.5	\$4.5	\$13.5
Customer Business Intelligence and Decisioning	\$4.0	\$4.0	\$4.0	\$12.0
DEMS Replacement Project	\$2.8	\$1.5		\$4.3
AutoCAD (Engineering	\$0.8	\$0.8	\$0.8	\$2.4

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

INFORMATION TECHNOLOGY PANEL

Equipment Upgrade Program)				
Electric - ARM Replacement (Phase 0)	\$2.2			\$2.2
Central Operations Tableau to Power Bi Migration	\$0.6	\$0.6	\$0.6	\$1.7
Operation Management System at ECC	\$0.8	\$0.4	\$0.4	\$1.5
TNVS WEB	\$0.5	\$0.5	\$0.5	\$1.5
Operations Network for EMS	\$0.4	\$0.5	\$0.5	\$1.3
District Operator Task Managing System	\$0.8	\$0.4		\$1.2
Central Operations Battery Monitoring Systems	\$0.6	\$0.6		\$1.2
Integration of virtual reality into Substation Operating Orders	\$0.8	\$0.3		\$1.1
Central Operations Condition Monitoring and Asset Health	\$0.5	\$0.5		\$1.0
2021 Electronic Feeder Sign On	\$0.3	\$0.3	\$0.3	\$1.0
nMarket upgrade to accommodate REV	\$1.0			\$1.0
Contingency Analysis Program (CAP)	\$0.2	\$0.2	\$0.2	\$0.7
Distribution Ops Training Simulator	\$0.1			\$0.1
Total – Electric IT Projects	\$20.8	\$15.2	\$11.8	\$47.8

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

INFORMATION TECHNOLOGY PANEL

1

2 Q. Has the Panel prepared any documents that explain these
3 projects?

4 A. Yes. Whitepapers have been prepared under our direction and
5 supervision.

6 MARK FOR IDENTIFICATION AS EXHIBIT __ (IT-4)

7

8 **CUSTOMER ENERGY SERVICES (CES) IT PROJECTS**

9 Q. Please explain what IT projects are included in this section.

10 A. IT projects that support Customer Energy Services (CES) are
11 included in this section.

12 Q. What is the total requested capital investment for CES
13 projects?

14 A. The total capital request for 2023-2025 is \$294.8 million:
15 \$90.6 million in RY1, \$99.6 million in RY2 and \$104.6 million
16 in RY3.

17 Q. Where are the details about the CES IT requests?

18 A. The table below lists all CES IT projects with the requested
19 capital funding.

	Capital - Total Annual Request			
	(\$ Millions)			
CES IT Projects	2023	2024	2025	Sum - 3 years
DSP	\$62.2	\$62.6	\$63.1	\$187.9
DERMS ADMS	\$16.5	\$15.3	\$15.3	\$47.0
Customer Recommendation	\$12.0	\$12.0	\$11.0	\$35.0

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INFORMATION TECHNOLOGY PANEL

& Analysis Tools				
AMI Enhancements Program		\$7.0	\$15.2	\$22.2
REV DER Forecasting Application		\$2.7		\$2.7
Total – CES IT Projects	\$90.6	\$99.6	\$104.6	\$294.8

Q. Are there any documents that explain these projects?

A. Yes. The CES testimony explains these projects.

Additionally, we have prepared whitepapers, under our direction and supervision, that provide additional detail.

MARK FOR IDENTIFICATION AS EXHIBIT __ (IT-5)

GAS IT PROJECTS

Q. Please explain what IT projects are included in this section.

A. IT projects that support Gas are included in this section.

Q. Is there one large project which represents the majority of the requested capital investment?

A. Yes. The Work & Asset Management New Functionality project, described earlier, (\$10.1 million for RY1-RY3), which is discussed in the Major Enterprise portion of this testimony.

Q. Are there any additional Gas IT projects?

A. Yes. There is one project with a total capital request for 2023-2025 is \$0.6 million, all in RY3.

A. The table below lists the Gas IT project with the requested capital funding.

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

INFORMATION TECHNOLOGY PANEL

	Capital - Total Annual Request (\$ Millions)			
	2023	2024	2025	Sum - 3 years
Gas IT Projects				
SmartApp Replacement - Gas	\$0.6			\$0.6
Total – Gas IT Projects	\$0.6			\$0.6

1

2 Q. Has an exhibit been prepared to discuss this project?

3 A. Yes. A white paper entitled SmartApp Replacement - Gas has
4 been prepared under our direction and supervision.

5 MARK FOR IDENTIFICATION AS EXHIBIT __ (IT-6)

6 Q. Does this complete the Panel's initial testimony?

7 A. Yes, it does.

8

Information Technology Panel
Exhibit IT-1
Major Enterprise IT Projects

Item #	Program Name	Page #
1	Construction Migration (Contractor Payment System Work Tracking)	2
2	Control Center Resiliency	7
3	enterprise Geographical Information System (eGIS)	13
4	eGIS Business Case 2019	20
5	Electric - ARM Replacement	56
6	Gas Work - Asset Management New Functionality	62
7	Maximo Consolidation Program Phase 1	69
8	OMS IT System Hardening	75
9	Oracle EBS ERP Cloud Migration	82
10	Oracle HCM Cloud Implementation	89
11	Outage Management System - Phase Four	96
12	Protective Relay Settings Repository	102
13	Substation Technology Improvements Program	108
14	WMS Sustainability Project	113

Information Technology 2022

1. Project / Program Summary

1. Project / Program Summary			
Type: ☒ Project ☐ Program		Category: ☒ Capital ☐ O&M ☐ Regulatory Asset	
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic			
Project/Program Title: Construction Migration (Contractor Payment System Work Tracking)			
Project/Program Manager: Daniella Seymour		Project/Program Number(Level 1): 24647462	
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date: 6/15/2021		Estimated Date In Service: 11/30/2023	
A. Total Funding Request (\$000) Capital: 27,115.2 O&M:		B. ☒ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: 3,000.0 Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 462.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
Construction is partnering with Information Technology (IT) to migrate the Construction Layout Tracking (LOT),Purchase Order Change Request (POCR) and Contractor Payment and Scheduling (COMPASS) systems to the enterprise Maximo work and asset management system to process work tracking, change orders, payment, and estimating for the Construction department, internal customers, contractors, and the Cost Management department. The project started in August 2021 and scheduled for implementation in end of first quarter 2024. This includes implementing IBM's Maximo core, as well as several other IBM modules; Scheduler, HSE (Health and Safety), Linear Assets, Anywhere, Spatial, and Contracts. We will establish one centralized system for work estimation, work initiation, planning, scheduling, work lifecycle tracking, work history, and payments. This solution will improve on business process efficiencies, and automate new business processes, including processes not currently in the existing legacy systems. It will aid in in maintaining compliance within regulatory guidelines for all types of work with varying frequencies and schedules. It will provide total visibility into all phases of work. This solution will also interface with several other legacy systems to share and report on work. Since LOT, POCR and COMPASS functionalities will be migrated into the same enterprise system, several existing interfaces between the systems will be eliminated, improving application efficiencies by enabling seamless progression from work completion to payments and to close of the project. Construction can leverage existing Maximo features, functions, and interfaces already configured/developed in Maximo which will reduce the cost of the migration. For example, the interface to EBS to report on completed work units. The current "Controlled" Enterprise Maximo license needs to be extended to a true enterprise model, thus removing current usage restrictions. In addition, the suite of IBM Maximo WMS products does not include a Contract module needed by Construction to make Contractor Payments. Moving to the IBM MAS (Maximo Application Suite) Model will remove all restrictions in terms of user base as well as product line usage. This effort will encompass the re-			

negotiation of the current license model and migration to the MAS model.

Justification Summary:

One of the applications, Construction Management's Contractor Payment and Scheduling System (COMPASS) is running on obsolete technology (VB6). Another, Construction Management's Layout Tracking System (LOT) is running on technology (Oracle Forms and Reports) which will be on extended and sustained support; post August 2022 there is no upgrade path. Note Purchase Order Change Request is end of life and requires to be moved to a new integrated platform.
Additionally, there are existing user issues due to liecenses.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name: Corporate ConEd.Regulatory and Compliance.Fraud	Risk 1 Description: Ability to have transparency to payments and invoices in one common location. Review of delegation of authorityon each payment.
Risk 2 Name: Corporate ConEd.Operations.Cybersecurity	Risk 2 Description: Migrating from old technology to updated environment.
Risk 3 Name: Department.Construction.Damage Prevention	Risk 3 Description: Ability to have increased transparency to historical damages as it relates spefic work being performed.. Performing predictive analysis for potential damages.
Risk 4 Name: Department.Construction.Street Hazards	Risk 4 Description:

2. Supplemental Information

Alternatives:

The alternative is to operate these IT systems as they are today, supported by current and soon “end of life” technology. This approach will not adequately provide the process improvements necessary to evolve our business to support the current demand. This option is not recommended because it results in increased costs and inefficiencies.

Risk of No Action:

New security technology is required to protect customer information, prevent unauthorized access, and safely deliver energy to CECONY customers. In addition to the need to have systems that can be

supported, business outcomes cannot be improved if staying within the current applications and would need supplemental support from several applications to meet the demands of the business.

Non-financial Benefits:

This project will allow for improved availability and reliability of current and new systems. Today's technology allows for greater automation and data acquisition to help improve efficiencies and potential cost reductions associated with these benefits.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

The cost estimates of a unified work management system will be help review costs to achieve synergies and cost reductions.

2. Major financial benefits

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast (10,380.0) + Next 5 Years Est. (27,115.2) = Total Cost (37,495.3)

4. Basis for estimate

Vendor's assessment and internal IT assessment based on past systems migration to Maximo and current systems migration requirements

5. Conclusion

IT currently supports a large portfolio of disparate WMS type legacy applications, Two of which are LOT (Construction Layout Tracking) and COMPASS (Contractor Payment and Scheduling) systems. These two systems are running on obsolete technologies and can no longer adequately support the current and growing needs of the business. Additionally, this raises cybersecurity concerns. Cyber-attacks have increasingly targeted critical infrastructure. Obsolete systems, such as LOT and COMPASS, do not have the ability to allow the Company to leverage the latest cybersecurity tools such as advanced monitoring and alerting and multifactor access control. Replacing the LOT and COMPASS systems will allow us to modernize cyber controls such as these. This cybersecurity risk and the dwindling number of skilled resources with backgrounds to support the obsolete legacy applications is a major risk to the company. Due to the cybersecurity risk, and the asset management practices and the current business processes, the support of

these legacy system environments are not sustainable. It is critical to pursue this project during the upcoming rate case.

Project Risks and Mitigation Plan

Risk	Mitigation Plan
Funding need to be secured for the years 2022/2023	

Technical Evaluation/ Analysis

Information Technology performs planning and analysis on all technologies introduced and policies established. Work Management systems are implemented in conjunction with the IT strategy and vision planning process. Interaction with IT advisors, vendors, and Company employees ensure the selection of the optimal solutions. Each implementation is done with technology evaluations and commercial Request for Proposals (RFPs) before selection and rollout.

Project Relationships (if applicable)

Gas Work Management System (GWAM), WMS (Electric), EPMO (PM/ Estimating).

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						10,380.0
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	6,644.0	10,377.0	10,094.2	0.0	0.0
Implementation O&M*					

Regulatory Asset					
*If Whitepaper is supporting a capital project/program this refers to implementation O&M. Capital Request by Elements of Expense (\$000):					
<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	0.0	690.0	500.0		
M&S					
A/P	0.0	2,364.0	2,300.0		
Other	6,644.0	6,500.0	6,494.2		
Overheads	0.0	823.0	800.0		
Total	6,644.0	10,377.0	10,094.2	0.0	0.0
Total Gross Cost Savings / Avoidance by Year:					
	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance		500.0	1,250.0	1,250.0	
Capital Savings					
Capital Avoidance					
Total Ongoing Maintenance Expense by Year:					
	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M		0.0	498.0	498.0	0.0
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program		Category: ☒ Capital ☐ O&M ☐ Regulatory Asset	
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic			
Project/Program Title: Control Center Resiliency			
Project/Program Manager: Shawn O'Donnell		Project/Program Number(Level 1): 25546178	
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date:		Estimated Date In Service: 12/31/2026	
A. Total Funding Request (\$000) Capital: 28,000.0 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 1,950.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
The Distribution Control Center (DCC) data networks have the ability to immediately sever the connection to the Corporate data networks to operate independently in the event of a cyber-attack or virus threat or corporate emergency. This would isolate and protect the critical infrastructure and applications that the Distribution Control Centers need to operate efficiently and safely. However, the ability to sever the network requires standalone servers and infrastructure. The objective of this project is to ensure control centers information technology (IT) and operational technology (OT) software and infrastructure stay up to date with new cyber security requirements and have the level of redundancy and resiliency to ensure business continuity during an event. When operating in this disconnected "Islanded" state, the DCC would have access to their critical applications and resources that reside on the DCC internal data network. Since these applications and resources will separated from the corporate data network and resources this network needs to maintain its own copy of critical services and tools to ensure seamless operations and cyber monitoring. Besides minimizing hardware and software obsolescence issues and installing new cyber protections this project will also separate critical operational systems and data traffic into different security zones limiting the exposure and paths into each of these critical systems.			

Justification Summary:

Cybersecurity requirements for Information Technology and Operational Technology systems associated with the SCADA systems have continued to grow, as the risks and threats of cyber-attack have increased. Federal legislation and regulatory standards present risks for fines associated with failing to comply with standards. The risk to availability and reliability of the Company's electric, gas, and steam distribution SCADA systems, and downstream outage management applications and systems, has increased with complexity and adversary abilities. This project will limit exposure to the cybersecurity risks by creating different security zones for applications and communication channels for data acquisition, separating and compartmentalizing components into different networks to minimize impact to those critical systems.

Due to the increasing likelihood of a cyber-attack or intrusion, and the potential this will occur during an electric/gas/steam event, it is deemed necessary to review and enhance the existing networks for critical applications, that could continue to operate in the event the corporate resources were unavailable.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name:

Risk 1 Description:

2. Supplemental Information

Alternatives:

The alternative option is to operate DCC Operational Systems as they are today, supported by current Islanding architectures. This approach will not adequately protect or provide data and control, or defend against new threat vectors and techniques. This option is not recommended as it opens Con Edison to security threats.

Risk 1

- Enhanced Islanding architectures are required to protect critical systems, prevent unauthorized access, and safely deliver energy during a cyber-attack. Failure to address this will place these systems at risk, and they will be vulnerable to targeted attacks, and where regulatory standards are mandated, put us at risk for fines due to non-compliance.

Risk 2

- Strategic topology and architectural revisions to the existing Islanding design, and are required to improve

system availability, and to mitigate and remediate impact from cyber events.

Non-financial Benefits:

- Increased availability, reliability, and efficiencies of critical systems and systems support during potential cyber attacks.
- Improved security to segregate, secure, and improve energy delivery and outage response.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

The cost estimates of a cyber-breach to DCC SCADA systems can vary greatly based on the impact. In a worst-case scenario, the threats to energy delivery and, personnel and public safety are significant.

2. Major financial benefits

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (28,000.0) = Total Cost (28,000.0)

4. Basis for estimate

Historic purchases are used as well as vendor presentations and Internet sources. The requested expense for maintenance assumes 20% of the capital spend in each year after the initial purchase of the equipment.

5. Conclusion

This on-going project acts as an addendum to the Corporate CyberSecurity program, with more of a focus on required projects to constantly improve the DCC cybersecurity posture.

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Information Technology performs planning and analysis on all technologies introduced and policies established. Cybersecurity policies and procedures are implemented in conjunction with the IT strategy and vision planning process. Interaction with IT advisors, vendors, and Company employees ensure the selection of the optimal solutions. Each implementation is done with appropriate technology evaluations and commercial Request for Proposals (RFPs), as applicable, before selection and rollout.

Project Relationships (if applicable)

Enhanced Outage Management and Mapping Systems, Distribution automation and Grid Modernization projects including Dynamic Feeder Rating, Disturbance Monitoring system and high-tension monitoring are related to this project. Also, new utility of the future initiatives like Advanced Metering Infrastructure (AMI), Reforming the Energy Vision (REV), and the introduction of distributed generation will increase the cybersecurity risk and require investment in these areas.

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	8,000.0	8,000.0	8,000.0	4,000.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor		8,000.0	8,000.0	8,000.0	4,000.0
M&S					
A/P					
Other					
Overheads					
Total	0.0	8,000.0	8,000.0	8,000.0	4,000.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M		700.0	1,750.0	2,250.0	2,250.0
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology
2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M																				
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic																					
Project/Program Title: enterprise Geographical Information System (eGIS)																					
Project/Program Manager: Baeth Fanek	Project/Program Number (Level 1): 25764450																				
Status: ☐ Planning ☐ Design ☐ Engineering ☐ Construction ☒ Ongoing ☐ Other: _____																					
Estimated Start Date: 1/2/ 2023	Estimated Date in Service: 12/31/2025																				
A. Total Funding Request (\$000) Capital: \$140,000 O&M: \$11,500 Retirement:	B. ☐ 5-Year Gross Cost Savings (\$000) ☒ 5-Year Gross Cost Avoidance (\$000) O&M: \$80,168 Capital: \$5,403																				
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: Capital:	D. Investment Payback Period: 7 years & 6 months (Years/months)																				
Work Description: In 2019, the company began the eGIS (enterprise Geographic Information System) project to transfer the distribution system onto a new state of the art mapping system to adapt to the changes in the energy landscape This project will implement an enterprise-wide enterprise Geographic Information System (“eGIS”) in three phases. The company filed a business plan in 2019 and received approval from the PSC to proceed with the first two phases of the project (see Exhibit (IT-1)). Phase 3 was mentioned in the original filing but was not started to minimize project risk. The business case filed in 2019 highlighted the benefits of the completing all three phases of the project. To reduce project risk, the company is migrating the mapping systems in three phases described below: - Phase 1 (began in 2019 – ends in Q4 2022): M&S for Gas and Electric – These are the distribution class cables and transformers (120v – 460v). These plates include all the cables, transformers and services that deliver power to the customers. There are 24000 combined plates between Electric and Gas. - Phase 2 (began in 2020 – ends in Q4 2022): Primary and Staten Island Mapping. These maps include distribution class cables for our 4kV to 33kV cables; these medium voltage cables deliver power and higher voltage to a customer area. There are over 2800 medium voltage cables. - Phase 3: C&DO (Q12023 – Q42025), Conduit and Composite Feeder. These plates include in the underground conduits that occupy the electric distribution class cables described in phase 1 and phase 2. They also include maps that show which conduits are occupied and which conduits are vacant. This request migrates the C&DO plates onto the eGIS platform allowing the Company to establish an enterprise state of the art mapping system. When complete, this platform will offer one consolidated mapping and visualization system across electric, gas, steam, and construction. A separate white paper for Steam will be filed. All costs in this white paper are for the electric portion of the project only. In 2019, the company submitted a business plan and a Cost Benefit Analysis for all three phases. We have updated the financials since 2019 to accommodate for updates to the project schedule and updated various financial factors (i.e., discount rate and other factors). The table below highlights the revised total project NPV costs and avoidance over a 20-year period: <table><tr><th colspan="2">Project Costs (\$ In Millions)</th></tr><tr><th>Category</th><th>2019 -2038</th></tr><tr><td>Capital costs</td><td>\$263</td></tr><tr><td>O&M expense</td><td>\$86</td></tr><tr><td>Total</td><td>\$350</td></tr></table> <table><tr><th colspan="2">Cost Avoided (\$ In Millions)</th></tr><tr><th>Category</th><th>2019 -2038</th></tr><tr><td>Operational efficiencies</td><td>\$93</td></tr><tr><td>Legacy applications maintenance and support</td><td>\$302</td></tr><tr><td>Total</td><td>\$395</td></tr></table> To realize the costs avoidance in the table above, the company must complete the conduit and composite phase of the project, known as phase 3. As noted in the table above, most of the cost’s avoidance is attributed to the eliminating the legacy applications and maintenance support. Failure to migrate the		Project Costs (\$ In Millions)		Category	2019 -2038	Capital costs	\$263	O&M expense	\$86	Total	\$350	Cost Avoided (\$ In Millions)		Category	2019 -2038	Operational efficiencies	\$93	Legacy applications maintenance and support	\$302	Total	\$395
Project Costs (\$ In Millions)																					
Category	2019 -2038																				
Capital costs	\$263																				
O&M expense	\$86																				
Total	\$350																				
Cost Avoided (\$ In Millions)																					
Category	2019 -2038																				
Operational efficiencies	\$93																				
Legacy applications maintenance and support	\$302																				
Total	\$395																				

conduit and composite plates will require the Company to maintain two separate mapping systems which hinders operations and may increase costs.

For phase 1 and phase 2, The Company has spent \$76M dollars and will begin go live by boroughs beginning in April of 2022 and ending in December of 2022`. The company will spend all funds allocated by the PSC by the end of 2022. In addition, the Company will have successfully transferred 24000 mains and services plates for Electric and Gas and 2800 feeders.

The Company has engaged a GIS product vendor, a data migration service vendor, and system integrators to:

- Develop the electric and Steam geospatial data models
- Develop functional requirements documentation for the Core GIS, Web Visualization and Mobile product components
- Develop the necessary integrations between GIS and the existing systems.
- Migrate existing mapping data from existing legacy mapping applications, populate it to electric and Steam geospatial data models, conflate it to real-world coordinates and adjust assets as necessary
- Integrate the Graphic Design tool with Phase 1, 2 & 3 GIS maps
- Identify business processes that will be impacted by GIS and Graphic Design tool and define business process redesign
- Train all end-users on the Core GIS, Web Visualization and Mobile

The company also intends to convert the Steam System onto the GIS platform in Phase 3. The Steam conversion will facilitate more efficient dispatching of crews to mitigate steam main rupture risks, more effective work, and asset management through integration with enterprise systems and reduce risk of mis-operation by enhancing the mapping information available for crews to perform their work. Control Center personnel will be able to see a live map of existing outages and can better direct crews to return customers to service faster. In addition, the eGIS will allow the Company to produce models that reflect data from its steam distribution assets and customer meters connected to the system. With these models, Con Edison can more efficiently plan, design, and better operate the steam systems in collaboration with electric and gas systems. A conjunctional white paper addresses the Steam conversion, please see “GIS Steam Conflation”. This project (whitepaper) addresses all costs for the conversion of Electric conduit and composite assets from its current legacy mapping application to newly established enterprise GIS.

Justification Summary:

Maintaining detailed and accurate mapping systems is critical to Con Edison’s ability to operate, maintain, and plan for its extensive electric, gas, and steam systems, both today and as the systems become more complex in the future safely, reliably, and efficiently. Con Edison’s maps are used to catalog millions of assets in every street in our service territory, and are critical to maintain, repair, and operate the system as well as account for these assets (property records) from a financial and tax perspective. The Company is in the process of transferring the distribution system as described in Phase 1 and Phase 2 above, the roll out for these phases will occur by borough; although some boroughs will be transferred to the new mapping system, the reaming boroughs are currently operating on a non-supported mapping system. An enterprise GIS has become standard technology for large utilities and although Con Edison has been able to extend the life of the existing mapping system, it is becoming increasingly resource intensive and limiting to achieving the Company’s goals and keep with the changing energy landscape. Based on our benchmarking exercise, most other major utilities in the United States have already implemented a state-of-the-art enterprise GIS. Other major utilities have had an enterprise GIS for at least five years, and many for more than 10, and their testimonials and product demonstrations are extremely compelling.

Phase 1 and Phase 2 of the project will deliver the distribution system of the electric and gas which include all low voltage (120V/460V) and medium voltage system (13kV – 33kV). The completion of Phase 3 is required to prepare Con Edison for the grid of the future and eliminate the risk of operating on an outdated mapping system. Phase 3 will transfer the remaining mapping systems that are currently operating on the outdated applications onto a new state of the art mapping application called eGIS. There are over 14,000 combined conduit plates and composite feeder plates in all the boroughs and Westchester. Once implemented, the eGIS will be the cornerstone for Con Edison’s Grid Modernization and customer experience efforts. A GIS platform is required to implement a modern intelligent grid. Various vendors have existing tools utilized by other utilities that modernize the grid, allow for the integration of distributed generation, and enhance analytics and automatic operations for the distribution grid. Without a GIS platform, the company will fall behind its peers in preparing the grid for the utility of the future.

The Company’s AMI program and enhancements in its communication infrastructure will allow real-time data to feed into the eGIS, which the Company can then use to assist with outage management. Control Center personnel will be able to see a live map of existing outages and can better direct crews to return customers to service faster. In addition, the eGIS will allow the Company to produce models that reflect data from its distribution assets, AMI meters, EV Charging Infrastructure, and DERs connected to the system. With these models, Con Edison can more efficiently plan, design, and better operate the

grid and its gas and steam systems. In short, the eGIS will touch on all aspects of the Company's operations.

The GIS mapping system will also impact several business processes followed in gas and electric's Customer Engineering, Regional Engineering, Control Center, New Business and System Reliability groups. For example, since all regions will be utilizing the same software, the methods for updating maps will be consistent across all regions. This allows the company to better utilize resources during contingencies in the future since all regions are following the same procedures.

As major storms are expected to increase frequency and severity due to climate change, the eGIS platform will improve the Company's storm outage recovery efforts by integrating with the Outage Management System and the AMI system. The eGIS will also integrate asset information and flood maps. This will facilitate evaluation and planning for flood risks to Con Edison assets, which takes on greater importance as the Company migrates to a projected floodplain of FEMA +5 for planning purposes. An eGIS platform allows the company to better collaborate with local, state and federal agencies during sever weather or catastrophic events.

In addition, the mapping and visualization of DER connected that eGIS will facilitate modeling and support the Distributed Energy Resources Management System ("DERMS") the Company is developing, improving the Company's integration of DER and support achievement of Climate Leadership and Community Protection Act ("CLCPA") goals.

Please refer to the GIS Business Case in Exhibit (IT-1) for further details.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

The Company's long-range plans includes having a GIS system to enhance storm response and system sensors & gird modernization.

2. Supplemental Information

Alternatives

Alternative 1– Upgrade Existing Systems	Reasons for Not Selecting Alternative
- Upgrade underlying versions of MicroStation and Oracle for composite and conduit plates - Migrate custom code from all systems to be compatible with upgrades - Modify existing system interfaces to be compatible with underlying system upgrades	- Functional gaps in workflow and processes will exist - Data discrepancies will continue to exist - Increased costs of maintaining multiple mapping systems - Requires specialized mapping personnel - Lack of specialized resources with skills in obsolete technology platforms
Alternative 2 – Build new systems internally	Reasons for Not Selecting Alternative
Select underlying GIS or Computer Aided Design ("CAD") product and internally develop a custom system	- Adequate "off the shelf" alternatives exist - Length & cost of project would be extended - Lack of specialized resources

Risk of No Action

Not finishing Phase 3 of the project would mean that the Company will need to continue to rely on current mapping systems. This would disrupt the future business process being implemented that leveraged a graphic design tool that integrates with eGIS maps. Efficiency gains from the new process would be lost and require additional manhours to create new assets, construct, and map them. The current mapping systems are also beyond their respective product support life cycles and do not provide the capabilities of current GIS products. In addition, not finishing Phase 3 of the project will hinder the Company's ability to realize all the outlined benefits described in this white paper. Without full eGIS implementation, Con Edison will continue to face technical and business challenges/risks, such as:

- o Reduced functional capabilities
- o Potential security vulnerabilities in non-supported system components
- o Inoperable systems
- o Inconsistent asset data across multiple mapping systems
- o Continued reliance on static map products instead of dynamic interactive map displays
- o Suboptimal integration with operational systems across the Company (e.g., with the WMS and Outage Management System ("OMS")) and with external entities (e.g., New York City

- Smart City efforts); GIS will enhance the Company’s current WMS and OMS functionality and improve the ability to share mapping data with external entities that already use GIS.
- o Increased costs to maintain and enhance multiple obsolete technologies

Non-Financial Benefits

Examples:

Customer Collaboration

- Calculate and visualize DER installations and hosting capacity
- Develop accurate distribution grid models all the way to the customer
- Enhance data collection from non-utility systems
- Increase use of distributed energy resources during emergencies

Technological Innovation

- Visual trace capabilities to validate circuit continuity reducing mapping errors
- Virtual reality and augmented reality application allow for spatial views of field conditions such as hazardous environmental and field conditions
- Real-world modeling and sharing of the grid with inclusion of various sensor from AMI, Gas Sensors, Supervisory Control and Data Acquisition (“SCADA”), DERMS, and Advanced Distribution Management System (“ADMS”)

Emergency Planning and Storm Response

- Enable spatial mobile application for damage assessment
- Heat maps for crowdsourcing social media outages and damage data
- Turn-key mobile applications during emergencies

Grid Visibility & Monitoring – With the availability of geo-spatial data on our assets, grid operators will be able to visualize grid variables and equipment conditions. Advanced grid monitoring and operator tools depend on robust visualization tools enabled by GIS technology.

Grid Modeling & Simulation – Interconnected grid models with AMI data and DER assets will enable end to end load flow modeling all the way to the customer meter for seamless functionality between the grid and customer technologies. The Enterprise GIS will increase the quality of data used by engineering load flow analysis systems such as electric Poly Voltage Load flow (“PVL”) and gas SynerGEE, reducing the time required to prepare data for import into planning and analysis systems. The Enterprise GIS system will also improve the efficiency of isolation traces using built-in trace capabilities in the GIS and improving the accuracy of gas load flow models

Grid Planning – The eGIS platform will enable spatial analytics to improve grid reliability planning. For example, Company engineers can visualize historical electric and gas outages across the entire system to identify low reliability areas for planned investments that coincide with New York City and Westchester County’s planned infrastructure projects to reduce costs. Over time, spatial analytics enabled by machine learning tools will improve grid asset management capabilities.

Grid Hosting Capacity – Interconnected grid models will improve the accuracy of the impact of the DER installations and increase the accuracy of the hosting capacity.

Grid Operation – Enterprise visualization platform enabled by the eGIS will be integrated with the electric and gas outage management systems to provide operators near-real-time visibility on grid conditions and enhanced situational awareness to dispatch resources to nearest assets.

Vegetation Management – The eGIS will enable new spatial analytics capabilities combined with accurately mapped facilities that will enable efficiency gains in the planning and tracking of vegetation management to reduce unplanned outages. In addition, the eGIS will provide the capability of targeting vegetation management based on circuits and migrate to condition-based vegetation management program vs. time-based program, thereby optimizing investments. eGIS will enable integration of LiDAR technology to enhance vegetation management programs soon.

Outage Management – eGIS will improve the accuracy of outage counts in the OMS system and facilitate faster restoration of customer outages during normal blue-sky events as well as major storms. Combining geospatial visualization of AMI data with predictive analytics tools will enable the Company to reduce the duration of the outages from weather events and identify weak points in the electrical distribution system to prevent future outages.

Damage Assessment – Enterprise GIS will allow the Company to deploy a standardized damage assessment tool that will seamlessly integrate with our existing OMS and WMS systems to increase operational efficiency.

Software licensing and infrastructure costs – These costs are higher for unsupported mapping systems due to need for custom support and with no additional functionality. Mitigation of cybersecurity vulnerability with unsupported infrastructure components require additional investments that affects end users’ access to these systems and increases support costs. Migrating to an enterprise-wide GIS will allow the Company to consolidate the mapping systems and reduce software and hardware costs associated with multiple systems. Deploying an eGIS platform will allow the Company to develop strategic partnerships with vendors to standardize technology platforms and effectively manage support costs.

Reducing non-enterprise GIS applications – An eGIS will reduce costs and streamline business processes by using Company-wide application platforms. An enterprise-wide GIS platform will reduce the segmentation of the application portfolio and matching support levels to system needs.

Support costs – An eGIS will reduce costs associated with training and sourcing of limited resources supporting outdated mapping technology platforms. An eGIS platform will allow the Company to focus talent on the highest value work, such as technology enablers, and using vendors for standard work. Standardizing common mapping tools will also lower support costs by mitigating the need for custom tools.

Software integrations – Software integrations with obsolete outdated mapping platforms increase implementation and operational costs of operational utility systems (WMS, OMS, etc.). eGIS will reduce the integration costs of future software platforms as well as improve the availability and security of these platforms by replacing non-standard integrations. eGIS will reduce cybersecurity risks due to obsolete technology, promotes enhanced infrastructure utilization.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

Please refer to Exhibit (IT-1) for GIS BCA Model for Phase 1, 2, 3

2. Major financial benefits & Total Costs

The major financial benefits and total costs are shown below. The savings variance from the Phase 1 & 2 Business Plan (see Exhibit (IT-1)) is due to the one-year delay and the differences in rates and assumptions.

Project Costs (\$ In Millions)	
Category	2019 -2038
Capital costs	\$263
O&M expense	\$86
Total	\$350

Cost Avoided and Savings (\$ In Millions)	
Category	2019 -2038
Operational efficiencies	93
Legacy applications maintenance and support	\$302
Total	\$395

4. Basis for estimate

An in-depth Phase 0 study was conducted to estimate the costs based on acquiring the software, hardware, and labor/contract resource requirements.

5. Conclusion

Based on the analysis we developed the company’s ROI is 7.6 years, therefore this project is financially beneficial to the Company.

Project Risks and Mitigation Plan

Risk 1: A risk that may prevent completion involves Schneider Electric (SE), who is the provider of the ArcFm mapping system that we are currently utilizing to go out of business or SE could stop providing their ArcFM services to Con Edison.

Mitigation plan 1: The likelihood of SE going out of business or stopping their ArcFM services is highly unlikely. Many utilities in the United States and world-wide utilize the ArcFM software as their main mapping application. SE plans to continue providing support for the current version of ArcFM purchased by the Company, and they have outlined plans to provide support for future upgrades of the ESRI platform and ArcFM software. In addition, other contractors in the industry have enough knowledge in the ArcFM software and could potentially take over the upgrade if SE goes out of business or decides to stop providing their GIS services.

Risk 2: A risk that may extend the project timeline involves the accuracy of Company data during the transfer of data from the old mapping system onto the new mapping system. Accurate data is needed to operate the system. The vendors will perform the data transfer work and the Company relies on them to produce accurate maps.

Mitigation plan 2: The vendors selected to perform the data transfer have extensive experience in this field. The first mitigation step taken was to verify their experiences during the bidding selection process. The vendors provided a list of companies and previous experiences they had in data transfers. The second mitigation plan developed was to perform Proof of Concepts or POC's. A similar concern over data accuracy was identified before the start of the Phase 1 and Phase 2 of the project. Working with the vendors, the Company will provide them a small sample of the data to be transferred onto the new mapping system. The Company will provide the rules of the transfer to the vendors; once the work is completed, the work is reviewed for accuracy and completeness by the vendors and Con Edison. Performing a POC on a small sample of data helps prevent delays when the overall transfer of data is performed.

Technical Evaluation / Analysis

Project Relationships (if applicable)

This is a new White Paper that is an addition to the previously submitted business plan for Phase 1 and Phase 2.

The Company's current mapping system was designed to meet the needs of individual departments. 16 Company departments had previously developed their own GIS related capabilities for their own use. A few examples include:

- Construction Business Services uses a custom application that is designed to show the Company's proposed excavating work in real world coordinates in conjunction with New York City's paving schedule. This functionality is relatively easy to configure in the web-based visualization component of the planned eGIS.
- Construction Management uses a survey base map to capture Company underground structures with survey grade accuracy. The base map is utilized by regional engineering groups when issuing a layout for new underground structure and conduit. This base map functionality will be incorporated into the eGIS base map layers mitigating the need for a standalone application.
- The Electric System Damage Assessment application was developed following Hurricane Sandy to visualize overhead distribution feeders to improve the damage assessment information gathering process. This application was developed on a custom product platform and requires specialized technical resources to administer and maintain this application.

Some of these GIS related applications are supported by specialized business led IT teams and are limited by the specific department need that required them. None of the existing GIS-related applications provide an interconnected model for use across the engineering departments and operational systems. This departmental level approach does not effectively leverage resources and increases total cost of ownership due to:

- **Increased software licensing costs** - Multiple departments purchase software license and maintenance agreement, from same product vendors rather than using a single corporate licensing arrangement.
- **Functional and data redundancies** - Departmental solutions are not designed from an enterprise perspective and do not share computing, database, or technical resources.
- **Inconsistent product architectures** - The current applications do not leverage a common GIS platform architecture and consequently support, and training costs are increased.

3. Funding Detail

Historical Spend

	Actual 2017	Actual 2018	Actual 2019	Actual 2020	Historic Year (O&M only)	Forecast 2021
Capital		3,000	8,700	34,600		34,200

O&M		0	0	0		0
Retirement						

Total Request (\$000):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital		35,000	60,000	45,000	0
O&M*	1,500	2,500	2,500	5,000	0
Retirement					

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor		17,000	17,000	17,000	0
Contract Services		10,016	22,907	12,973	0
Other		1,016	1,621	1,258	0
Overheads		991	1,581	1,227	0
Subtotal		27,023	43,109	33,458	0
Contingency**		5,977	16,891	12,542	0
Total		35,000	60,000	45,000	0

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings					
O&M Avoidance	4,560	16,170	19,260	19,020	20,870
Capital Savings					
Capital Avoidance	1,040	1,060	1,080	1,100	1,120

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M	1,500	2,500	2,500	5,000	0
Capital					

*If whitepaper is supporting a capital project/program this refers to implementation O&M

**Please refer to the Corporate Contingency Guidelines

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don’t occur today (e.g., anticipated short-term fixes/maintenance if capital isn’t deployed)

CON EDISON GEOGRAPHIC INFORMATION SYSTEM (GIS) IMPLEMENTATION BUSINESS PLAN

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EXECUTIVE SUMMARY

The energy landscape is changing. Customers expect more involvement in their energy choices, more clean energy options, and more resiliency in the face of increasingly extreme weather events. New technologies like distributed solar, electric vehicles, energy storage, smart appliances, and electric heating are reshaping how and when customers use energy. Advances on utility sided assets and information systems provide powerful tools to expand innovation on the grid, increase customer choice, and add resiliency to an already reliable system. New York State is leading the nation in advancing the clean energy future and grid innovation.

Con Edison supports the movement to a customer focused, clean energy future, and has developed programs to get there. The Company has put significant effort into assisting our customers become more energy efficient with their electric energy usage and is now developing programs to assist customers with their gas energy usage. The Company is also developing the tools to give customers the personalized, seamless, and dynamic service and information across different communications platforms they expect. In parallel, the Company has developed a Grid Innovation initiative that strengthens its core infrastructure and allows it to respond to events more dynamically.

The Company's proposed Enterprise Geographic Information System ("GIS") is at the heart of these efforts. Con Edison plans to upgrade from its static mapping systems that include department-specific GIS applications to a single dynamic Enterprise GIS available to all departments within the Company. An Enterprise GIS will catalog and record the specific location and operating characteristics of all grid-connected assets, whether Company-owned or third-party distributed energy resources ("DER"), and the Company's gas and steam infrastructure. This information will enable the Company to develop a single, up-to-date model of its electric, gas, and steam distribution systems.

Many of the Company's Grid Innovation initiatives, which are designed to achieve a bi-directional DER-enabled grid, depend on an Enterprise GIS. For example, an Enterprise GIS is a prerequisite for an Advanced Distribution Management System ("ADMS") that would run continuous load flow calculations to optimize system configuration and improve the Company's situational awareness. An Enterprise GIS is also a prerequisite for a fully functional Distributed Energy Resource Management System ("DERMS"). Con Edison currently has over 23,000 DER (like rooftop solar) on its system and expects an exponential increase to achieve environmental policy goals; DERMS will be an essential tool for monitoring, forecasting, dispatching, and planning for this existing and new DER. An Enterprise GIS will enable the Company to:

- Visualize grid variables, equipment condition, and geo-spatial position of assets;
- Develop accurate distribution grid models all the way to the customer meter;
- Calculate and visualize DER installations and hosting capacity;
- Integrate with the electric outage management system and improve gas outage management;
- Improve the time required for valve isolation traces on the gas system using built-in trace capabilities in the GIS to replace current manual processes;
- Enhance situational awareness to locate nearest assets and resources; and
- Use a state of the art mapping system through all aspects of planning and implementing work (from design, to construction, to asset documentation, to operations and maintenance) thereby streamlining what is today a labor intensive process to achieve internal productivity gains.

The Company will use the Enterprise GIS to develop up-to-date models of its system that reflect both Company assets and third-party DERs. The Company's control center will depend on these models to reliably operate the DER-integrated grid. These and other capabilities make an Enterprise GIS critical to building the distributed system platform ("DSP") envisioned by the New York State Public Service Commission's Reforming the Energy Vision ("REV") initiative. An Enterprise GIS will also enhance gas safety, an important public policy objective.

Con Edison will proceed with an Enterprise GIS in three phases for an estimated total cost of approximately \$235 million. Phase 1 (\$25 million) will focus on replacing the VISION Electric and Gas system and will combine the Company's low-tension electric and gas maps into a single, state of the art GIS system. Phase 2 (\$87 million) focuses on integrating the electric primary feeders and high-tension maps into the new GIS system. Phase 3 (\$125 million), which is outside the horizon of the Company's 2019 rate filing, integrates the Company's

steam system and electrical conduits, including vacant and obstructed conduits into the new mapping system, and will provide enhanced capabilities to all systems. While the Company currently estimates that Phase 3 will cost \$125 million, the Company has not yet fully designed and developed final cost estimates associated with migration of the conduit mapping system under Phase 3. Phase 3 is the most complex piece and, its final cost will be affected by rapid changes in how GIS technology is evolving, enabled by emerging technology trends in analytics, artificial intelligence, and cloud computing. The present estimates indicate that the Enterprise GIS would have a positive net present value and will act as an enabling technology to unlock additional benefits associated with planned future investments. The Company , will continue to refine its analysis in the future as this project progresses.

INTRODUCTION

Importance of GIS

Enterprise GIS is fast becoming standard technology for large utilities. Though Con Edison has been able to extend the life of the existing mapping system, it is becoming increasingly resource intensive and limiting to achieving the Company's goals. Based on our benchmarking exercise, most other major utilities in the United States have already implemented a state-of-the-art Enterprise GIS. Other major utilities have had an Enterprise GIS for at least five years, and many for more than 10, and their testimonials and product demonstrations are extremely compelling.

Some of the challenges that surfaced for Con Edison in past evaluations of upgrading to a GIS platform were the pace of technological change, the complexity of adapting legacy systems to a new platform, and the sheer amount of assets in our gas, electric, and steam systems that needed to be converted. Consequently, Con Edison was not an early adaptor of evolving GIS technologies. The technology has since become less expensive and simpler to integrate with other systems. With all that is on the horizon in terms of our changing energy landscape, we are moving to this platform now.

For companies that have adopted it, GIS has evolved from being a "mapping system" to an interconnected visualization platform that is a central component of both operations and asset management. Con Edison's current mapping applications do not provide the capabilities of GIS technology.

Once implemented, the Enterprise GIS will be the cornerstone for Con Edison's Grid Innovation and customer experience efforts. The Company's Advanced Metering Infrastructure ("AMI") program and enhancements in its communication infrastructure will allow real-time data to feed into the Enterprise GIS, which the Company can then use to assist with outage management. Control Center personnel will be able to see a live map of existing outages and can better direct crews to return customers to service faster. In addition, the Enterprise GIS will allow the Company to produce models that reflect data from its distribution assets, AMI meters, and DERs connected to the system. With these models, Con Edison can more efficiently plan, design, and better operate the grid and its gas and steam systems. In short, the Enterprise GIS will touch on all aspects of the Company's operations.

Scope of Con Edison Systems

Maintaining detailed and accurate mapping systems is critical to Con Edison's ability to safely, reliably, and efficiently operate, maintain, and plan for its extensive electric, gas, and steam systems. Con Edison's maps are used to catalog literally millions of assets in every street in our service territory, and are critical to maintain, repair, and operate the system as well as account for these assets (property records) from a financial and tax perspective.

Electric System

Con Edison's electric system provides service to approximately 3.46 million customer accounts in New York City and Westchester County, which together have a population of almost 10 million. The Company's electric service territory covers 604 square miles and includes all of New York City, except the fifth ward (Rockaway Peninsula) in Queens, and approximately two-thirds of Westchester County.

The electric delivery system is comprised of approximately 96,300 miles of underground transmission and distribution lines and over 34,400 miles of overhead lines. Con Edison's service territory, while relatively small geographically, represents approximately 40 percent of New York State's peak electricity demand.

The Company's transmission system includes both underground and overhead infrastructure.¹ Con Edison's underground transmission system is the largest underground transmission system in the United States and delivers electric energy at 69 kilovolts ("kV"), 138kV, 230kV, 345kV, and 500kV. The overhead transmission system, located in Dutchess, Putnam, Westchester, and Richmond Counties, consists of 1,220 towers that support 355 circuit miles of cable situated along 113 miles of right-of-way. The Company also owns or jointly owns 387 structures that support 81 circuit miles in Orange and Rockland counties.

The Company's transmission and area substations consist of equipment (circuit breakers, transformers, series and shunt reactors, phase angle regulators, switches, relay systems, and communications systems) that are used to transform, sectionalize, control, and direct power on the electrical power system. Transmission substations receive power from generators or transmission lines and step the voltage down using transformers to deliver electric power to the area substations. Area substations receive power from the transmission stations and further step the voltage down to deliver electric power to the distribution system. The Con Edison system has 39 transmission stations and 62 area substations.

Con Edison's 62 area substations supply 65 networks and 19 non-network load areas. The distribution system is composed of network and non-network systems operating at voltages of 4kV, 13kV, 27kV and 33kV. Approximately 2,300 primary voltage distribution feeders supply network and non-network load.

Con Edison's underground distribution system is the largest underground, low-voltage, network system in the world. It includes approximately 266,000 manholes and service boxes; 25,400 conduit miles of duct; 96,300 miles of underground cable; and 42,500 underground transformers that further step the voltage down to supply the low-voltage secondary distribution system.

The Company's (non-network) overhead distribution system includes 192 auto loops; 217 unit substations; 13 multibank substations; approximately 198,700 poles; 51,800 overhead transformers; and approximately 34,300 miles of overhead wire including primary, secondary, and service wire.

Gas System

A gas distributor since 1823, Con Edison currently provides natural gas service to more than 1.1 million customers in Manhattan, the Bronx, the first and third wards of Queens, and Westchester County. The Con Edison natural gas transmission system is supplied by seven major gate stations and its northern distribution system is supplied by an additional four gate stations fed from various external interstate transmission pipeline companies. The Con Edison gas system also uses a shared inter-utility pipeline across its service territory that links us through two metering station interconnects with National Grid NY and LI, maintains eight underground utility tunnels that house electric, gas, steam, and communications pathways, and operates one liquefied natural gas plant.

Con Edison manages a large, complex underground natural gas transmission and distribution system. This system contains approximately 4,400 total miles of gas main with approximately 375,000 service pipes that transport more than 330 million dekatherms of natural gas each year. The approximately 4,400 miles of gas mains consist of 94 miles of transmission mains operating at pressures greater than 125 psig and 4,300 miles of distribution mains operating at pressures less than 100 psig. Approximately 300 miles are large-diameter distribution mains, greater than or equal to 16" that mostly connect the transmission mains through multi-stage pressure regulators to approximately 4,000 miles of smaller-diameter distribution mains. Three hundred and thirty three pressure regulators across the system step the pressure down from transmission to high to medium to low in various parts of our system.

The Company is tracking the installation and location of every fuse made on its distribution system, in accordance with Public Service Commission requirements. Consistent with the Company's main replacement program, which involves installing almost 100 miles of new gas mains per year until 2036 in order to replace smaller diameter cast iron and unprotected steel materials, and in tandem with new customer connections, the Company has and will continue to install about 100,000 fuses per year. To maintain asset integrity, the

¹ The Company has a GIS system for its transmission system that will interoperate with the new Enterprise GIS system but would remain separate for security reasons.

Company must track fuses. The Company plans to integrate this information into GIS; until then, it is stored in a separate data warehouse. The ability to visualize these assets and incorporate them into one system is a benefit that will come with the new Enterprise GIS system.

Steam System

Con Edison's steam system is the largest district steam system in the United States. A district steam system generates steam at central plants and distributes it through a network of underground pipes directly to buildings. Con Edison owns and operates five steam plants and 105 miles of underground steam mains and service pipes in Manhattan. In addition to its own facilities, the Company has a long term steam supply contract with Brooklyn Navy Yard Cogeneration Partners. The Company's steam system runs from Battery Park at the southern tip of Manhattan to 96th Street on the West Side and 89th Street on the East Side.

Current Mapping Systems

The Company's current mapping system consists of five major systems and 32 ancillary systems. The five major mapping systems are outlined in the table below.

#	Major System	Function	Region
1	VISION	Electric Secondary	Brooklyn/Queens, Bronx/Westchester, Manhattan
		Gas	Bronx/Westchester, Manhattan, Queens
		Conduit	Brooklyn Only
2	Electric Primary	Electric Primary	Brooklyn/Queens, Bronx/Westchester, Manhattan

3	EDFIS	Electric Primary, Secondary & Conduit (Staten Island mapping)	Staten Island Only
4	Conduit & Duct Occupancy	Electric Conduits & Structures	Brooklyn/Queens, Bronx/Westchester, Manhattan
5	SOMIS	Steam Operations Mapping and Information System	Manhattan Only

BUSINESS DRIVERS FOR ENTERPRISE WIDE GIS

The Company's five major mapping systems and 32 ancillary mapping systems are functionally redundant. Combined, they use 15 distinct and proprietary coordinate systems with outdated graphical user interfaces. These systems have redundant data and are costly to maintain or enhance and require Information Technology ("IT") to maintain expertise in outdated technologies. The Company's continued use of its current mapping and visualization systems limits business effectiveness and capabilities including:

- **Collaboration with Federal, State, Local government agencies during emergencies** – The proprietary coordinate systems and obsolete data formats of the current mapping systems limit the Company's ability to share facility location information with external stakeholders. More importantly, these systems restrict the Company's ability to leverage the multitude of geospatial data services published by government entities including the City of New York, Westchester County, Federal Emergency Management Agency ("FEMA"), the Census Bureau, and the National Weather Service.
- **Multi-commodity maps** – The current mapping systems do not effectively display all commodities in a single view. As a result, significant effort is required to acquire and reconcile multiple map products during planning, design, and construction activities. When new electric and gas assets are added, these are recorded multiple times in the current systems.
- **Lack of automation** – For each completed work request or data correction request, asset mapping data must be manually entered into three systems. This introduces data discrepancies between the respective systems.
- **Lack of new capabilities** – Incorporating new and much needed functions and features into the current mapping systems is a complex and costly undertaking due to the number of systems and their obsolete technical environments. For instance, new GIS would enable Distributed Generation ("DG") hosting capacity maps to be updated more quickly.
- **Ad-hoc map production** – Substantial effort is required by IT to produce specialized maps. The future Enterprise GIS will provide end users the ability to develop ad-hoc thematic maps, which will incorporate internal and third-party map layers.
- **Limited functionality** – Existing systems have limited functionality, such as the inability to plot maps from an end user device. The existing mapping systems have limited mobile device functionality. This capability is deployed through conversion of our asset data on mobile software platforms at increased costs and reduced functionality.
- **Redundant data entry & maintenance** – Presently, the Company enters the same data multiple times into three separate mapping systems. This adds to the amount of time required to post data, creates the potential for error, and delays the availability of data for external systems, such as the electric Outage Management System - System Trouble Analysis & Response ("STAR") and Load Flow Modeling System -Poly Voltage Loadflow ("PVL"). An Enterprise GIS, with a central geo-database, offers potential savings through efficiency gains and reduction in support costs.
- **Limited Technical Expertise** – The Company has limited specialized resources with skills to support these obsolete platforms. The technical skills required to maintain and support these systems are not readily available in the market due to limited use across the industry and aging technology.
- **System Failure & Recovery Times** – In the event of catastrophic hardware failure or software malfunction, current mapping systems may become inoperable, increasing recovery time and impacting critical business operations. The risks associated with relying on these unsupported products increase over time, as the underlying operating systems are discontinued.

The Company's current mapping system was designed to meet the needs of individual departments. Sixteen Company departments have developed their own GIS related capabilities for their own use. A few examples include:

- Construction Business Services uses a custom application that is designed to show the Company's proposed excavating work in real world coordinates in conjunction with New York City's paving schedule. This functionality is relatively easy to configure in the web-based visualization component of the planned Enterprise GIS.
- Construction Management uses a survey base map to capture Company underground structures with survey grade accuracy. The base map is utilized by regional engineering groups when issuing a layout for new underground structure and conduit. This base map functionality will be incorporated into the Enterprise GIS base map layers mitigating the need for a standalone application.
- The Electric System Damage Assessment application was developed following Hurricane Sandy to visualize overhead distribution feeders to improve the damage assessment information gathering process. This application was developed on a custom product platform and requires specialized technical resources to administer and maintain this application.

Some of these GIS related applications are supported by specialized business led IT teams and are limited by the specific department need that required them. None of the existing GIS-related applications provide an interconnected model for use across the engineering departments and operational systems. This departmental level approach does not effectively leverage resources and increases total cost of ownership due to:

- **Increased software licensing costs** – Multiple departments purchase software license and maintenance agreement, from same product vendors rather than using a single corporate licensing arrangement.
- **Functional and data redundancies** – Departmental solutions are not designed from an enterprise perspective and do not share computing, database or technical resources.
- **Inconsistent product architectures** – The current applications do not leverage a common GIS platform architecture and consequently support, and training costs are increased.

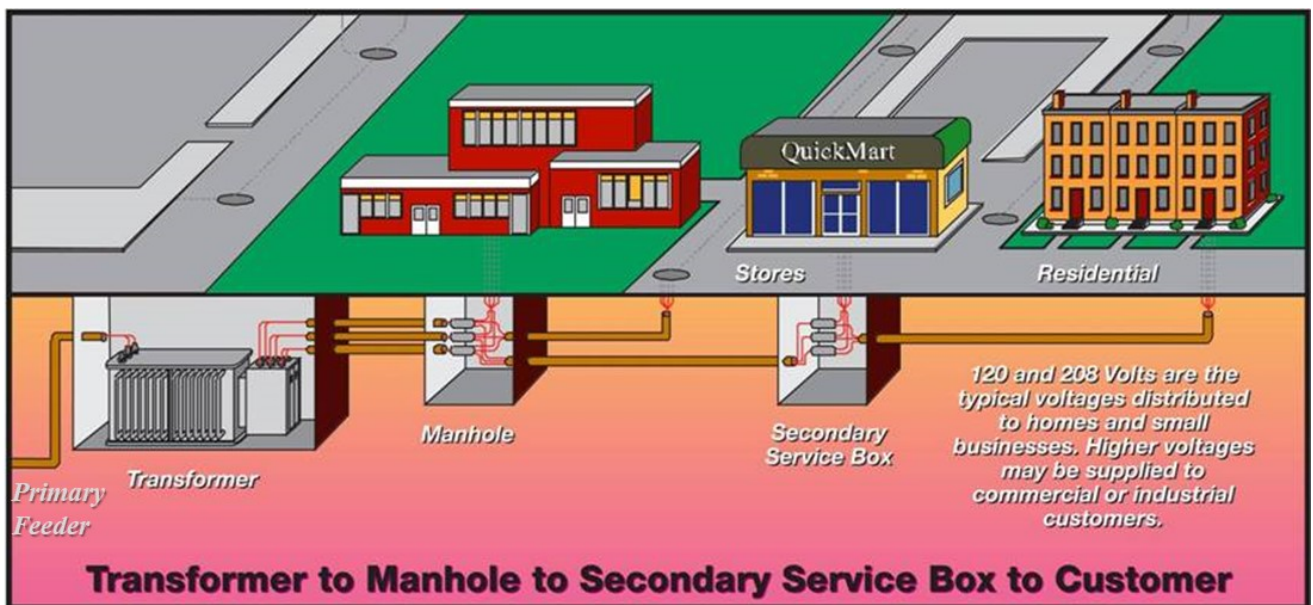
ENTERPRISE WIDE GIS IN ACTION

An Enterprise GIS will allow the Company to combine multiple maps into a single model. This section presents an example of what that means for the Company's electric distribution system.

The Company relies on three major mapping systems for its electric distribution system. The Electric Primary system, which maps primary feeders, VISION, which maps the secondary system and is also utilized by Gas, and Conduit & Duct Occupancy, which maps the underground structures that house electrical components, like transformer vaults, manholes and service boxes. Staten Island is an exception; there, all three systems are combined on the EDFIS system. The steam system is another exception and has its own mapping system. Adding these two exceptions totals to the five mapping systems shown in the table above and the plan is to also integrate these two exceptions into a single GIS platform.

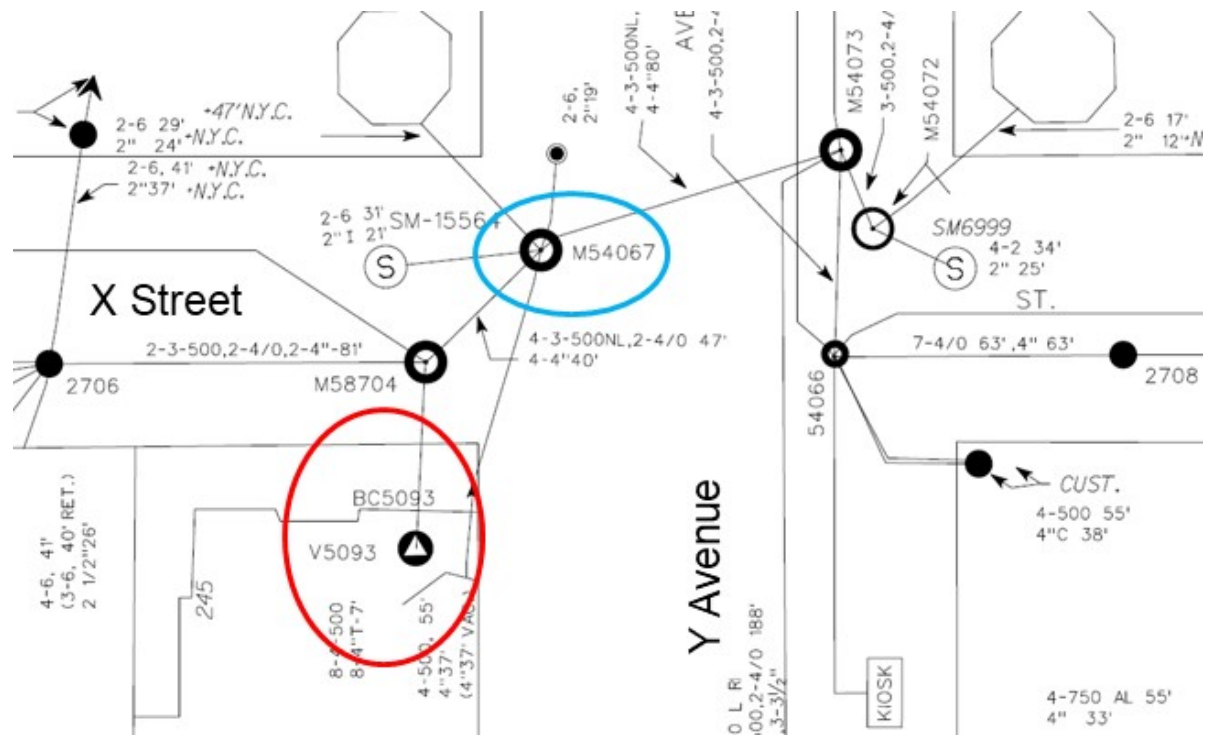
The figure below is a simplified, graphic illustration of the Company's underground electric system; the Company relies on three major mapping systems to depict the different elements of the underground electric system that make up this illustrative graphic.

In this figure, the primary feeder (which would be delivering power at 13,800 volts in Manhattan) delivers power from the left side of the transformer (i.e., the primary side) to the right side of the transformer (i.e., the secondary side). The transformer takes the primary feeder voltage of 13,800 volts and transforms it down to the secondary (also the delivery) voltage of 120/208 volts where it is routed through the streets to manholes, then to customer service boxes and then ultimately to the customer premise. Historically, it has been easiest to segment these components into the primary feeder system, the secondary electrical system, and the conduit system which would include the manholes, service boxes and transformer vaults that house the equipment; the mapping system is designed in the same fashion.

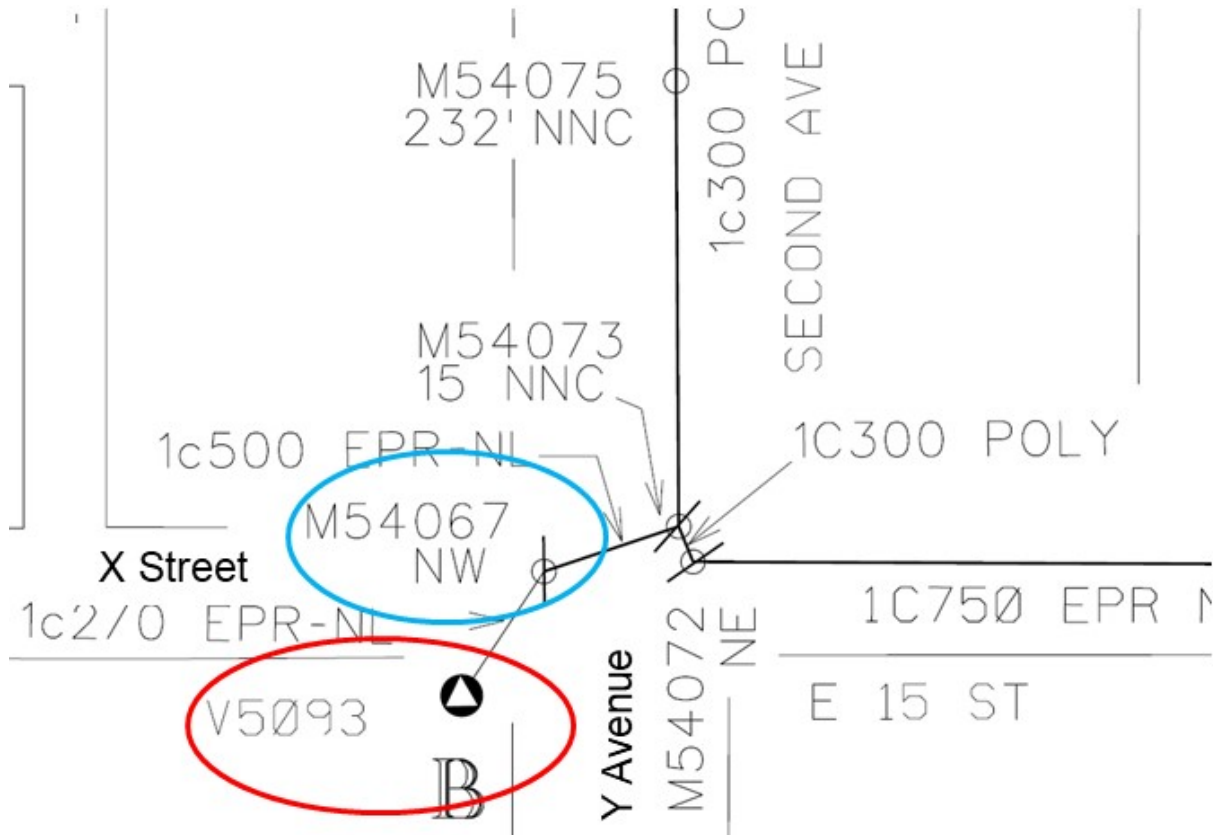


To demonstrate the historical benefit of having three mapping systems (prior to GIS being available), the elements of a representative common street intersection (called X Street and Y Avenue in this example) are shown on all three electrical mapping systems:

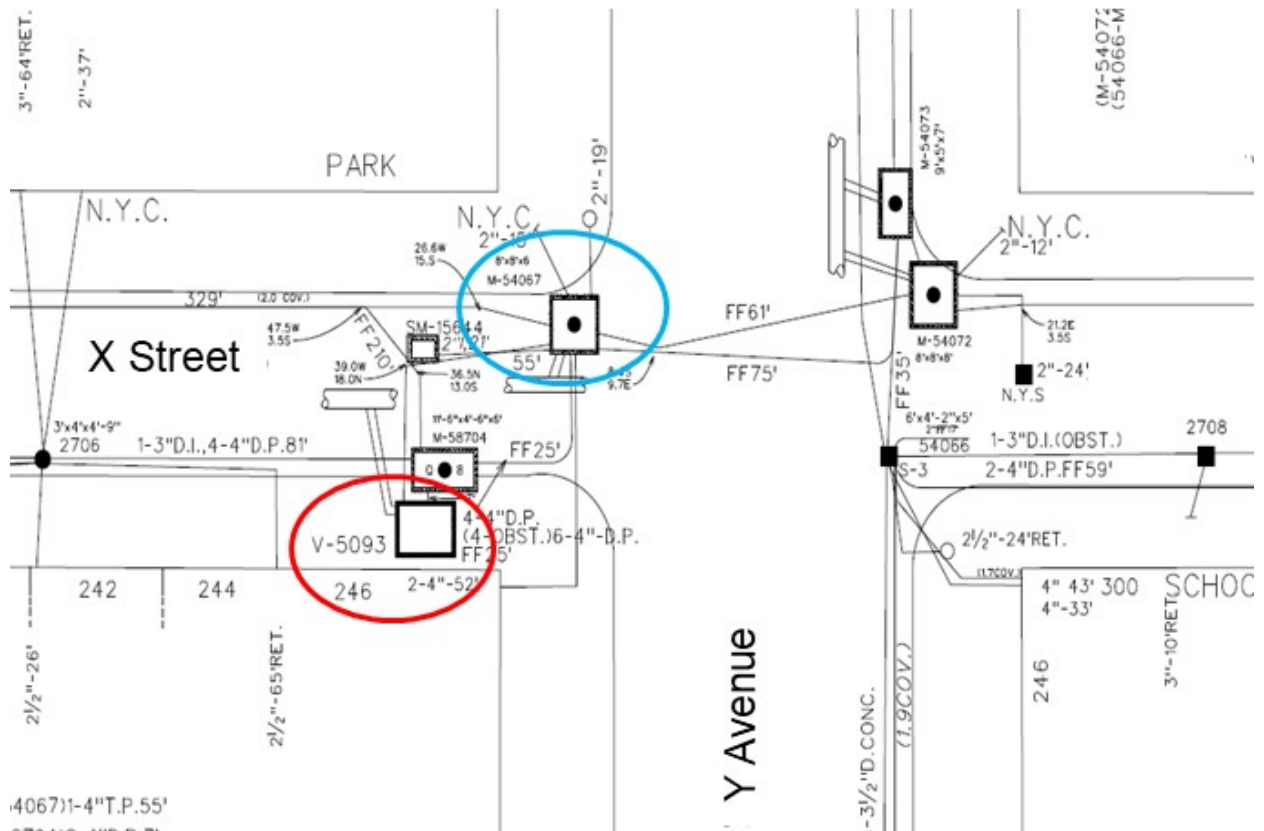
1. The VISION mapping system (which depicts the electric secondary system sometimes referred to as the network or grid) depicts the 120/208 volt delivery system and displays the vast majority of the Company's structures. Unlike the conduit maps described below, these maps are not drawn to scale but attempt to be spatially correct.



2. The Electric Primary mapping system displays a schematic of the primary feeder and is used mostly to provide safety to Con Edison personnel working on the primary voltage system (in this example, the 13,800-volt feeders and associated equipment). As schematics, these maps are neither drawn to scale nor spatially close to actual field conditions (this is intended and appropriate for this set of maps). These maps are also used to inform our load flow models, as will be discussed in more detail below.



3. The Conduit and Duct Occupancy mapping system displays the structures that house the electrical equipment and is critical for construction work. These PDF maps are drawn to scale and are the most detailed with respect to structure size, curb lines, street lines and property demarcations.



In each of the figures above, common elements like manhole M54073 (circled in blue) and transformer/transformer vault V-5093 (circled in red) are identified. Since the primary feeder map is simply a schematic that helps operators and maintenance employees identify how to safely work on equipment, it is not to scale and only displays components specific to that feeder (for example, there are no service boxes on primary feeder prints because services boxes are used exclusively to deliver secondary voltage to customers). The VISION (i.e. mains and secondary) mapping system and conduit system both show all the structures involved, providing much more detail on the streets and buildings and, in the case of the conduit maps, are drawn to scale. The Company developed these maps long before computers existed and they were originally developed separately because of the extensive information required in every street and the need to provide them on a sheet of paper that could be carried and handled by field personnel. When they were eventually digitized, computational capability at the time only allowed for static pictures so the format remained the same. A GIS mapping system allows us to “layer” these maps within a single mapping system (along with gas, steam and whatever other mapping system we choose to interface with that is spatially correct) and “turn on” and “turn off” only the layers we need to see.

The VISION mapping system serves an additional function of providing all the electrical data to our advanced load flow models that are used for both planning and operations. As such, upgrading our VISION mapping system to a GIS mapping system platform is the most logical starting point and yields the most immediate benefits. In addition, the VISION system’s underlying technology (“FRAMME”) has a remaining domestic user base of four sites including Con Edison.² All other sites are in the process of implementing system replacements. The product vendor (Intergraph) has discontinued new capabilities to the product.

² As of January 2019 Los Angeles, Department of Water and Power (“LADWP”), and Oncor utilize FRAMME technology with planned migrations to GIS technology beginning 2020.

PROJECT BENEFITS

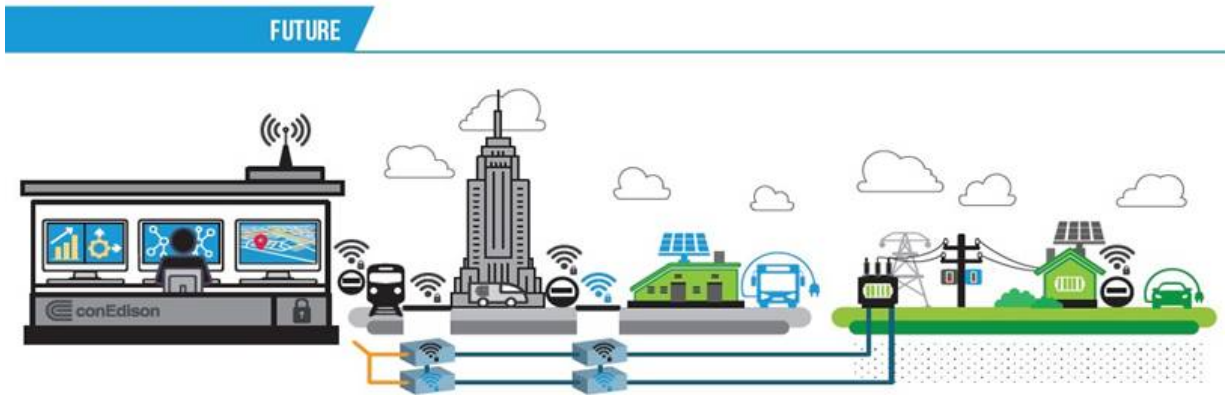
An Enterprise GIS is necessary to unlock the benefits of the customer focused, clean energy future both New York State and the Company are seeking to achieve. An Enterprise GIS enables resource sharing, data organization, and improved decision making. An Enterprise GIS will provide precise and meaningful business intelligence solutions for effective asset and resource management and delivering safe and reliable services to our customers.

Grid Innovation

Many of the Company's Grid Innovation initiatives, which are designed to achieve a bi-directional DER-enabled grid, depend on an Enterprise GIS. The Department of Energy's DSPx Modern Grid Distribution Project has identified GIS technology as foundational to grid innovation in the United States.³ An Enterprise GIS is a prerequisite for an Advanced Distribution Management System ("ADMS") that would run continuous load flow calculations to optimize system configuration and improve the Company's situational awareness of grid and customer assets. An Enterprise GIS is also a prerequisite for a fully functional Distributed Energy Resource Management System ("DERMS"). Con Edison currently has over 23,000 DER (like rooftop solar) on the Company's system and expects an exponential increase to achieve environmental policy goals; DERMS will be an essential tool for monitoring, forecasting, dispatching, and planning for this existing and new DER. In addition, an Enterprise GIS will enable new grid capabilities that include:

- **Grid Visibility & Monitoring** – With the availability of geo-spatial data on our assets, grid operators will be able to visualize grid variables and equipment conditions. Advanced grid monitoring and operator tools depend on robust visualization tools enabled by GIS technology.
- **Grid Modeling & Simulation** – Interconnected grid models with AMI data and DER assets will enable end to end load flow modeling all the way to the customer meter for seamless functionality between the grid and customer technologies. The Enterprise GIS will increase the quality of data used by engineering load flow analysis systems such as electric Poly Voltage Load flow (PVL) and gas SynerGEE, reducing the time required to prepare data for import into planning and analysis systems. The Enterprise GIS system will also improve the efficiency of isolation traces using built-in trace capabilities in the GIS and improving the accuracy of gas load flow models.
- **Grid Planning** – The Enterprise GIS platform will enable spatial analytics to improve grid reliability planning. For example, Company engineers can visualize historical electric and gas outages across the entire system to identify low reliability areas for planned investments that coincide with New York City and Westchester County's planned infrastructure projects to reduce costs. Over time spatial analytics enabled by machine learning tools will improve grid asset management capabilities.
- **Grid Hosting Capacity** – Interconnected grid models will improve the accuracy of the impact of the DER installations and increase the accuracy of the hosting capacity.
- **Grid Operation** – Enterprise visualization platform enabled by the Enterprise GIS will be integrated with the electric and gas outage management systems to provide operators near real time visibility on grid conditions and enhanced situational awareness to dispatch resources to nearest assets.

³ <https://gridarchitecture.pnnl.gov/modern-grid-distribution-project.aspx>



Reforming the Energy Vision (REV) Goals

Working Group 2 of the Public Service Commission’s “Reforming the Energy Vision” (REV) initiative previously issued a final report that identifies the required technology to enable the transition of New York’s electric utilities to “Distribution System Platform Providers” (DSPP).⁴ GIS is one of the platform technologies included in the report (See Figure 2). It is an accepted industry practice to maintain comprehensive facility models in GIS – models that are required by multiple operational systems including ADMS. In addition, GIS is an effective tool for aiding in the communications infrastructure planning and monitoring the deployment of AMI solutions.

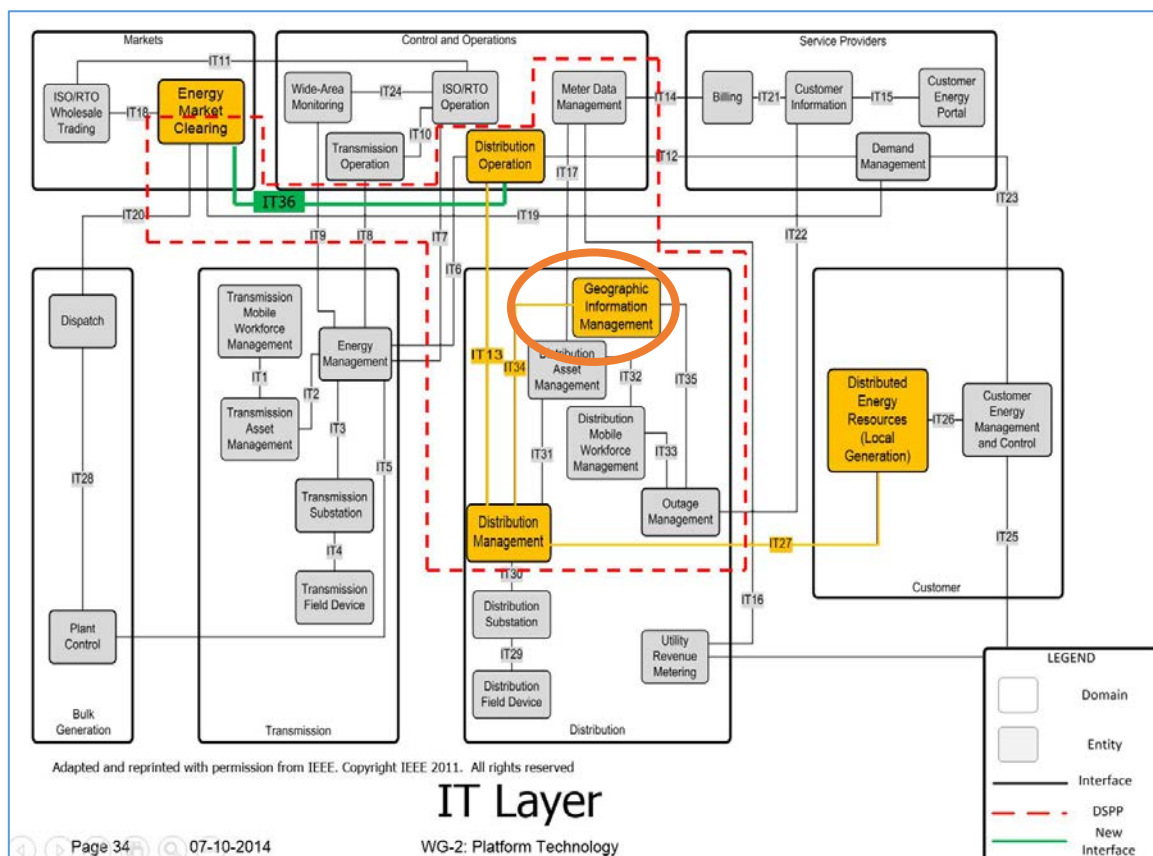


Figure 2 - PSC Working Group 2 Platform Technology

⁴ PSC Working Group 2 Platform Technology Final report, July 8th, 2014

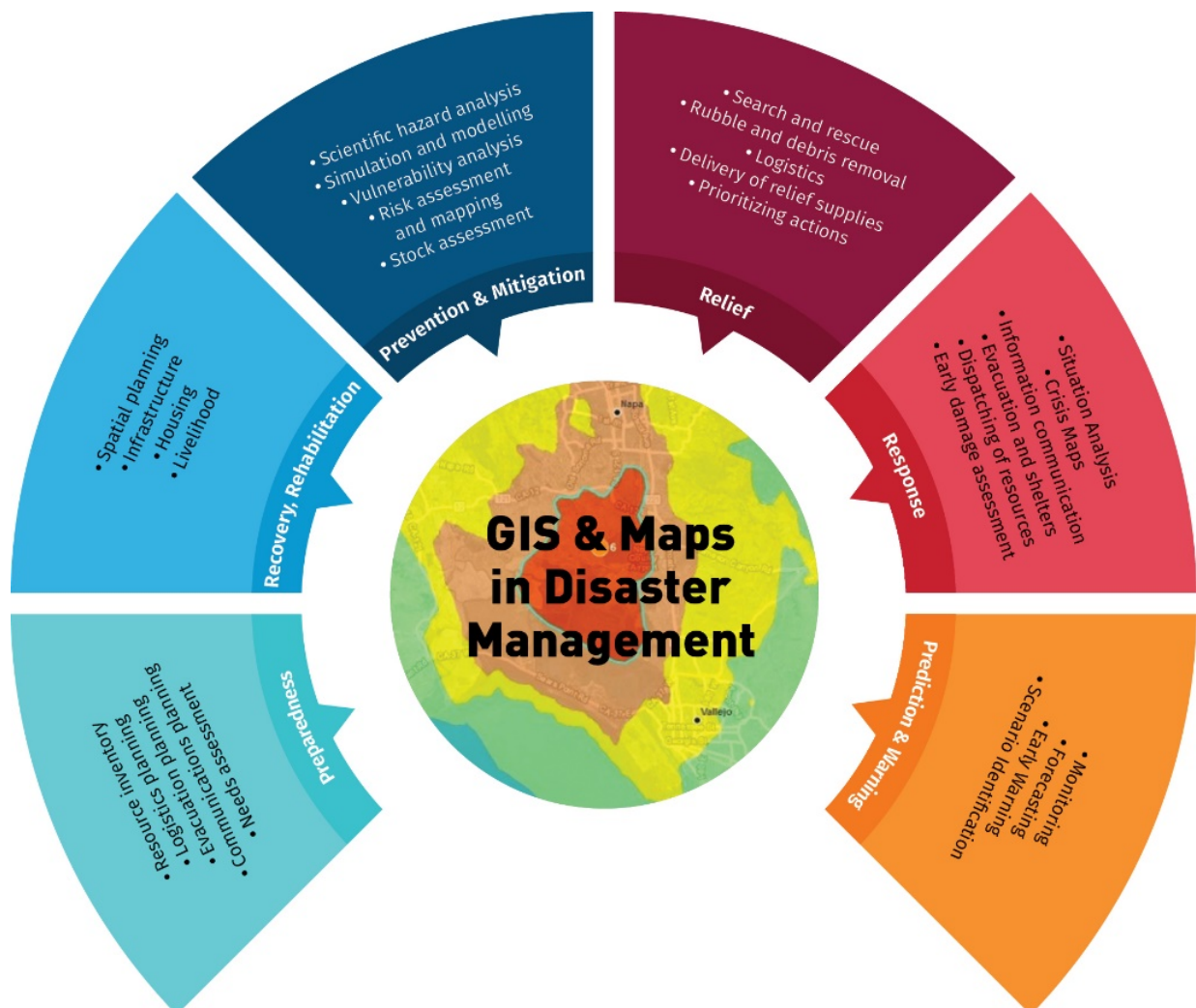
[https://www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/853a068321b1d9cb85257d100067b939/\\$FILE/WG%20Platform%20Technology_Final%20Report%20&%20Appendices.pdf](https://www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/853a068321b1d9cb85257d100067b939/$FILE/WG%20Platform%20Technology_Final%20Report%20&%20Appendices.pdf)

The up-to-date, real-time system model produced by an Enterprise GIS is required for the Company to meet long-term REV initiatives, including establishing the DSPP, and facilitates timely and current load flow modeling that control center personnel will depend on in the future.

Additionally, distribution circuits will become vastly more complex to plan and operate due to the continuous integration of DERs. One of REV's goals is to defer utility spending on capital reinforcement of these circuits by way of non-wires solutions. An Enterprise GIS will improve the accuracy of load flow modeling to streamline the benefits of siting non-wires solutions. REV will also enable more customer-centered initiatives including time of use rates, more customer energy choices and programs, and customer access to load data to better manage their usage. An Enterprise GIS will provide a single integrated platform for managing and disseminating the requisite network models and provide employees access to geospatial data from a suite of centrally managed applications.

Emergency Planning & Response

The modern GIS technology is steadily transforming the capabilities to respond to major events. Hurricane Sandy heightened the use of GIS by federal, state, and local governments in the northeast. For example, New York City recently established a Disaster Assessment and Power Restoration Plan, which incorporates GIS at the center of response planning, field assessment, and public outreach. In addition to the telecoms and peer utilities, Con Edison is a participant in this plan. This and similar programs in Westchester County present an opportunity for outage management and municipal collaboration.



Emergency planning and response rely on geographic information to predict areas that are most at risk. An Enterprise GIS will enable the Company to share spatial information about assets affected by events with the New York City Office of Emergency Management (“OEM”) and Westchester County to prioritize relief efforts. In general, emergency management services increasingly rely on GIS platforms to generate crisis maps based on a combination of satellite imagery, remote sensor readings, statistical models, and crowdsourced data. For instance, utilities and first responders use spatial analysis of utility assets and customer social media posts to create a map of locations in urgent need of relief during storms. Robust and accurate geographic information is necessary for first responders to make well-informed decisions, and ongoing refinements to real-time data analysis are increasing GIS accuracy. Enterprise GIS would allow the Company to deploy turn-key mobile applications during emergencies. Such mobile apps have been deployed during recent major events such as Hurricane Harvey and the Northern California Campfire.^{5/6}

Employee & Public Safety

Enterprise GIS platform integration with the Company’s Outage Management System (OMS) and Supervisory Control and Data Acquisition (SCADA) system will enable electronic switching orders for electric distribution circuits and replace a manual process that can lead to operating errors. The built-in visual trace capability inherent to modern GIS platforms improves the safety and reliability of gas and electric distribution circuits through validation of circuit continuity and reducing mapping errors.

Con Edison electric and gas crews will benefit from an Enterprise GIS system by being able to more readily view field hazards/conditions as a layer that is available on the GIS visualization platform. For example, today, electric crews are often dispatched and arrive to find that the structure cannot be worked on due to a safety hazard. Having an integrated Enterprise GIS will allow for any field safety hazard or “D” fault to be tagged to the asset. For example, should a feeder joint be “D” faulted, the mapping system will allow for that structure to be displayed as “tagged”. This status would be immediately reflected to all users and displayed on all map products. This will yield efficiency by eliminating the unnecessary dispatching of a crew(s) to hazard locations. Other examples of potential field hazards include, environmental (oxygen deficient or hydrogen sulfide in structures) or structural (condemned due to structural defects) hazards. The Company would also be able to share this data with other City agencies in spatial format.

Grid Resilience

An Enterprise GIS will improve grid resilience and reduce outage restoration times. Some of these benefits include:

- **Vegetation Management** – An Enterprise GIS will enable new spatial analytics capabilities combined with accurately mapped facilities that will enable efficiency gains in the planning and tracking of vegetation management to reduce unplanned outages. In addition, the Enterprise GIS will provide the capability of targeting vegetation management based on circuits and migrate to condition based vegetation management program vs. time-based program thereby optimizing investments. Enterprise GIS will enable integration of LiDAR technology to enhance vegetation management programs in the near future.
- **Outage Management** – Enterprise GIS will improve the accuracy of outage counts in the OMS system and facilitate faster restoration of customer outages during normal blue-sky events as well as major storms. Combining geospatial visualization of AMI data with predictive analytics tools is enabling utilities to reduce the duration of the outages from weather events and identify weak points in the electrical distribution system to prevent future outages.⁷

⁵ 3 Ways GIS Is Changing How We Respond to Hurricanes: <https://www.govloop.com/gis-is-changing-how-we-respond-to-hurricanes/>

⁶ How GIS was used in the response to the 2018 Northern California wildfires: <https://inpublicsafety.com/2018/11/gis-technology-aids-in-effective-response-to-california-wildfires/>

⁷ Weathering the Storm: Using Predictive Analytics to Minimize Utility Outages. Kathy Ball, SAS Institute: Mark Konya, Ameren Missouri. Paper 232-2013. <http://support.sas.com/resources/papers/proceedings13/232-2013.pdf>

- **Damage Assessment** – Enterprise GIS will allow the Company to deploy a standardized damage assessment tool that will seamlessly integrate with our existing OMS and WMS systems to increase operational efficiency.

Enterprise GIS for Gas

An Enterprise GIS also benefits the Company's gas system. With an Enterprise GIS, Gas Operations will be able to reduce excavation risk and operating errors, engage in real-time collaboration with City agencies when responding to gas public safety incidents or coordinating planned work, more efficiently monitor the performance of gas transmission and distribution systems, and better manage gas outages and restoration efforts. Gas Operations could also have potential integration opportunities with AMI to monitor system performance at the service level. Additionally, the Company could create gas flow modeling and simulations for planned and emergency work. An Enterprise GIS would also provide a gas system inventory which will give the Company the ability to trend data and analytics required to identify threats for our Distribution/Transmission Integrity Management Programs, as well as ad-hoc reporting.

Customer Experience

Con Edison, as the Distributed System Platform Provider (DSPP), remains committed to increasing the amount of data available, making it easier to access system data through its online portal, and supporting stakeholder data needs. An Enterprise GIS will allow for future use cases for system data availability, identify additional datasets to share, and respond to stakeholder requests to improve ease of access to system data. The Company currently provides extensive system data as part of the hosting capacity platform within the system data portal. The existing hosting capacity maps are customized web-based GIS format to show locations where it is beneficial to interconnect distributed generation. With continued enhancements to the Enterprise GIS through the phased implementation, the Company will continue to provide useful information to customers and developers looking to interconnect to the Con Edison distribution system. A few use cases include:

- GIS platform will enable asset management capabilities for all assets behind the meter and reduce the time needed to analyze grid impact of citing DER resources.
- Spatial proximity analysis of new electric and gas service requests within existing infrastructure will reduce the time for new business and DER requests.
- The current systems proprietary coordinate systems and obsolete data formats substantially inhibits the Company's ability to exchange and/or integrate third party data. The Enterprise GIS technology uses Application Programming Interfaces (API) architecture that will provide the ability to incorporate data from external entities into dynamic map displays. Examples of available data include New York City / New York State / FEMA "GeoHub" portals, public improvement job sites, contractor drawings, parcel/cadastral data, flood zones, census bureau zones, and associated demographic data.

Single Source of Information

The Enterprise GIS will provide efficiency gains associated with mapping, facility records management, and data analysis. At the end of the project, the Company will create a single reliable source of information for all the Company's assets and customer assets that interoperate with the grid.

- Data integrity and accuracy will improve as mapping teams will update a single system at work order completion, instead of multiple systems (Primary, Secondary, and Conduit) once all three phases are completed. There will no longer be a need to maintain composite feeder maps in Manhattan and the Bronx and Conduit and Duct Occupancy maps (cable updates only) for Westchester, Brooklyn and Queens.
- GIS integration with electric and gas WMS will mitigate the need for redundant data entry and improve accuracy for electric and gas work orders.
- Enterprise GIS will simplify the mapping and data updates associated with large load transfers, and network splits that require significant time.

Cost Reduction

Consolidating the mapping applications into an enterprise wide GIS platform will reduce total cost of ownership. Cost efficiency gains include:

- **Software licensing and infrastructure costs** – These costs are higher for unsupported mapping systems due to need for custom support and with no additional functionality. Mitigation of cybersecurity vulnerability with unsupported infrastructure components require additional investments that affects end users access to these systems and increases support costs. Migrating to enterprise wide GIS will allow the Company to consolidate the mapping systems and reduce software and hardware costs associated with multiple systems. Deploying an Enterprise GIS platform will allow the Company to develop strategic partnerships with vendors to standardize technology platforms and effectively manage support costs.
- **Reducing non-Enterprise GIS applications** – An Enterprise GIS will reduce costs and streamline business processes by using Company-wide application platforms. Enterprise wide GIS platform will reduce the segmentation of the application portfolio and matching support levels to system needs.
- **Support costs** – An Enterprise GIS will reduce costs associated with training and sourcing of limited resources supporting outdated mapping technology platforms. An Enterprise GIS platform will allow the Company to focus talent on the highest value work, such as technology enablers, and using vendors for standard work. Standardizing common mapping tools will also lower support costs by mitigating the need for custom tools.
- **Software integrations** – Software integrations with obsolete outdated mapping platforms increase implementation and operational costs of operational utility systems such as WMS, OMS etc. Enterprise GIS will reduce the integration costs of future software platforms as well as improve the availability and security of these platforms by replacing non-standard integrations. Enterprise GIS will reduce cybersecurity risks due to obsolete technology, promotes enhanced infrastructure utilization.

Cost Benefit Analysis

As shown below, the estimated total cost for CECONY to establish a new GIS system is \$332M escalated over a 20-year period . The O&M costs shown in the table below are associated with new maintenance contract for the new GIS system. The estimated cost avoidance and savings are \$431M which are associated with operational efficiencies and legacy application maintenance and support.

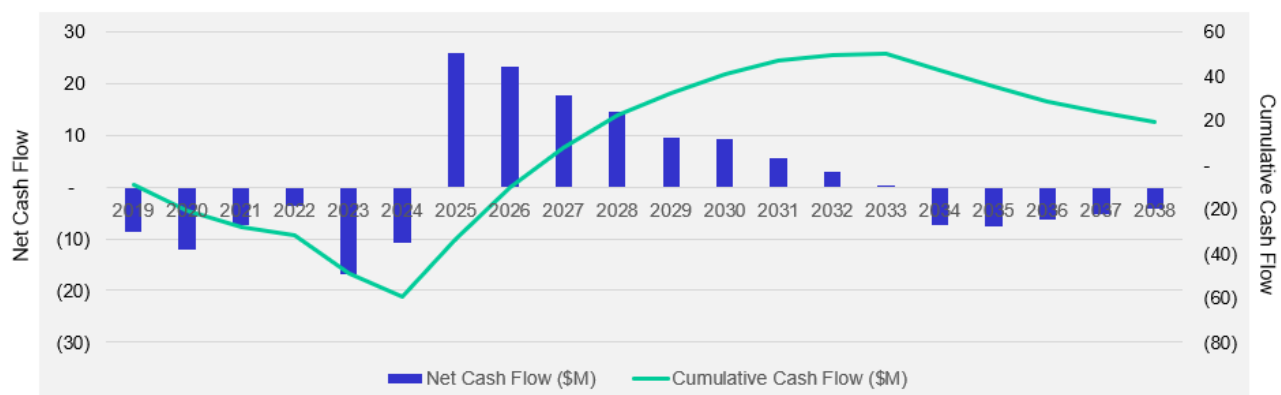
The Company utilized the internal financial analysis model and the BCA handbook to adjust the cost saving model which is attached in appendix B. The attached financial model in appendix B includes the following assumptions, upgrades and enhancements will be made periodically beginning five years after implementation, and costs are escalated over the analysis period.

The table and chart below, summarizes the cumulative estimated benefits of cost avoidance, and efficiency gains and the cash flows for all three phases.,

Business Case (Phases I, II, and III)

PROJECT COSTS (\$ IN MILLIONS)		COSTS AVOIDED AND SAVINGS	
Category	2019-2038	Category	2019-2038
Capital cost	\$ 245	Operational Efficiencies	\$97
O&M expense	\$ 87	Legacy applications maintenance and support	\$ 334
Total	\$ 332	Total	\$ 431

The tables above show the costs savings in undiscounted dollars over a 20-year period



The tables above show the net cash flows in discounted dollars over a 20-year period

Benefits Analysis

In developing the business case to replace the CECONY legacy mapping applications, the project benefits were identified based on how the new GIS will support the continued growth through operation efficiencies and a reduction in legacy applications that require maintenance and support. Refer to Table below for additional details.

To accurately reflect the impacts of these benefits on the organization, they have been categorized into the following

- 1) Non-financial: capabilities that will be critical to enabling the further growth of the organization but are not possible to link to a direct revenue or cost impact; and
- 2) Financial capabilities as described in the Financial Cost Tables below

Benefits Analysis – Non- Financial

While developing the business case to replace CECONY's legacy mapping systems, non-financial customer benefits have been identified based on how the new GIS will support continual improvement of the customer experience through enabling technologies that are readily available in the industry; existing mapping applications either severely limit deployment or require extensive cost to accommodate. Detailed information on these future capabilities of employing a GIS system is described below:

Customer Collaboration

- Calculate and visualize DER installations and hosting capacity
- Develop accurate distribution grid models all the way to the customer
- Enhance data collection from non-utility systems
- Increase use of distributed energy resources during emergencies

Technological Innovation

- Visual trace capabilities to validate circuit continuity reducing mapping errors
- Virtual reality and augmented reality application allow for spatial views of field conditions such as hazardous environmental and field conditions
- Real -world modeling and sharing of the grid with inclusion of various sensor from AMI, Gas Sensors, SCADA, DERMS, and ADMS

Emergency Planning and Storm Response

- Enable spatial mobile application for damage assessment
- Heat maps for crowdsourcing social media outages and damage data
- Turn-key mobile applications during emergencies

Gas Operations Benefits

- Live leak survey maps
- Integration with AMI gas sensors to monitor system performance at service level
- Integrate fused pipes in GIS platform
- Real-time collaboration with city agencies when responding to public safety incidents for planned work
- Gas modeling and simulations for planned and emergency work

Across these non-financial benefit categories, a new GIS system will establish a more sustainable foundation and is essential for modernizing the distribution grid. It will provide a variety of core capabilities, as well as a more flexible GIS, that will be critical in deploying a wide range of functionality for current and future needs to support our customers.

Benefits Analysis – Financial

CECONY expects to achieve cost reductions by replacing the legacy mapping applications. This will include reductions in labor and vendor costs as well as the avoided capital costs associated with maintaining and enhancing the existing mapping systems. These avoided costs include routine and ongoing maintenance costs and technology investments to support legacy applications.

Financial Cost Savings

The new GIS application will generate operational efficiencies resulting in additional reduced labor and maintenance costs, as shown in the table below valued at approximately \$431 million over a 20-year period.

	Estimated Annual Cost Reduction Function	Description	Estimated Cost Reduction (\$000) for 20-year period
Legacy Application Maintenance and Support	Custom support agreements	Custom software support agreements with various vendors (Intergraph, Microsoft, Bentley, Citrix, Oracle, etc) for end-of-life products – on demand custom solutions	\$214.45
	Annual support costs	Combined expenses for ongoing maintenance of 10+ mapping software products	\$58.42
	Non -IR supported GIS applications	Maintain point solutions for emergent needs	\$34.26
	Avoided GIS like applications	Create new point solutions for emergent needs	\$19.32
	Cuflink	Custom data model for Customer-Asset associations	\$6.18
	System failure	Support business continuity while recovering from system wide outage	\$1.03
Operational Efficiencies	Regional engineering mapping efficiency	Load relief and network maintenance – Engineering studies	\$60.73
	Electric spatial analysis	Labor costs associated with spatial analytics	\$18.48
	DER data entry savings	Labor & infrastructure overhead to maintain various DER datasets	\$6.89
	Vegetation management	Tree trimming contracts	\$4.23
	Restoration factors	Improvements in SAIFI and CAIDI	\$2.26
	Transmission efficiencies	Work planning & Safety	\$1.65
	Gas spatial analysis	Labor costs associated with spatial analytics	\$1.54
	Energy efficiency department benefit	New customer & interconnection requests – internal labor	\$0.69

Advanced Future Capabilities

With the increase in the availability of spatial data, GIS enabled solutions are driving new capabilities for utilities. The global GIS solutions market is expected to reach \$17.3 billion by 2023 according to P&S Market Research.⁸ GIS investments are providing substantial positive payback across the industry. For example, King County, WA has undertaken a GIS ROI Study where the County has realized \$775 million from its GIS investments.⁹ Future use cases for Con Edison include:

- **New York State Smart Cities Initiative** – Con Edison’s GIS implementation will support New York City’s initiative to develop the Subterranean Information Model that includes all utility and city assets that allows all stakeholders access to buried infrastructure.¹⁰ There is a strong business need to map underground infrastructure, but it is limited by availability of spatial data and the security concerns associated with sharing the data amongst facility owners. Securely incorporating asset data into this model will allow the Company to identify its infrastructure amongst all the buried infrastructure.
- **Location Based Services** – GIS will enable real time location processing, which may allow the potential for incorporating autonomous vehicle locations in the future to automatically direct field crews nearest to a job. This could enhance post-disaster outage recovery operations and enable customers to track utility restoration crews.
- **Artificial Intelligence** – Advancements in AI and machine learning (ML) enabled by cloud computing infrastructure will enable rapid integration of 3D (three dimensional) visualization tools on modern GIS platforms. Modern GIS platforms support integration of Virtual Reality (“VR”) and Augmented Reality (“AR”) to enable new capabilities. Artificial intelligence is another rapidly evolving technology that has been applied to GIS projects in recent years. For example, AR enabled 3D models of hazardous locations can be utilized for safety training of field crews.
- **Environmental Sustainability** – One important application for GeoAI¹¹ is in planning urban infrastructure and tracking changes in an area over time. For example, researchers in Los Angeles wanted to know how land use and roadways impacted air pollution and, in turn, how pollution would affect health in residents. GIS helped them analyze traffic patterns over different times of day in relation to the concentration of harmful particles in the air. By using this information to predict when pollution levels would become dangerous, the city could issue warnings as early as possible.

⁸ <https://www.psmarketresearch.com/press-release/global-geographic-information-system-market>

⁹ <https://www.kingcounty.gov/elected/executive/constantine/news/release/2012/April/05GISroi.aspx>

¹⁰ <https://www.nytimes.com/interactive/2014/03/23/nyregion/the-network-of-pipes-under-manhattans-streets.html>

¹¹ <https://ecce.esri.ca/wpecce/2018/04/23/what-is-geoai/>

SCOPE OF THE PROGRAM

Con Edison has initiated a phased deployment plan to consolidate the various mapping systems in stages that reflect the three primary mapping systems and deliver business benefits along the way. When complete, GIS will result in a single model that displays the Company's electric, gas, and steam distribution systems, with the capability to turn layers on and off so a user can see all or some of the data. All data and assets will also be displayed on a google based real word coordinate mapping application that allows the user to toggle on/off various mapping systems.

Phase 0

In 2014, the Company undertook a Phase 0 planning project for an enterprise wide GIS deployment. During this project, the Company engaged GIS product and data migration service vendors to:

- Conduct functional, data migration, and system integration workshops with subject matter experts from the electric, gas, and construction organizations and IT
- Finalize the electric and gas geospatial data models and perform a formal pilot data migration of all core mapping systems
- Develop functional requirements documentation for the GIS mapping, visualization and mobile product components
- Develop requirements for the integration of GIS with existing systems including STAR, Gas Inspection System, PVL, and Work Management System ("WMS")
- Conduct five pilot data migration, conversion, and data conflation¹² for Electric and Gas in Manhattan, Bronx, Westchester, Brooklyn and Staten Island
- Define implementation options and associated cost estimates
- Analyze Graphic Design products and estimate implementation costs
- Train the GIS Core Team in the future GIS product
- Update the GIS Business Case to reflect Phase 0 findings

In 2017, the Company expanded on Phase 0 to conduct additional data quality assessment and to evaluate the latest GIS technology. In 2018, the Company began competitive sourcing for parts of the project. The Company incorporated lessons learned and information gathered from Phase 0 into this business plan.

Phase 1

Phase 1 (\$25 million) will focus on replacing the VISION system, which consists of the Company's low-tension maps for all electric customers supplied by 120V and 465V cables and all gas customers supplied by gas service pipes. Phase 1 will combine these Company electric and gas maps into a single, new GIS platform.

Phase 1 will occur from 2019 to first quarter of 2020. Benefits of Phase 1 include:

- New Mapping Tools for secondary electric distribution system and gas distribution
 - Spatial Asset Management Tool
 - Planning & Analysis tool
 - Field Mobility Mapping Tool
- Create a new visualization tool

¹² In GIS, conflation is defined as the process of combining geographic information from overlapping sources to retain accurate data, minimize redundancy, and reconcile data conflicts.

- Reduce secondary mapping and gas mapping backlogs
- Create asset management capabilities for example, DERMS, AMI, and MTA assets
- Enhanced Load Flow Analysis
- Retire CuFLink and APS applications
- Third party data integration e.g., NYC Open Data, Westchester County, Orange and Rockland Counties
- Enhance regulatory compliance for Gas through visualization of assets such as fuse tracking

Phase 2

Phase 2 (\$87 million) focuses on electric primary feeders and high-tension maps. These maps include all cables and joints associated with our feeders. The EDFIS system consists of all high-tension maps in Staten Island, which currently use a different mapping application than the rest of the boroughs and Westchester County. The conversion of the high-tension maps will be added to the already converted low tension maps. Phase 2 will commence in 2020 and continue until the end of 2022. Benefits of Phase 2 include:

- New mapping tools for the Primary or feeder system
- Electric Primary, Secondary Connectivity Model
- Robust Enterprise Wide Spatial Analytics Platform
- Enable use of emerging technologies such as AR, VR, LiDAR, Drones etc.
- Location intelligence – autonomous vehicles and asset access
- Enhance regulatory filings for electric, construction, and gas; for example, the proposed Enterprise GIS platform would increase the accuracy of layout and drawings submitted for New York City and State permitting requirements.
- Enable REV DSP goals to share data with customers
- Reduce total cost of ownership for technology and create the opportunity for potential partnerships

In addition, Gas Operations will leverage functionality offered by the GIS system to enhance and support its work and asset management system implementation. These include out of the box features such as spatial views of flood maps, population data and other related demographics. Subsequent to the full deployment of its work and asset management system in 2020, Gas Operations will leverage lessons learned from Phase 1 to determine the implementation roadmap of Enterprise GIS with work and asset management system.

Phase 3

Phase 3 (\$125 million), which is outside the horizon of the Company's 2019 rate filing, targets the Company's steam system and electrical conduits, including vacant and obstructed conduits. This phase involves converting the Company's Conduit and Duct Occupancy (C & D O) mapping system, which is essentially PDF images, to a modern GIS platform. At this time, Phase 3 is envisioned to be most complex technically and labor intensive of all the three phases. When Phase 3 is complete, GIS will enable the Company to display all mapping systems on a single platform.

Benefits of Phase 3 include:

- New mapping tools for conduit and composite maps
- Underground 3d Model to enable more visibility for electric and gas interference

- Integration of LiDAR data for road depressions
- Intelligent conduit mapping, enhanced load flow and feeder ratings
- Accurate property records for taxation and legal settlements

GIS PRODUCT OVERVIEW

Figure 3 (below) illustrates the planned system architecture and application components for the Enterprise GIS.



Figure 3 – GIS System Architecture

The Enterprise GIS system is based on a Services Oriented Architecture (“SOA”), which allows software applications to leverage a common set of services. Services can take many forms including:

- Geo-processing services (e.g. deriving coordinates for an address)
- File transformation services (e.g. PDF file creation of a map display)
- Application programming interface (“API”) services
- Map display services (e.g. a map display service that provides an interactive map with electric features and the location of historical outage records)

Major components include:

- **Spatial Asset Management, Planning & Analysis tool** – The tool will be used primarily by mapping teams for maintaining Con Edison’s facility models, updating maps, and publishing map services that can be used by the web and mobile users. The desktop GIS product is Schneider’s ArcFM. The ArcFM product is an extension to Esri’s ArcGIS Desktop product. The ArcFM extensions are functionality specific to electric and gas utilities. ArcFM will replace Con Edison’s current mapping systems (VISION Electric, VISION Gas, Primary Mapping, EDFIS and Conduit Mapping).
- **Visualization tool** – All Company users will be able to access general map displays and specific application logic via a web browser. The map displays are maintained in the form of map services. Examples of map display services include a visualization that allows for the display and querying

of primary electric features and conduit/duct locations. The web-based component will ultimately replace the multitude of visualization applications currently deployed including NetMap and Area Profile System. Map Centric data studies have demonstrated significant improvements in decision making using maps.

- **Field Mobility Mapping Tool** – The mobile applications will be based on Esri’s ArcGIS Mobile platform and will replace the Byers application. This is expected to support over 3,000 mobile field users.

RISK MITIGATION

The following table summarizes major project risks and the associated mitigation plan.

Risk Item	Potential Impact to Project	Mitigation Strategy
Insufficient resources	- Schedule delays resulting from lack of timely response to vendor deliverables. - Functional gaps caused by lack of access to subject matter experts from stakeholder organizations/regions.	- Develop a comprehensive implementation plan with clearly define roles/responsibilities. - Proactively identify required resources and skillsets. - Work with stakeholder organizations in identifying prospective resources and associated time commitment.
Incomplete requirements	- Development “rework” because of lack of understanding of requirements. - Schedule delays. - Cost overruns.	- Phase 0 activities as defined in Section 3. - Allocating enough time and resources to sufficiently documenting and approving functional requirements. - Engaging requisite subject matter experts in requirements definition process.
Functional Scope Variance	- Schedule delays. - Cost overruns.	- Defining and adhering to a structured change control process that assesses change requests in terms value to business as well as schedule and cost considerations.
Change Management Plan	- Lack of organizational awareness of project - End user adoption of new systems.	- Incorporate change management into project implementation plan. - Initiate change management activities at an early stage of project. - Ensure change management specialists are part of implementation team. - Engage individuals from stakeholder organizations as project “champions”.
System Testing	- Schedule delays. - Cost overruns. - System performance issues. - Loss of credibility of system/lack of system acceptance by end users.	- Incorporate System Test Plan into the implementation plan. - Incorporate functional requirements into detailed test cases. - Identify system QA/QC manager who is responsible for overall definition and execution of test and acceptance plan. - Incorporate enough time in implementation plan for all types of testing including but not limited to: ▪ Unit testing ▪ System integration testing ▪ Performance and scalability testing.
Project Interdependencies	- Schedule delays. - Cost overruns.	- Continuously identify parallel projects with interdependencies. - Define and execute an interdependency management communication plan. - Incorporate regularly scheduled interdependency meetings into the implementation plan.

Risk Item	Potential Impact to Project	Mitigation Strategy
Data Quality – lack of authoritative data or degradation in data quality because of legacy system data migration	- Schedule delays. - Cost overruns. - Loss of critical data	- Identify dedicated resources responsible for the overall data migration process. - Incorporate in the implementation plan the development of detailed data migration specifications. - Execute multiple pilot migrations to validate and refine data migration procedures and results. - Clearly define data acceptance criteria and the automated and manual methods for ensuring data deliverables adhere to the acceptance criteria.
Vendor Resources - insufficient vendor project resource commitment and/or unqualified vendor resources.	- Schedule delays - Unacceptable deliverables - Contentious client/vendor relationship	- Identify, review and approve vendor resources during Statement of Work definition. - Incorporate resource approval/removal language in contractual terms and conditions.
Adoption of New Systems	- Continued use of legacy systems, - Cost overruns.	- Define and implement effective change management plan. - Incorporate into the project implementation plan the development of a system training plan. - Engage representatives from the end user community in a “train the trainer” approach to increase the end user acceptance. - Implement “just in time” training.

DATA CONVERSION

Data conversion has been recognized as a high risk for cost/schedule overruns. There are three components of data conversion:

- Conversion: digitizing maps from paper or raster (picture)
- Migration: processing data from one digital source to another
- Conflation: adjusting graphic data and aligning to the real world

The data conversion tools have matured since Phase 0 in 2004 with the availability of Safe Software's product FME (Feature Manipulation Engine). Three market leading vendors have also emerged with proven conversion software products: Avineon, Cyient, and RAMTeCH. At this time benchmarking indicates that migration and conversion risk is more process and execution based than software-based. The following table is a summary of data conversion lessons learned and a high-level plan to mitigate data conversion risks.

#	Lesson Learned	Risk Mitigation
1	Data model is the most important component. Pare it down to the most important elements to ensure performance and flexibility.	• Developed and tested models for Electric and Gas in Phase 0.
2	Carefully evaluate vendor expertise, capacity and methodology.	• Established relationships with market leading data vendors. • Benchmark with peers and get references for qualified resources.
3	Data conversion specifications and acceptance must be complete and well documented.	• Head start on specifications and acceptance criteria. • Executed acceptance criteria during Phase 0. • Documented gaps. • Build a cross functional team structure with separate GIS solution & data migration teams.
4	Business SME involvement critical at all levels through the process to understand and validate data and map display.	• Project organization includes SME's from Engineering at all levels. • Involve resources as part of the data validation rules, not just part of the validation process.
5	Use data conversions tests to refine scope & requirements for full deployment.	• Define specific functional expectations, size and assumptions for a series of data conversion tests, rather than just "x" numbers of tests. • Use this in SOW for acceptance, advance to next phase, and payment criteria.
6	Test conversions "too big" had diminishing returns for the effort expended.	• Implement "right size" test conversions based on function, time box, expected

		functional results and number of resources that will be allocated to the QA/QC. • Augment with vendor resources to perform initial visual and automated testing. Use Company resources as final acceptance for critical data such as Feeder Maps.
7	Automate QA/QC	• Head start on specifications for automated QA/QC. Evaluated vendor tools from Esri and RAMTeCH that can be leveraged. Documented gaps for targeted tools that can be developed.
8	Data Errors	• Start change management process early. Recognize that annotation will be a concern. Maps will look different. • Processes to review “map data” will change. Focus on accomplishing business needs, not maintaining legacy formats.
9	Manage risk and single-point of failure with data conversion process.	• Use two data conversion vendors to execute multiple data migration iterations, cross-checking, backlog processing and provide contingency.

COST BREAKDOWN

Annual Funding Levels (\$000):

Historical Elements of Expense:

<u>EOE</u>	<u>Actual 2014</u>	<u>Actual 2015</u>	<u>Actual 2016</u>	<u>Actual 2017</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2018</u>
Labor	-	-	-	-		-
M&S	-	-	-	-		-
A/P	-	-	-	-		-
Other	-	-	-	-		-
Overheads	-	-	-	-		-
Total	\$3,000	\$3,000	\$3,000	\$3,000		\$2,700

Future Capital Elements of Expense

<u>EOE</u>	<u>Request 2020</u>	<u>Request 2021</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>
Labor	\$3,034	\$3,030	\$3,000	\$6,000	\$6,000
M&S	-	-	-	-	-
A/P	\$20,482	\$20,652	\$20,479	\$43,354	\$43,354
Other	\$1,819	\$1,834	\$1,890	\$3,850	\$3,850
Overheads	\$4,666	\$4,483	\$4,703	\$9,298	\$9,298
Total	\$30,000	\$29,999	\$30,001	\$62,502	\$62,502

As the project transitions from development to production of the various mapping systems new Operations and Maintenance (“O&M”) costs will be incurred. We anticipate that additional costs will be partly offset by the retirement of the various legacy systems. At this time, there is no incremental O&M request included. O&M costs will be re-evaluated as the project implementation is completed.

Annual O&M Funding Levels (\$000):

<u>EOE</u>	<u>Budget 2021</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025+</u>
Vision	\$1,000	\$1,000	\$1,000	\$1,000	-
EDFIS	-	\$500	\$500	\$500	-
Primary	-	-	\$1,000	\$1,000	-
C&DO	-	-	-	-	-
Enterprise GIS	-	-	-	-	\$5,000
Total	\$1,000	\$1,500	\$2,500	\$2,500	\$5,000

APPENDIX A – GIS GRID ENABLERS

GIS Enabler Description	Operational Efficiency	Cost Avoidance	Collaboration	Customer Experience	Employee Engagement	Stakeholder Engagement	Compliance
Providing capability of intelligent modelling of conduit duct network and duct occupancy. The current record of Con Edison's conduit network is "unintelligent" or static maps that cannot be effectively incorporated into design layouts, electric or gas maps etc.	✓	✓	✓		✓		✓
Adoption of standard coordinate systems and accurate positioning of facilities in map displays. The current systems have inaccurate, proprietary and inconsistent coordinates for facilities.	✓	✓	✓	✓	✓	✓	✓
Comprehensive data validation prior to posting facility record updates to corporate repository - higher data quality	✓		✓		✓		✓
Consolidation of four electric mapping systems into single system	✓	✓	✓		✓	✓	✓
Consolidation of CuFlink into GIS electric model and improved customer facility matching.	✓			✓	✓		
Consolidation of electric and gas mapping systems into single system	✓		✓		✓		✓
Ability to maintain a single comprehensive model of the entire electric distribution system (primary, secondary service customers)	✓	✓			✓		✓
Consolidation of multiple visualization systems e.g. NetDVD into enterprise GIS environment	✓	✓	✓		✓		✓
Ability to display electric, gas and steam facilities into a single map display	✓		✓		✓	✓	
Utilizing New York City and Westchester county base map features e.g. road edge, street center line...	✓		✓		✓	✓	
Programmatic synchronization of electric asset data between GIS and WMS	✓		✓		✓		✓
Providing a comprehensive electric model to external analysis and operational systems e.g. PVL and STAR from single system.	✓		✓		✓		✓
Consolidation of CuFlink Gas into GIS model and improved customer facility linkage.	✓	✓			✓		✓
Improve self-service capabilities for end users to create ad-hoc map products	✓		✓	✓	✓	✓	✓
Ability to integrate external data e.g. Flood plains into map displays using web services	✓		✓		✓		✓
Capability to consolidate non-enterprise GIS systems into enterprise GIS	✓				✓		
Ability to create all standard electric map products from a single system of record	✓				✓		
Providing enhanced gas model to external analysis and operational systems (e.g. SynerGEE and MRP)	✓						
Ability for end users to perform ad-hoc queries against GIS data and extract to multiple file formats	✓		✓		✓		✓
Ability to incorporate new features into GIS model without custom coding.	✓						
Programmatic synchronization of valve data between GIS and Gas Inspection System	✓				✓		✓
Ability for field users to connect to and display up to date spatial asset data.	✓				✓		

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset	
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic		
Project/Program Title: Electric - ARM Replacement		
Project/Program Manager: Jason Foehrenbach	Project/Program Number(Level 1): 25546338	
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :		
Estimated Start Date:	Estimated Date In Service: 12/31/2027	
A. Total Funding Request (\$000) Capital: 66,500.0 O&M:	B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 15,000.0	D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:		
This effort is to migrate the Electric WMS (Work and Asset Management) system to the enterprise Maximo WMS platform. This is in keeping with IT's strategy of moving to a "One Enterprise" Work and Asset Management solution for all of Con Edison's business areas, to realize the full benefits of a true enterprise solution across all business areas. Electric WMS is now on the CGI ARMS platform and is experiencing severe limitations in the product line to meet the current and growing needs of the business. Significant investments have to be made to enhance the current functionalities of the Con Ed CGI ARMS implementation which can be met with Maximo out of the box capability. Maximo has been successfully implemented and has been in use in several business areas at Con Ed for many years: Central Operations, Steam, and Transmission Ops. In 2021 the platform was upgraded and the Controlled Enterprise license, which had some limitations in terms of the number of Maximo products licensed and the business areas covered, was re-negotiated to a true enterprise model which gives Con Edison and its affiliates use of any/all modules within the Maximo work and asset management suite of products on a subscription basis. A roadmap has been established to migrate over 45 disparate legacy WMS systems over the next decade. The Steam Job Tracking System migration to Maximo is now underway and Construction WMS will be migrated starting the fourth quarter of 2021. With this unrestricted use of the product line and total user base coverage, Electric Operation can now access and utilize all of Maximo's Work and Asset Mgt modules under the current enterprise license. The current Electric WMS system manages and tracks all work done by Electric Operations including: • Emergency repairs • Maintenance and inspection • New construction and customer connections • System performance/reliability programs		

This effort will encompass all major categories of work and asset management currently tracked in CGI ARMs, understand the limitations of the existing solution to meet the current and future needs of the business, and fill in the gaps. It will look at a cross section of, but not limited to:

- Work Initiation – initiate work from various sources
- Design and Estimating - The use of Compatible Units (CU) to define the labor, material and associated accounting
- Prerequisite and Materials Management – Prerequisites, such as parking data, is asset part of an embargo area, is a permit required to work on the asset or any special equipment needed, are set up for the work prior to the clerical effort required for dispatch. The materials are defined in the compatible units (CU's) of work to be performed
- Scheduling - The scheduling process starts with planning and forecasting the work, then scheduling.
- Dispatching and Resource Management – Dispatching is an extension of the scheduling process where the work is dispatched to field forces and resources around this are managed. Mobile, Work Closure and Time Reporting.

Justification Summary:

In keeping with IT's strategy of establishing a true "one enterprise" WMS platform for all operating areas, all legacy WMS systems are roadmapped to be migrated to the Maximo Platform including Electric WMS. In addition, potential risks associated with limitations in CGI's capabilities to continue meeting Electric Operations' changing needs with their ARM suite will be mitigated.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Long Range Plans

A roadmap has been defined for legacy work and asset management systems which are running on obsolete technology/and or are limited in capability and need extensive enhancements to address current and future business needs. These need to be migrated to the Maximo Enterprise Platform. The total number of systems identified is around 45 applications which can be migrated within the next decade, including Electric WMS.

Risk 1 Name: None

Risk 1 Description:

2. Supplemental Information

Alternatives:

Do not migrate to Maximo but keep the limited WMS Logica implementation. This is not in keeping IT's strategy for establishing a state of the art enterprise Work and Asset Mgt solution for all of Con Edison which fully meets/exceeds the current and growing needs of the business.

Risk of No Action:

Electric WMS has work management capability limitations. The product line cannot support the growing needs of the business.

Non-financial Benefits:

- Increased efficiency and customer satisfaction
- Improved workflows and streamlined business processes
- Enhanced business capabilities in areas of asset life-cycle management and asset performance management.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

A 12 week assessment was done at a high level to determine the fit for Electric WMS and 19 other disparate legacy WMS systems to the "One Enterprise" Maximo platform and estimate the benefits of migrating (both quantifiable and non-quantifiable). Of the quantifiable benefits, it was estimated that \$52 million, on the conservative side, will be realized over a ten year period following the systems migration of all 20 legacy systems.

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (66,500.0) = Total Cost (66,500.0)

4. Basis for estimate

Project estimate was based on prior Maximo migrations and the 12 week assessment estimate.

5. Conclusion

The current system's platform vendor, CGI, is not investing in their technology roadmap and do not have a vision for future capabilities needed for work management. As such, their technology will likely be obsolete within 3 to 5 years (e.g., Powerbuilder)

In addition, ARM WMS for Electric is functionally limited and may not meet the current and growing needs of the business. Migrating to a "One Enterprise" WMS system will bring new and greater efficiencies, consolidated platform and system support, and the ability for the business to leverage new and innovative functionalities to meet its current and future needs.

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

The 12 week assessment determined Electric WMS was a fit for IBM Maximo and it is extremely beneficial to migrate off its current platform to Maximo

Project Relationships (if applicable)

CORE, EGIS

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	0.0	23,750.0	23,750.0	19,000.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor			6,500.0	6,500.0	5,000.0
M&S					
A/P			12,000.0	12,000.0	10,000,000.0
Other			2,000.0	2,000.0	1,000.0
Overheads			3,250.0	3,250.0	3,000.0
Total	0.0	0.0	23,750.0	23,750.0	19,000.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M					
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☐ Project ☒ Program	Category: ☒ Capital ☐ O&M	☐ Regulatory Asset	
Work Plan Category: ☒ Regulatory Mandated ☒ Operationally Required ☐ Strategic			
Project/Program Title: Gas Work & Asset Management New Functionality			
Project/Program Manager: Catherine Serrano		Project/Program Number(Level 1): 25496791 (L1_Gas Work & Asset Managemnet New Functionality)	
Status: ☐ Initiation ☒ Planning ☒ Execution ☐ On-going ☐ Other :			
Estimated Start Date: 1/1/2023		Estimated Date In Service: Ongoing	
A. Total Funding Request (\$000) Capital: 10,125.0 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 0.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
The objective of this program is to enhance the functionality of the Gas Work Management System (WMS) by adding new functions, automation, and additional integrations to improve business processes. An example of new functions that will be implemented are: Operator Qualifications, Material Traceability, Fuse Tracking, Paving Schedule, Pre-requisite Functionality, Auto Scheduling, etc. These functions are needed to further achieve the goals and objectives of Gas Operations. Furthermore, other applications such as the new CSS (CORE) and the Graphical Information System (eGIS) have commenced implementation and enhancements are needed in Gas WMS to make the integration seamless. This program will also yield strategic benefits that support both corporate and Gas Operations' goals and objectives. Some examples are an integrated view of financial and operational data resulting in more effective risk mitigation strategies, increased transparency, more effective trending and analysis, improved operational efficiencies, and an enhanced customer experience through more accurate and timely information around work flow and job status. Certain aspects of this program (particularly the Contractor Portal and OQ integration), will begin the road to compliance with certain aspects of proposed OQ rules recently re-released by DPS Staff. Of particular compliance concern is the proposed language related to 255.604(b)(2)(i), which requires detailed records kept, for the purposes of DPS Staff auditing, of work performed by non-qualified individuals. The above referenced program aspects are only the first step in compliance with this proposed rule; however, additional future programming will be needed to achieve compliance.			

Justification Summary:

Requirements for enhancements to Gas WMS (a CGI ARM application) and interfaces will be required as the Customer Information System (CIS) is replaced and the implementation of a Graphical Information System (GIS) is completed. Along with new integrations and additional items that are not currently available in Gas WMS, additional cost savings such as following are also planned:

- GEM (Gas Work Management Mobility):
 - As updates are made in the ARM suite corresponding enhancements will need to be made to the GEM Mobile application to insure continuity for our production users.
- OQ/Contractor Portal
 - Integration to contractor portal and OQ solution to capture operator qualification and field data from contractors into ARM
- NYC DOT Paving Schedule:
 - Add an integration with ProceMX to receive the NYC DOT Paving schedule. This will allow Con Ed to get any work on the block done before the NYC-DOT paves the block. Con Edison can be liable for very high repaving costs when we excavate a recently paved street.
- Fuse Tracking
 - Ability to bring fuse tracking into the ARM platform and leverage a cohesive WR system to identify details on fuses.
 - Eliminate additional licensing costs
- Contractor Portal
 - Ability to have contractor interact with ARM through middle layer allowing for timely field data collection
- CGI ARM Pre-Requisite Functionality:
 - Add functionality improvements to better understand the Pre-Requisites that need to be managed and the status of those Pre-Requisites to minimize delay time, created by items such as no access.
- EBS Pre-Requisite Integrations:
 - Integrations with Oracle EBS to better understand the full cost of managing a Pre-Requisite such as Cone hive, Flagger, or NYC Parking signs. Today it is very hard to marry these costs to the work that was done.
- Auto Scheduling:
 - Develop an Auto Scheduling engine that will automate like and kind replacement work such as shunts, bridges, and open mains rather than needing significant planning and scheduling time from Schedulers, Work Organizers, and Clerical. This automation will use the new CGI ARM Pre-Requisite functionality mentioned above.
- Parking/access information:
 - Adding a mechanism to better capture parking data associated to the Facilities within Asset Manager and use that data to create a more effective work schedule.
 - automatically manage the Pre-Requisites and build out the Work Request for the pole replacement.
- ARCOS:
 - ARCOS is a crew management software with a very sophisticated user interface. The Work Management System has an application Called Central Configuration that allows for similar functionality but the user interface is very difficult to use. As such, the clerical is updating crewing information such personnel assigned to the crew, shift pattern, training schedules, vacation, etc. in both systems. We plan a bi-directional integration between ARCOS and ARM Central Configuration to eliminate this double entry.
- HR Payroll:
 - HR Payroll intends migration from HR payroll to Oracle's HCM (Human Capital Management). This will likely require retiring the existing WMS to HR Payroll integrations and replacing them with new.

Additional reporting in Tableau to utilize the additional data being captured

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

The new functions will allow additional efficiencies gained from field level data collection.

Risk 1 Name: Department - Gas Operations -
Regulatory Non-Compliance

Risk 1 Description:

The enhancements covered in this whitepaper directly impact the system ability to facilitate the end-to-end process of compliance related inspections.

Ability to reduce risk of non-qualified resources performing work along with ability to fully track and trace gas assets through scope outlined in this whitepaper.

2. Supplemental Information

Alternatives:

Risk of No Action:

Impact to integrations in production will severely impact the continuity of operations and prevent the organization from achieving efficiency while posing risk to compliance.

Additionally, without the implantation of certain aspects of this work (particularly the Contractor Portal and OQ integration), Con Edison will be unable to comply with certain aspects of proposed OQ rules recently re-released by DPS Staff. Of particular compliance concern is the proposed language related to 255.604(b)(2)(i).

Non-financial Benefits:

Maintaining a reliable work management system will continue to allow for gained efficiencies in work performed in Gas Operations

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

In support of the overall Gas Central Business case savings of \$13M annually.

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (10,125.0) = Total Cost (10,125.0)

4. Basis for estimate

Benchmarked with other organizations that have implemented a similar system in previous years

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis
In Flight Project
Project Relationships (if applicable)
Gas Central

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):
Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital		3,375.0	3,375.0	3,375.0	
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor		2,193.8	2,193.8	2,193.8	
M&S					
A/P					
Other					
Overheads		1,181.2	1,181.2	1,181.2	
Total		3,375.0	3,375.0	3,375.0	

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	0.0	0.0	0.0	0.0

Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

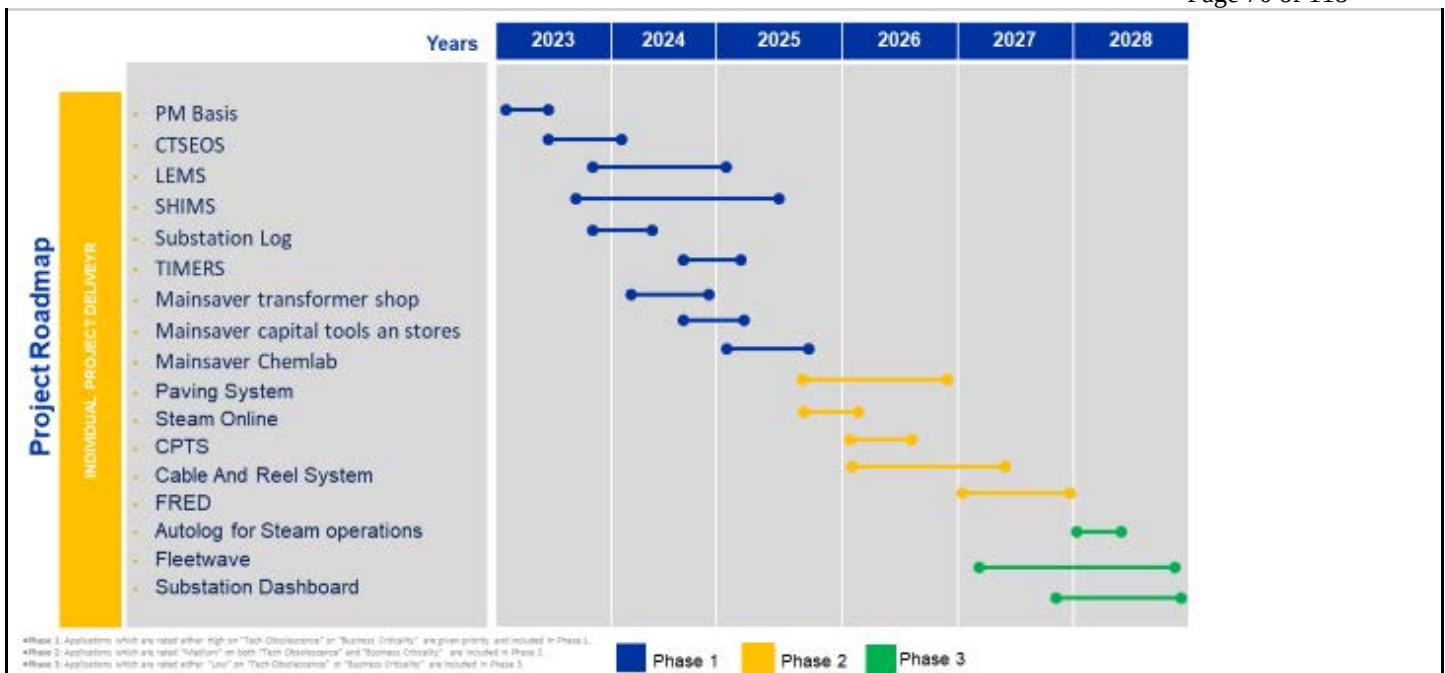
Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: Project ☒ Program	Category: ☒ Capital ☐ O&M	☐ Regulatory Asset	
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: Maximo Consolidation Program Phase 1			
Project/Program Manager: Clement Baker		Project/Program Number (Level 1): 25524249	
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date: 1/3/2023		Estimated Date In Service: 12/30/2025	
A. Total Funding Request (\$000) Capital: 87,630.9 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 150.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
Information Technology has established a roadmap consisting of several work and asset management legacy applications to be migrated to Maximo. This is in keeping with IT's strategy of moving to a "One Enterprise" Work and Asset Management solution for all of Con Edison, to realize the full benefits of a true enterprise solution across all business areas, as well as to address technology obsolescence and mitigate cyber risks. Maximo has been successfully implemented and has been in use in several business areas at Con Ed for many years: Central Operations, Steam, and Transmission Ops. In 2021 the platform was upgraded and the Controlled Enterprise license, which had some limitations in terms of the number of Maximo products licensed and the business areas covered, was re-negotiated to a true enterprise model which gives Con Edison and its affiliates use of any/all modules within the Maximo work and asset management suite of products. With this unrestricted use of the product line and total user base coverage, we are looking to extend the current use of the implemented Maximo, eliminate disparate legacy systems which are challenging and costly to maintain, many currently running on obsolete technologies, and continue to build out and improve on the current functionalities There are a total of 17 migrations to be done in 6 years. The current assumption is we will implement based on the timeline below.			



The dollars requested in the rate case were determined based on a Legacy WMS Portfolio (17 Applications) assessment done by Cognizant International as a starting point. This assessment estimated at a very high level, the feasibility and cost of migrating all 17 applications to Enterprise Maximo. The estimated migration cost is \$61M. However, this did not include all legacy WMS applications/functionalities currently in use throughout Con Edison via legacy applications as well as paper processes. The dollars requested are based on Cognizant's estimate plus dollars and contingency added to fill the gap listed above. The additional contingency added was \$26M.

Some of the legacy systems/requirements not included in this assessment are:

1. Migrate IT Infrastructure and Operations Paper Processes to Maximo
2. Migrate IT Corporate Security Paper Processes to Maximo
3. Additional Enhancements
 - Facilities (MOC Integration, Inspection Forms, Mobility and Engage Integration)
4. Implement OOWP (Operating Orders and Work Permits) for LNG
5. Migrate Capital Tools application and paper processes to Maximo

Justification Summary:

There are several legacy work management systems in CECONY which are running on obsolete technologies and present a cyber risk unless re-written or replaced. These need to be migrated to

Maximo. Others are limited in functionality and simply need to be migrated to Maximo to be able to leverage new and advanced WMS capabilities, a consolidated application and platform support, and to realize new efficiencies now and accommodate future needs.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name: None

Risk 1 Description:

2. Supplemental Information

Alternatives:

Do not migrate the systems, but re-write, upgrade, and enhance them in their legacy status. This is not in keeping IT's strategy for establishing an enterprise Work and Asset Mgt solution for all of Con Edison

Risk of No Action:

Systems remain either in a state of technology obsolescence presenting a cyber risk, inefficiency, or with inadequate functionality to meet current and future business needs and

Non-financial Benefits:

Consolidated Enterprise Platform support and maintenance, streamlined business processes, enterprise product license leveraged.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

A 12 week assessment was done by a third party, to migrate 20 legacy WMS applications to "One Enterprise" Maximo. A total of 52M of cost avoidance and financial benefits were estimated.

2. Major financial benefits

Reduction in Application supports costs of \$17M over 10 years after project implementation.. The project cost (2023 - 2028) is estimated to be approximately \$68M.

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (87,630.9) = Total Cost (87,630.9)

4. Basis for estimate

An 12 week assessment was conducted by a third party vendor to determine the project cost.

5. Conclusion

IT currently supports a wide portfolio of disparate WMS legacy applications. Many are running on obsolete technologies while others have reached their functional limitations and can no longer adequately support the current and growing needs of the business. This raises cybersecurity concerns. Cyber-attacks have increasingly targeted critical infrastructure providers. Malicious actors have increased their capabilities, and such attacks can cause serious disruption to the operation of the Company's corporate IT network, operational networks, and critical energy infrastructure. Obsolete systems lack the ability to allow the Company to leverage the latest cybersecurity tools such as advanced monitoring and alerting and multifactor access control. Replacing these systems will allow us to modernize cyber controls such as these. This cybersecurity risk is compounded by the dwindling number of skilled resources with the background to support the obsolete technology in the legacy applications. Due to the cybersecurity risk, and because the current asset management practices and business processes are not sustainable, it is critical to pursue this project during the upcoming rate case.

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

20 legacy WMS systems were analyzed as a fit for the Maximo "One Enterprise" platform implemented at Con Edison and found to be a good fit.

Project Relationships (if applicable)

EGIS, CORE, and Gas & Electric WMS.

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):
Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	15,492.7	24,955.8	18,070.6	12,217.6
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor		15,021.8	23,778.5	16,830.5	11,295.0
M&S		16.3	902.6	965.5	737.2
A/P					
Other		454.6	274.7	274.7	185.4
Overheads					
Total	0.0	15,492.7	24,955.8	18,070.6	12,217.6

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M		0.0	0.0	100.0	0.0

Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/ project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset		
Work Plan Category: ☒ Regulatory Mandated ☐ Operationally Required ☐ Strategic			
Project/Program Title: OMS IT System Hardening			
Project/Program Manager: Gabriel Cano		Project/Program Number(Level 1): 23317064	
Status: ☐ Initiation ☐ Planning ☐ Execution ☒ On-going ☒ Other :			
Estimated Start Date: 01/01/2023		Estimated Date In Service: 12/31/2025	
A. Total Funding Request (\$000) Capital: 12,430.0 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 2,372.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
In March 2018, two consecutive nor'easters struck our service territory damaging our distribution electrical system. Several compounding factors lead to issues with the Outage Management System (OMS) landscape negatively affecting our customer's experience. The Company put together a Storm Assessment Team to analyze Con Edison's response to the weather events and engaged McKinsey and Company to conduct a technical review of the OMS landscape and an evaluation of the Customer Outage Journey. These efforts produced a list of suggested corrective actions. The goal of this project is to address these suggestions and any other PSC orders. The work can be categorized into seven work streams. - Technology – Address current technology issues. - Architecture – Re-architect or correct current system design issues and set standard for future projects. - Data Optimization – Correct and set data standards for integration between systems, - IT Process Management Tool – Improve maturity of core IT processes. - End to End testing environments – Build environment and test procedure that allow full system testing and validation of business rules. - Standards & Governance - Define enterprise enforcement and implementation standards for application, integration and infrastructure. - Business Led Technology – Transform current business process to work with existing technology. This opportunity will be used to excel at the basics (e.g., increase system stability) while also laying the foundation for advanced capabilities and new systems implementation (e.g., GIS), and enhancing the customer experience.			

Justification Summary:

This program is in direct response to technical and systematic issues experience during winter storms Riley and Quinn identified by Storm Assessment Team and the McKinsey study. The proposed enhancements will both correct current technical gaps as well as set the building blocks for future integrations, enhancements, and testing.

The hardware/infrastructure upgrade will enable High Availability (HA) architecture mitigating the need for prolonged maintenance outages for software patching, as well as significant reduction in Disaster Recovery (DR) times during failover. To implement the HA architecture, the Company will deploy the new Exadata hardware which is Oracle's latest platform for hosting databases. In addition, the Company will deploy virtual infrastructure (Nutanix) to support the new environments. These platforms will increase system performance and recovery times. The new HA architecture will include additional test environments that closely match production environments and will increase the Company's capacity to undertake additional testing.

Develop an OMS DR option to further strengthen availability, resiliency and scalability of our OMS systems.

The Company has also committed to perform semi-annual OMS end to end testing in order to comply with a PSC requirement that came out of the Riley/Quinn Winter storms in 2018. Following the Tropical Storm Isaias storm in August 2020, the PSC has directed NYS utilities to additionally conduct testing of their OMS systems to simulate 90% customer impact. As a result of these ever-increasing testing requirements, the Company will make investments in its systems and processes to support these testing initiatives in 2021 and beyond.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

A robust OMS platform is a key input to the Company's OMS Storm Hardening initiatives. Key investments in a modern high availability architecture maintain the OMS under peak system usage which is essential during storms of ever-increasing intensity. In addition, the OMS software upgrade will further enhance the user experience and keep the Company current regarding the vendor's product offering.

Following the Riley/Quinn Winter Storms in March 2018, the NYPSC directed all NYS utilities to conduct semi-annual end-to-end testing of their OMS suite of applications. This requirement was added as a Key Risk Indicator for the Company and incorporated in Company's Emergency Response Plan (ERP). Following Tropical Storm Isaias, the NYPSC took this requirement a step further and directed all NYS Utilities to conduct end-to-end testing of their OMS systems simulating an outage impacting 90% of their customers. To meet this new requirement now and into the future, the Company must continue to invest in robust testing environment and processes.

Risk 1 Name: Corporate ConEd.Operations.Major Storm

Risk 1 Description:

Project resources can be pulled for Storm support

Risk 2 Name: Department.Electric Ops.Cost Control

Risk 2 Description:

Major business partner is under resourced and not full time with OUA project. This brings schedule challenges in terms of delayed requirement addition and extended user acceptance testing

2. Supplemental Information

Alternatives:

Alternative 1 description and reason for rejection

Delaying the OMS hardware puts the Company at significant risk of not being able to support storm restorations in a timely manner. The new HA architecture is also required to satisfy the new NYPSC requirements for more comprehensive end-to-end system testing.

Alternative 2 description and reason for rejection

The alternatives to this proposal would be to extend the timeline for technical corrections and delay future enhancements suggested by the PSC and Storm Assessment Tea

Risk of No Action:

Risk 1

No action would leave Coned not in compliance with the PSCs recommendations and mandates and expose the company to fines and penalties.

Non-financial Benefits:

The OMS is critical to storm restorations and allows the Company to provide timely and accurate status of outages to its customers. Any risk to these systems can adversely impact the Company's ability to restore customers and provide them timely information.

Enhanced customer experience.

Correcting the technical and systematic issues with the OMS system will improve CSAT by reducing errors in outage communications (e.g., incorrect ETRs / dropped ETRs), reliable access to all communications channels and an overall improved outage journey experience for the customer.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

The Company will benefit from process improvements and reduced overhead through the reduction of unplanned system outages through system stability improvements, improved incident response, and reduction in future project cost by streamlining current IT environments (simplifying existing environments and leveraging reusable services), implementing better testing strategies (automating testing).

For the AMI – OMS initiatives, allows for more efficient use of crews by showing the location of the nested outage before the crews leave the area. With the legacy process, often the crews have already left the location before any notification of nested outages are received due to the reliance on the customer.

3. Total Cost (\$000)

All Previous Actuals (19,419.2) + Cur. Yr. Sanctioned Forecast (9,783.2) + Next 5 Years Est. (12,430.0) = Total Cost (41,632.4)

4. Basis for estimate

Historical charges for the OUA and outage management projects, which include vendor efforts such as testing, project management and development, from Hexstream, Wipro, Oracle & Kubra. The basis for the estimate includes the forecasted labor hours along with the architecture, development, requirement gathering/documentation, testing and implementation of the OMS suite

5. Conclusion

OMS storm systems are mission critical applications that support storm restoration and incident response. The Company should continue to enable new functionality and enhance the reliability of these systems. The Company's service territory continues to be impacted by severe weather events. Any delays in service restorations can adversely impact customers. The projects being implemented as a part of this program will allow the Company to respond more effectively to storm events.

Project Risks and Mitigation Plan

Risk	Mitigation Plan
Storm Support affecting project deadline	* Build a solid storm support documentation and guidance plan * Share knowledge with other members of the team

Technical Evaluation/ Analysis

The OMS is critical to storm restorations and allows the Company to provide timely and accurate status of outages to its customers. Any risk to these systems can adversely impact the Company's ability to restore customers and provide them timely information. The technical evaluation considered the following activities that are expected to be evaluated and implemented over the upcoming years:

- Implement automation of testing for our suite of outage management systems.
- Develop an outage filtering engine to improve the accuracy of the AMI reported outage messages and automated verification of customer meter power status prior to restoring outage jobs in OMS thereby improving accuracy of restoration communication with customers.
- Implementation the outage management system, for disaster recovery, providing the Company additional resiliency options.
- Design and develop the next generation cloud-based architecture for OMS. This includes hardware upgrade of

the OMS technology stack over the next few years.

- Oracle Utility Analysis Phase 2 – this data warehouse will serve as the system of record for all dashboards and new downstream systems and will ensure consistent and timely outage data across multiple applications and new customer communication channels.
- Standing up the outage map on premise. Creating an outage map on the Company's on-premise servers assist in resiliency and higher reliability, along with on-site accessibility.
- Correcting the technical and systematic issues with the OMS system will improve CSAT by reducing errors in outage communications (e.g., incorrect ETRs / dropped ETRs), reliable access to all communications channels and an overall improved outage journey experience for the customer.
- The Municipal Outage Map & New Site Safety Platform.

Project Relationships (if applicable)

Digital Customer Experience (DCX) – DCX will continue to refine the customer journey and this project will support technology changes to the OMS landscape to support these future requirements.

Geographic Information System (GIS) - This project will set future state integration principles and architecture that will be leveraged by the GIS project.

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital			7,377.4	12,041.8		9,783.2
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	3,200.0	3,944.0	3,990.4	4,151.8	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor					
M&S					
A/P					
Other	3,200.0	3,944.0	3,990.4	4,151.8	
Overheads					
Total	3,200.0	3,944.0	3,990.4	4,151.8	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	620.0	620.0	1,282.0	1,282.0	
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset		
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: Oracle EBS ERP Cloud Migration			
Project/Program Manager: Shauntel Jenkins		Project/Program Number(Level 1): 25524250	
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date: 1/1/2022		Estimated Date In Service:	
A. Total Funding Request (\$000) Capital: 120,755.1 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 16,940.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
The goal is to implement Oracle E-Business (EBS) Cloud and retire the existing local Enterprise Resource Planning (ERP) solutions. For Oracle EBS, all business requirements will be reviewed and validated. Gaps in functionality will be evaluated and solutions determined. The adoption of Cloud applications requires standardized processes and is expected that configurations resolve most gaps. The Oracle EBS System has 515 Con Edison-specific modifications to the base system, which require evaluation and testing. These modifications change how the system works to conform to Con Edison's business practices. 118 Functional Extensions 121 Inbound Interfaces 99 Outbound Interfaces 149 Custom Reports 28 Custom Workflows. Testing will include all finance and supply chain functions, interfaces to other Con Edison systems, and external systems such as banks and vendors. The information currently stored on-premises in the EBS system will be converted to Oracle's cloud solution. A Phase 0 assessment will assist in determining the scope of the EBS move to the cloud. It enables the Company to: - Understand and capture the functional and technical components of the cloud environment - Clarify the purpose, goals, and expected benefits of the cloud implementation - Perform a holistic review of all cloud modules and applications sharing a single instance and tenancy across the enterprise - Derive Key Design Decisions (KDD) - Obtain a gap-fit analysis - Determine the scope of, and organizational readiness for, desired larger-scale changes such as Projects modules redesign; implementation of Oracle Assets for asset accounting; and redesign of the chart of account structure. - Understand the extent of time, investment, and resources required to plan for a 2024/2025 go-live - Identify mandatory business change as a result of descoped customization			

- Provide early-on business change management via proof of concepts of new / changed functionality, access to experience the new look, and canvassed feedback
- Identify business drivers for required customization and determine feasibility – such as Complex Service Purchase Orders
- Contribute to the completeness of the scope included in the formal Request for Proposal to implement the Cloud migration.

In addition, Consolidated Edison Inc. entered an Oracle Strategic Partnership (OSP), which aligns with Con Edison's strategic business cost optimization, enhances operational efficiency, and improves customer experience through technology innovation. It supports Con Edison ability to:

- Innovate on new technologies that benefit Oracle's industry leadership and enable Con Edison to improve business processes and customer service
- Deliver and adopt software and services that are best-in-class for scope, functionality, performance, and quality
- Collaborate utilizing Con Edison's knowledge of the industry to assist Oracle in improving their solutions and Oracle system knowledge to determine critical solution design decisions and
- Prioritize work that focuses on the highest value for both companies

Justification Summary:

Oracle's strategic direction is to migrate all on-premises solutions to their cloud platform. Oracle is devoting most of their development resources to the cloud, with limited spend on local software. This means that on-premises software will have a time lag in bug fixes and eventually will not be enhanced.

If Con Edison does not perform this migration, supply chain and finance operations will be susceptible to delays in enhancements and bug fixes. It will also require periodic and costly upgrades to the local software.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name: Department.Information Technology.Unsupported technology in computer systems

Risk 1 Description:

The software vendor, Oracle, is moving all their applications to the cloud. Oracle EBS has been available on the cloud for several years. By 2021 it will be a mature product while Con Edison's on premise version will be obsoleting.

2. Supplemental Information

Alternatives:

Con Edison could maintain the current local solution or delay the migration to the cloud. These alternatives would require Con Edison to maintain a technical support staff as well as maintain on-premises infrastructure such as storage, networking, and servers.

Risk of No Action:

Risk 1

Con Edison's investment in the Oracle EBS would depreciate as Oracle devotes more time and resources to their cloud solutions relative to their on premise solutions. Although the on-process Oracle EBS would continue to work, it will not improve as quickly as the cloud solution.

Risk 2

If a Phase 0 assessment is not performed, there is a risk that major uptakes, key design decisions and scope considerations may be overlooked as we embark on the cloud migration project.

There would also be significant impacts to the actual implementation timeline due to lack of clarity on the project scope, business process gaps (fit-gap analysis) and key design decisions that would be achieved in Phase 0.

These oversights could result in disruption to the business and post migration implementation costs.

Non-financial Benefits:

Oracle's current cloud user interface has a modern look and feel. During the next few years, the cloud product will continue to evolve and improve. The timing of the project will provide Con Edison with a mature yet modern solution. One example is the standardization of work flow approvals in the cloud. The on-premises Oracle EBS has a different method of implementing workflows which increase the system complexity and cost. The cloud version has a simpler and more efficient workflow process. This would help to speed ordering, receipting of goods, and payments.

Increased safety, reliability and efficiency

The cloud product support's the Company's ability to:

- Continue to focus on technological innovation and effective and efficient support systems
- Continue to produce clear, accurate and timely financials for both internal and external customers and reduce the risk of misstatements in Corporate Accounting
- Continue to provide cost savings and productivity savings in Finance and Operations

The Phase 0 assessment will:

- Encourage stakeholder engagement and obtain early buy-in
- Reduce reliability on on-premises hardware infrastructure and associated upgrades
- Identify areas where Con Edison can leverage native/improved functionality while descope costly customizations

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

There will be savings/cost avoidance over a five-year period after implementation. These will come from the process improvement in the major Supply Chain work streams: Supplier Enablement, iProcurement, Sourcing, Order Management, iSupplier Portal, OBN, and Inventory. Additional savings/cost avoidance will result from the Accounting and Finance work streams: Payables, iExpense, Receivables, iReceivables, General Ledger, Assets, Cash Management, Project Costing, Advanced Collections, eBTax and Project Billing

Our software vendor, Oracle is committed to improving their Supply Chain and Finance platform. We have witnessed this with their introduction of the Account Reconciliation module that is only available on the Cloud. Cloud platforms offer more functionality and current technology without the need for financial investments in hardware and internal resources to support an on-premises application. Performing Supply Chain and Finance functions is fundamental and operationally required for all companies and a cloud platform will provide the most cost-efficient way to continue providing these required services.

The remaining savings/cost avoidance will be achieved as more of Con Edison's system are hosted on the same cloud platform. Already, Con Edison has moved the Budgeting and Forecasting, BI Cloud and Project Management (Primavera) to Oracle's Cloud. Soon CEB's will have their financial system in Oracle's Cloud.

In addition, implementing the Oracle solution provides the added incentive of utilizing the Oracle Strategic Partnership and realizing the cloud credits upon implementation and also by retiring our on-premises Oracle EBS application.

2. Major financial benefits

Eliminate the need to upgrade the on-premises application which should happen every 2 to 3 years. This would also eliminate the need to upgrade the servers every 5 or 6 years.

The estimated total cost of the Oracle EBS ERP cloud migration is \$127 million which is reflected in the requested five year budget detailed in this whitepaper. The \$127 million is spread over the 2021 (\$1.5 million), 2022 (\$7.1 million), 2023 (\$50.6 million) and 2024 (\$66.4 million) and 2025 (\$1.4 million) budget years.

The Capital Project will require the 7.3% of the cost to be allocated to Orange and Rockland Utilities.

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (120,755.1) = Total Cost (120,755.1)

4. Basis for estimate

The cost estimate was based on the initial Oracle EBS and BI installation with adjustments needed to account for reduced hardware and software licenses.

The O&M costs were estimated from historical costs and then projected forward. These were augmented with the planned increases due to future uses of the Oracle software products. These costs were then included in the negotiated Oracle Strategic Partnership (OSP).

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Project Relationships (if applicable)

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	2,353.1	50,570.0	66,429.0	1,403.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	0.0	4,226.0	4,350.0	1,051.0	
M&S					
A/P	0.0	38,577.0	52,204.0	242.0	
Other	2,353.1				
Overheads	0.0	7,767.0	9,875.0	110.0	
Total	2,353.1	50,570.0	66,429.0	1,403.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	7,100.0	0.0	0.0	1,370.0	8,470.0
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M	☐ Regulatory Asset	
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: Oracle HCM Cloud Implementation			
Project/Program Manager: Marie Chatterjee		Project/Program Number(Level 1): 24155401	
Status: ☐ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date:		Estimated Date In Service: 12/31/2023	
A. Total Funding Request (\$000) Capital: 38,899 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 2,566		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
The scope of this project includes the replacement of Peoplesoft's HCM and CRM applications (the HR Payroll and myHR Connection systems), the consolidation of disparate HR systems to a single platform, the development of advanced and predictive workforce analytics and the creation of a long-term workforce data platform to store 35 years of electronic history and new data from the HCM Cloud. The HR Payroll system was implemented in 2009 as an on-premise solution and it is the responsibility of the Company to maintain and upgrade the system when the version is no longer supported by Oracle, every three to four years. It is also the Company's responsibility to purchase and maintain hardware to house the production and all the test environments. The support provided by Oracle includes security patches, tax update and upgrades to the underlying technology called PeopleTools. Furthermore, there is a complex manual effort to gather and consolidate data to produce basic workforce analytic reports used to make data driven staffing decisions and manage succession planning. These factors increase risk and decrease efficiency and effectiveness of workforce planning. In 2018 the Company signed a Strategic Partnership with Oracle to support the company's technology which includes the subscription fee for the Human Capital Management (HCM) Cloud application which resulted in HR and Information Technology (IT) completing a rapid assessment to determine the level of effort and cost estimates to consolidate and migrate all employee related business processes to the Oracle HCM Cloud. The assessment included how the Company will reduce compliance risk, support enhanced business practices, increase the efficiency by offering mobile applications, create advanced workforce analytics, create a long-term data archive and replace obsolete HR and Learning and Inclusion (L&I) systems.			

Justification Summary:

Migrating to Oracle HCM Cloud will provide new functionality for employees and eliminate the need to maintain and upgrade our on premise application and hardware.

The implementation of the HCM Cloud, will result in both tangible (quantitative) and intangible (qualitative) benefits.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name: Corporate
ConEd.Operations.Cybersecurity

Risk 1 Description:

Oracle releases quarterly updates to the HCM Cloud for security patches, application updates and tax and compliance updates. In the Cloud environment Oracle will be pushing these changes into the system and IT Support teams will no longer be required to download and apply these patches. Updates will need to be reviewed, tested and accepted by the HR Payroll Support team then applied by Oracle on a quarterly basis. This process increases the efficiency of applying system updates to remain in compliance with required regulations or changes to the law.

2. Supplemental Information

Alternatives:

Phased Implementation

This alternative would delay a portion of the investment summarized above but would be costlier over the long run and delay the benefits of fully integrated and standardized employee processes and system implemented across the company.

Multi-Year Postponement

An alternative to postpone the HCM Cloud implementation for two or more years. This alternative would prolong the Company's ability to address the risks and inefficiencies associated with the current environment and realize the benefits of a recently negotiated agreement with Oracle.

Risk of No Action:

One alternative that was considered was to maintain the status quo and to use and maintain the current, separate systems that support employee, contractors and retiree processes. This alternative would expose the Company to the

following risks:

- Highly manual process for onboarding, succession planning and workforce analytics with increased chances for errors and mismanagement
- Existing systems are not fully integrated or user friendly, increasing time required to perform administrative tasks by employees and managers. i.e., performance reviews, timesheet entry and approvals.
- Support of homegrown HR systems has significantly reduced over time making the development of new enhancements or the maintenance of compliance related functionality difficult.
- Workforce analytics currently employ three different systems, limiting their ability to obtain a single consolidated view of workforce data to support effective analysis and decision making.

Non-financial Benefits:

Regulatory Mandated/ Reduce and Manage Risks

Oracle releases quarterly updates to the HCM Cloud for security patches, application updates and tax updates. In the Cloud environment Oracle will be pushing these changes into the system and IT Support teams will no longer be required to download and apply these patches. Updates will need to be reviewed, tested and accepted by the HR Payroll Support team then applied by Oracle on a quarterly basis. This process of increase the efficiency of applying system updates to always remain in compliance with all required regulations or changes to the law.

Operationally Required

A deferral of this project would have consequences on the existing HR Payroll System. The support and maintenance for PeopleTools will expire in January 2023 and the system will require an upgrade. Without the upgrade, security patches will longer be available leaving the system vulnerable for a CyberSecurity attack.

Improve Customer Experience:

The HCM Cloud platform offers the ability to deliver a modern experience for users via displaying content as tiles and on mobile devices. This will allow for the deployment of the employee and manager self-service transactions to mobile devices. This will enhance self-service to field employees thus reducing call volume in the call center and productive time of the HR Professionals.

Moving all employee related business functions to a consolidated platform will provide a single place for employees to manager their personal information and for managers to gain insight into their team.

Enhance External Relationships:

Migrating to HCM Cloud will ensure long term sustainability of the Company's payroll/time keeping process. Oracle's support is now providing updates and patches to cloud applications first before traditional on premise applications such as PeopleSoft illustrating Oracle's support priorities.

Reduce Costs and Strengthen the Company Processes:

The HCM Cloud will give field employees the ability to use self-service functionality anywhere at any time. The mobile applications will increase employee productive time as they will no longer need to come into the office, log onto a computer to make simple changes, such as change of address. In addition, the latest software version allows for improved performance with regard to reporting processing time and improved dashboard capabilities, which will allow for more streamlined business processes.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

An analysis of cost savings or avoidance as a direct result of this project was completed and the quantitative benefits are listed as follows:

Totals shown for CECONY and O&R

Cost Avoidance & Credits

Description	2022-2031
Headcount reduction / Operational Efficiencies	\$45
Avoid future upgrades, maintenance & patching	\$26
Oracle Shelving Credits	\$10
Total	\$81

Cost Reduction

Description	2022-2031
Headcount reduction / Operational efficiencies	\$5
Eliminate 3 rd party vendors	\$2
Total	\$7

3. Total Cost (\$000)

All Previous Actuals (136.7) + Cur. Yr. Sanctioned Forecast (18,448.1) + Next 5 Years Est. (32,807.9) = Total Cost (51,392.8)

4. Basis for estimate

Project cost estimates were developed from the Oracle Rapid Assessment and internal analysis of existing systems and integrations. System integrator cost is based on estimates from Oracle Consulting.

5. Conclusion

Project Risks and Mitigation Plan

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Risk	Mitigation Plan
Delay in the start of the project	A separate parallel project to complete a PeopleTools upgrade will be mobilized in 2022.

and the expected go-live date of the new system is postponed.	PeopleTools is the underlying technology software for PeopleSoft HCM (HR Payroll) and PeopleSoft CRM (myHR Connection). Completing the PeopleTools upgrade will keep the current on-premise PeopleSoft Application compliant and eligible to receive security and tax updates until 2024. This additional time will be a contingency if there are any additional delays with the go-live of phase 1 of the Oracle HCM Cloud project.

Technical Evaluation/ Analysis

Infrastructure Support:

No additional hardware purchase is required for HCM in the Cloud but a system administrator would be needed to monitor the status and system utilizations.

System Compatibility:

N/A

Customization/Development:

Cloud based applications cannot be modified directly. Any system customizations or modifications must be created using Platform As a Service (PaaS) to extend the cloud application. There is an additional subscriptions fee associated with creating a PaaS environment as well as all maintenance and testing of the extensions are the responsibility of the company. Oracle will not provide any support of PaaS development.

The HCM Cloud implementation project will prioritize business process re-engineering as the first option whenever possible. Compliance or union contract related requirements will be considered for a system customization if no other solution can be identified.

Currently the HR systems have over 200 integrations with other Company systems or external vendors that will be in scope for this project. In many cases, custom development may be required to create the data in the format requested.

Project Relationships (if applicable)

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital			-	136.7		18,448.1
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	18,033.9	19,366	1,500.0	0.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	0.0	3,440	600		
M&S	0.0				
A/P	0.0	13,920	700		
Other	18,033.9	227			
Overheads	0.0	1,780	200		
Total	18,033.9	19,366	1,500	0.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	1,154*	2,566*	2,566*	2,566*	2,566*
Capital					

*Included in the IT Oracle Application Program Change Form

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset		
Work Plan Category: ☒ Regulatory Mandated ☐ Operationally Required ☐ Strategic			
Project/Program Title: Outage Management System - Phase Four			
Project/Program Manager: Sandip Talati		Project/Program Number(Level 1): 22885571	
Status: ☐ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date:		Estimated Date In Service: 12/31/2025	
A. Total Funding Request (\$000) Capital: 20,947.7 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 582.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description: • From 2021 through 2025, continuous efforts to identify and incorporate enhancements within the modules utilized by the OMS system will supplement efforts to better identify opportunities for enhanced operator training. The Company will undertake a software upgrade of the Oracle Network Management System (NMS) system to the latest version 2.5. This upgrade will deliver enhanced operator functionality that increases ease of use and additional automation capabilities. This software upgrade is also critical to the continued stability, reliability, and resiliency of the OMS. This also enables the Company to take full advantage of new enhancements offered by the OMS product line as well as ensuring adequate support in terms of service packs and patches from the vendor. The Company plans to implement the Oracle Mobile Application (OMA) platform. We believe that the move to these enterprise class systems will allow us to continue to meet the increasing demands and changes in the industry. In addition, collaboration with other utilities and vendors has demonstrated the need to regularly upgrade associated software to remain in alignment with product improvements and changing industry technologies as well as avoiding exposure to unsupported hardware and software. Additionally, there are other modules that are currently not used by the Company, that need to continue to be evaluated for further enhancements on how we do business. Expected growth and development in Distributed Energy Resources and REV initiatives is expected to drive opportunities for improvement in the OMS systems utilized by the operators in order to better understand the impact the effect of these systems on the distribution system.			
Justification Summary:			
Oracle NMS version 2.5 is a leading end to end distribution management platform with advance optimization, outage			

and field management capabilities. The NMS 2.5 upgrade will provide high availability and reliability at local and remote sites. The updated version allows for faster routine patching and faster failover to a remote site. This will improve operational efficiency in performing common outage updates and completing action using the right click menusuch as updating the estimated time of restoration or assigning or updating the crew status. The Company will also pursue configuration of the monitoring system within the NMS application. In addition, this upgrade will provide a better user experience, that includes application supporting low-lit and daytime work environments.

OMS GIS Integration will help replace existing custom model extractor process with Oracle's standard ESRI adapter to import GIS assets and their associated connectivity model, which in turn should help with both standardization and enhanced support and reliability. In addition, with the GIS integration, assets within OMS will be stored and visualized in real world co-ordinates which will help improve outage accuracy and allow future opportunities to further enhance processes like Damage Assessment, Site safety and Outage Analytics.

Operations Mobile Application (OMA) brings a central set of NMS functionality for field crews to view, allowing crews to assess damage, update estimated restoration time, capture cause, resolve, and close out outage restoration activities. Tasks and safety documents are organized in separate tabs, along with this, users will have easy navigation to and from the network map. The application will be effortless for the users and efficient application leading to a smoother restoration effort.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name: Department.Electric Ops.Major Storm

Risk 1 Description:

The Company has generally operating on a 3 year cycle, It is imperative that we maintain that momentum and ensure that continuous maintenance, enhancements and evolvment are part of those efforts to maintain alignment with our peer utilities. With no enhancements the older technology will be difficult to maintain, as internal staff and vendor support personnel becoming no longer available to support existing products and systems. We want to ensure that we are utilizing the most cutting edge technology as it relates to new enhancements and features that are consistent with industry needs/drivers (crucial if/when storm arises).

2. Supplemental Information

Alternatives:

Delaying the OMS software upgrade puts the Company at significant risk of not being able to support storm restorations in a timely manner. The OMS software upgrade keeps the Company current regarding the vendor's latest product offering. By delaying the software upgrade, the Company will not be able to benefit from additional capabilities or address potential software bugs in older versions.

Risk of No Action:

.

Please see "Alternatives" section which outlines risks of no action.

Non-financial Benefits:

The OMS is critical to storm restorations and allows the Company to provide timely and accurate status of outages to its customers. Any risk to these systems can adversely impact the Company's ability to restore customers and provide them timely information.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast (3,220.6) + Next 5 Years Est. (20,947.7) = Total Cost (24,168.2)

4. Basis for estimate

The basis is the Company's historical purchases and prior project implementation, one including the outage management system on the cloud. In addition to several vendor quotes such as Deloitte and Oracle for the NMS 2.5 upgrade and OMA implementation.

Basis for the estimate includes the forecasted labor hours for the management employees and consultants along with the

architecture, development, testing and implementation of the OMS suite. In addition, the functional and design requirements documentations.

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Con Edison is committed to developing best practice outage restoration processes and information systems. These processes and systems help facilitate the correct assessment of customer outages, effective restoration planning, and timely return of service to customers. The Company continues to make significant improvement in its ability to quickly understand the number of customers impacted by power disturbances and provide customers with timely information on restoration times. These accomplishments were achieved through a series of process improvements and enhancements of the Outage Management suite of systems including STAR, which is based on Oracle's Distribution Management System software suite. The Oracle product continues to be one of the leading outage management software suites and is utilized worldwide by many large utilities. The technical evaluation considered the following activities that are expected to be evaluated and implemented over the upcoming years:

- Continue to implement additional functionality available to improve the accuracy of customer ETRs.
- Use of the mobile application to allow field crews to update ETRs, and provide outage causes to customers.
- Investigate and implement improvements as required for Damage Assessment to enhance remote damage data capture and interfaces with STAR or other OMS solutions for the timely development of work plan and customer level ETR's.
- Implement improvements to enhance training capabilities by creating more e-learning modules, and quick videos while providing additional in-class training for OMS processes and systems.
- Continue efforts to maintain alignment with major software release upgrades.

Project Relationships (if applicable)

Other projects that have close relationships include all applications related to improving how the Company manages Customer interfaces and related communications including the Customer Project Management System (CPMS), Work Management System (WMS), the Outage Management Dashboard (BI) and external Customer Portal.

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital				-		3,220.6
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	1,447.7	9,169.3	5,677.7	5,171.7	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor					
M&S					
A/P	0.0	9,169.3	5,677.7	5,171.7	0
Other	1,447.7				
Overheads					
Total	1,447.7	9,169.3	5,677.7	5,171.7	0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	165.0	165.0	165.0	417.0	
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

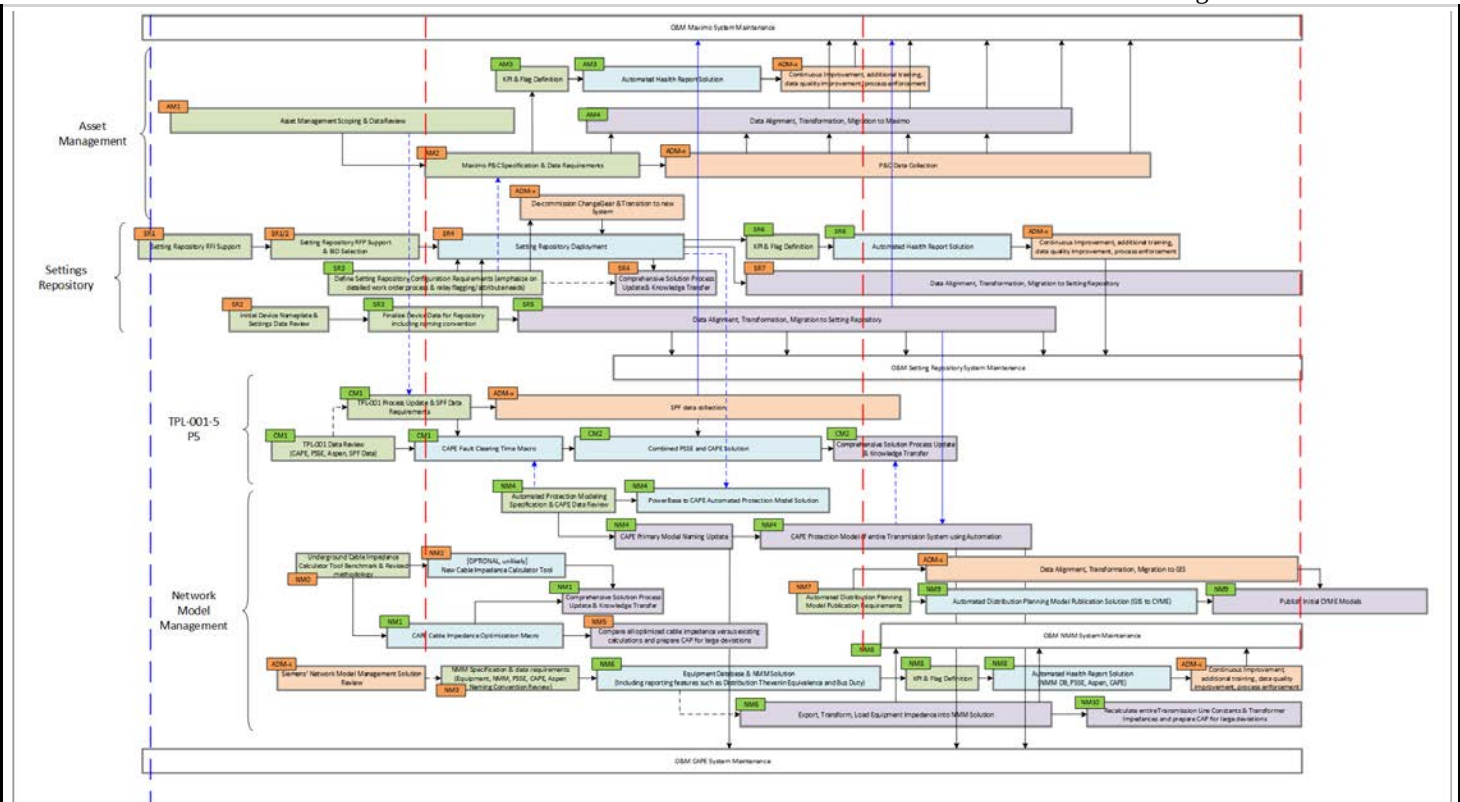
Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program			Category: ☒ Capital ☐ O&M ☐ Regulatory Asset		
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic					
Project/Program Title: Protective Relay Settings Repository					
Project/Program Manager: Benny Varughese			Project/Program Number(Level 1): 25524255		
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :					
Estimated Start Date: 1/1/2022			Estimated Date In Service:		
A. Total Funding Request (\$000) Capital: 11,500.0 O&M:			B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:		
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 300.0			D. Investment Payback Period: (Years/Months) (If applicable)		
Work Description:					
The scope of this project is to purchase and implement a protective relay settings repository software solution. The settings repository will be the sole source of truth for relay settings and asset information for the Company's protective relay systems. This initiative will also replace legacy systems that house protective relay information, and will also need to be Critical Infrastructure Protection (CIP) compliant. This includes protective relays across the electric transmission and distribution systems, as well as related equipment such as instrument transformers, communication lines and control circuits. In addition to protective relays, other systems such as SCADA and disturbance monitoring may be incorporated. The settings repository will be integrated with other systems such as Maximo, Logica and CAPE (Computer Aided Protection Engineering). A settings management workflow will be development and implemented using the software. Additionally, automated relay testing and settings verification features will be developed and deployed as part of this project. Please refer to exhibit below that explains the project in more detail:					

**Justification Summary:**

Benefits of a relay settings repository include the following:

- Perform extent of condition analysis on relay or settings issues
- Track and trend relay system performance history and metrics
- Deploy a mature settings management process with baseline configuration controls
- Implement automated testing features
- Automatically verify correct settings are in each relay
- Improved lifecycle management of relays

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

This project aligns with the Company's long-term goals of using asset management principles to improve asset performance while decreasing lifecycle costs.

Risk 1 Name: Corporate ConEd.Operations.Network Shutdown	Risk 1 Description:
Risk 2 Name: Corporate ConEd.Operations.Loss of Substation	Risk 2 Description: Better relay management reduces the risk of the loss of a substation due to relay misoperation.

Risk 3 Name: Department.Substation Operations.Cybersecurity	Risk 3 Description: Better digital relay management decreases the likelihood of a cybersecurity event.
Risk 4 Name: Department.Substation Operations.Loss of Substation	Risk 4 Description: Better relay management reduces the risk of the loss of a substation due to relay misoperation.
Risk 5 Name: Department.Substation Operations.Relay Misoperations	Risk 5 Description: Better relay management reduces the risk of relay misoperations.
Risk 6 Name: Department.Substation Operations.Regulatory Compliance	Risk 6 Description: Better relay management reduces the risk of non-compliance with NERC regulations.

2. Supplemental Information

Alternatives:

Relay settings could be stored in existing databases such as Maximo or CAPE. However, this would require a high level of customization to incorporate all the needed features. An off-the-shelf settings repository would not have this issue and would be integrated to other systems as needed.

Risk of No Action:

1. Lack of robust settings management and documentation leads to settings errors, lack of understanding of deployed relay settings, which ultimately leads to increased risk for relay misoperations and loss of a substation.
2. Unable to perform extent of condition analysis on relay settings issues
3. Increasing NERC compliance obligations such as testing and coordination are made manageable through a relay database.

Non-financial Benefits:

This solution is significantly more efficient than the current paper based process.
This solution enforces and streamlines relaying standards across the enterprise.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

The Project Cost is comprised of software purchases that will house the Relay Settings, and the associated licenses that will be needed. We will also need to populate the data, for which we will solicit support from outside vendors. This will help field forces by not having to supply personnel which would take away from the day-to-day obligations. This solution is significantly more efficient than the current paper-based process. Lack of robust settings management and documentation leads to settings errors and lack of understanding of deployed relay settings, which ultimately lead to increased risk for relay misoperations and loss of a substation. This solution enforces and streamlines relaying standards across the enterprise. This database will also streamline the Preventative Maintenance being performed on relays, instead of tracking the testing by zones of protection we can track by individual relay type and reduce redundant periodic maintenance.

2. Major financial benefits

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (11,500.0) = Total Cost (11,500.0)

4. Basis for estimate

Rough estimate based on the licensing and implementation costs of similar software platforms. The estimate will be refined once bids are received.

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Based on information received from vendors in response to RFI.

Project Relationships (if applicable)

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	3,500.0	5,000.0	3,000.0	0.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	0.0	1,500.0	1,200.0		
M&S	0.0	250.0	75.0		
A/P	0.0	3,000.0	1,500.0		
Other	3,500.0				
Overheads	0.0	250.0	225.0		
Total	3,500.0	5,000.0	3,000.0	0.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M		100.0	0.0	0.0	0.0
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset		
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic			
Project/Program Title: Substation Technology Improvements			
Project/Program Manager: Matthew Walther	Project/Program Number(Level 1): 10029072		
Status: ☐ Initiation ☐ Planning ☐ Execution ☒ On-going ☐ Other :			
Estimated Start Date: 1/1/2022	Estimated Date In Service: 12/31/2026		
A. Total Funding Request (\$000) Capital: 6,000,000 O&M:	B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:		
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 0.0	D. Investment Payback Period: (Years/Months) (If applicable)		
Work Description: This program funds the technology improvements needed to upgrade, enhance, automate, or establish substation processes with the goal of increasing safety, efficiency, and improving reliability. Substation Operations has established numerous procedures, instructions, and guidelines to ensure the safe operation and maintenance of the equipment. Numerous processes have been developed to ensure adherence to a governing course of action involve data/information collection, transfer, and storage. As technology advances, this program serves to identify and take advantage of opportunities to improve the efficiency of these processes by implementing new tools or upgrading existing ones to enhance how data is collected, transferred, and/or stored.			
Justification Summary: The implementation and upgrade of new technology is instrumental in ensuring Substation Operations continually improves efficiency and reliability. The use of technology to streamline processes results in better resource utilization and a reduction in task time requirements. Better data collection, and storage, facilitates enhanced data analysis and trending which ultimately leads to improved reliability and equipment performance.			
Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation) This project is in alignment with corporate goals of leveraging automation and technology and utilizing enterprise solutions to lower business costs.			
Risk 1 Name: Department.Substation Operations.Loss	Risk 1 Description:		

of Substation	Reduces the likelihood failure and loss of a substation
Risk 2 Name: Department.System & Transmission Ops.Equipment Failure	Risk 2 Description: Improved planning, scheduling, and work assignment tools will ensure the right corrective maintenance work is performed to prevent equipment failures.

2. Supplemental Information

Alternatives:

An alternative would be to do nothing. The reason for rejecting this alternative is because implementation and upgrades of technology are vital to ensuring safe, efficient, and reliable operation of the transmission system.

Risk of No Action:

The risk of no action is as follows:

- Increased probability of loss of substation due to failure to update technology of critical systems/processes.
- Increased probability of environmental release from a substation due to failure to update technology of critical systems/processes.

Non-financial Benefits:

- Improved reliability due to hardware and software tools.
- Improved employee development and engagement by ensuring current technologies are utilized in the workplace.
- Promotion of technology through mobile computing and automation.
- Lower risk of unsupported operationally required software.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

A cost-benefit analysis has not been performed.

2. Major financial benefits

3. Total Cost (\$000)

All Previous Actuals (15,638.8) + Cur. Yr. Sanctioned Forecast (1,634.3) + Next 5 Years Est. (12,655.0) = Total Cost (29,928.1)

4. Basis for estimate

The estimate for this project is based on the actual costs of similar initiatives previously completed.

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

N/A

Project Relationships (if applicable)

N/A

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital	1,931.8	3,766.8	2,923.4	3,705.7		1,634.3
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	4,655.0	5,000.0	3,000.0	2,500.0	2,500.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	0.0	0.0	0.0		
M&S	0.0	0.0	0.0		
A/P	0.0	0.0	0.0		
Other	4,655.0	4,655.0	2,655.0	2,155.0	2,155.0
Overheads	0.0	345.0	345.0	345.0	345.0
Total	4,655.0	5,000.0	3,000.0	2,500.0	2,500.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	0.0	0.0	0.0	0.0
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: Project ☒ Program	Category: ☒ Capital ☐ O&M	☐ Regulatory Asset	
Work Plan Category: ☒ Regulatory Mandated ☐ Operationally Required ☐ Strategic			
Project/Program Title: WMS Sustainability Project			
Project/Program Manager: Leo Scally		Project/Program Number(Level 1): 21982232	
Status: ☐ Initiation ☐ Planning ☐ Execution ☒ On-going ☒ Other :			
Estimated Start Date: 1/1/2023		Estimated Date In Service: 12/31/2024	
A. Total Funding Request (\$000) Capital: 17,469.4 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: 0.0 O&M: 0.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
The Work Management Project including process change, organization restructuring and the deployment of CGI-Logica ARM Suite (Work Manager, Scheduler, Central Configuration, Asset Manager and Mobile Field Manager) completed project implementation at the end of the fourth quarter 2014. Enhancements to the CGI-Logica application and interfaces will be required as the Customer Information System (CIS) is replaced and a Graphical Information System (GIS) is implemented. New integrations and automation to facilitate cost savings such as the following are also planned: • NYC DOT Paving Schedule: - o Add an integration with ProceMX to receive the NYC DOT Paving schedule. This will allow Con Edison to get work on the block done before the NYC DOT paves the block. Con Edison can be liable for repaving costs when we excavate a recently paved street. • CGI ARM Pre-Requisite Functionality: - o Add functionality improvements to better understand the Pre-Requisites that need to be managed and the status of those Pre-Requisites to minimize delay time such as no access need for flushes. • EBS Pre-Requisite Integrations: - o Integrations with Oracle EBS to better understand the full cost of managing a Pre-Requisite such as Flaggers, or NYC Parking signs. Currently it is difficult to marry these costs to the work that was done. • Auto Scheduling: - o Develop an Auto Scheduling engine that will automate like and kind replacement work such as shunts, bridges, and open mains rather than needing significant planning and scheduling time from Schedulers, Work			

Organizers, and Clerical. This automation will use the new CGI ARM Pre-Requisite functionality mentioned above.

- Parking/access information:
 - Adding a mechanism to better capture parking data associated to the Facilities within Asset Manager and use that data to create a more effective work schedule.
- Enhanced STAR Referral:
 - Enhancing the STAR Referral interface to automatically build out a WR based on required data entry by the STAR user making the referral. This will eliminate the time necessary to manually building out the WR.
- NJUNS:
 - We are required to make notification to the various entities that are attached to poles of our intent to replace a pole and the status of this work. Significant time is spent by Regional Engineering, Overhead First Line Supervisors, and Clerical manually updating the data within the National Joint Utility Notification System (NJUNS). We plan to build integrations to automate this work based on progressing the Work Request.
- Periodic Pole Inspection and Treatment:
 - We are required to test the structural integrity of our poles at least once every 12 years. This program is called Periodic Pole Inspection and Treatment. Presently this work is managed outside of the Electric Work Management System and requires manual entry of the rejected poles into the Work Management System. We also do not have records withing the Work management System of the results of those inspections. We also are not having the inspection vendor capture the information necessary to help us manage the Pre-Requisites such as parking/access to replace the defective pole. We plan to have the vendor capture the Pre-Requisite information and also the specifics of the pole so we can automatically manage the Pre-Requisites and build out the Work Request for the pole replacement.
- ARCOS:
 - ARCOS is a crew management software with a very sophisticated user interface. The Work Management System has an application Called Central Configuration that allows for similar functionality but the user interface is difficult to use. As such, clerical is updating crewing information such as personnel assigned to the crew, shift pattern, training schedules, vacation, etc. in both systems. We plan a bi-directional integration between ARCOS and ARM Central Configuration to eliminate this double entry.
- HR Payroll:
 - HR Payroll intends migration from HR payroll to Oracle's HCM (Human Capital Management). This will likely require retiring the existing WMS to HR Payroll integrations and replacing them.
- Pole Survey:
 - A joint pole survey between Con Edison, Verizon, and the various pole attachers will result in new data such as the pole owner, what entities are attached to the pole, and if there are any safety concerns. This survey data will require integration to the Electric Work Management System and applicable data.
- SEAPOT:
 - Add integrations with SEAPOT to create work in WMS to:
 - Cut and abandon mains that are likely to fail based on age or previous failure history.
 - Group the above with required PSC repairs to bundle cost

Additional reporting in Oracle BI by modification of Oracle Project Accounting interface will also be reviewed. A more effective solution to "Tableau" data analysis and reporting will be considered with a possible migration to the Oracle BIEE reporting environment.

Future upgrades

- Hardware upgrades of approximately \$200 k are necessary to support enhancing the system performance as well as adding additional servers to support new initiatives such as OMP enabled applications and ORDS reporting functionality.
- Additionally the Exadata hardware is three years old and will need additional storage and processor capability upgrades.

Justification Summary:

The original implementation of WMS had a business case that drove both Capital and O&M cost savings and paid for its implementation within five years. The WMS Sustainability Project continues that work by implementing new

functionality, automation, and integrations to improve business processes that reduce delays (and therefore, improve productivity), improve visibility into the costs/delays associate with pre-requisite management, reduce field work and administrative backlogs, etc. There are also other Capital programs such as GIS and the new HR Payroll system. WMS Sustainability also funds the WMS side of those programs. WMS Sustainability also funds necessary hardware replacements.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name: None

Risk 1 Description:

2. Supplemental Information

Alternatives:

Not taking advantage of known system defects or user requested upgrades, diminishes the effectiveness of the application and jeopardizes user support and use of the application

Risk of No Action:

Failure to take corrective action on known defects jeopardizes the stability of the application. Not taking advantage of user change requests eliminates any productivity gains that could potentially be realized.

Non-financial Benefits:

Streamlines and improves work-flows and processes.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits	
The estimate for this project is based on the historical cost of performing similar work.	
3. Total Cost (\$000)	
All Previous Actuals (6,233.2) + Cur. Yr. Sanctioned Forecast (1,950.1) + Next 5 Years Est. (17,469.4) = Total Cost (25,652.7)	
4. Basis for estimate	
The estimate for this project is based on the historical cost of performing similar work.	
5. Conclusion	
Improvements under this project are needed to keep the WMS process moving effectively. Not taking advantage of known system defects or user requested upgrades, diminishes the effectiveness of the application and jeopardizes user support and use of the application.	
Project Risks and Mitigation Plan	
Risk	Mitigation Plan
Technical Evaluation/ Analysis	
Project Relationships (if applicable)	
Oracle BI, STAR Outage Management System, Oracle Project Accounting, Oracle Labor Distribution, the Energy Services (CPMS) Pega application, HR Payroll PeopleSoft, LayOut Tracking (LOTs) system and PowerPlant	

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital	3,926.0	441.0	496.5	1,369.8		1,950.1
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	2,219.4	3,750.0	3,750.0	3,750.0	3,000.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor					
M&S					
A/P					
Other	2,219.4	3,750.0	3,750.0	3,750.0	3,000.0
Overheads					
Total	2,219.4	3,750.0	3,750.0	3,750.0	3,000.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	0.0	0.0	0.0	
Capital	0.0	0.0	0.0	0.0	

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology Panel

Exhibit IT-2

Foundational IT Projects

Item #	Program Name	Page #
1	Allegro Replacements	2
2	Analytics Center of Excellence - EDAP enhancements	8
3	Business Enablement (PACE – Digital Factory)	14
4	CCTN Program	20
5	Communication Infrastructure Grid-Mod Phase 2	30
6	Construction Paving App (SmartApps)	38
7	Construction Technology Improvements	44
8	Construction, Gas Mobile Migration (Angular)	50
9	Data Center Improvements	54
10	Data Governance White Paper	61
11	Data Integration Modernization	68
12	End User Computing	73
13	Enterprise Architecture Modernization	80
14	Enterprise Unifier Software Project - Phase 2	86
15	Fraud Data Analytics Platform	92
16	Hitachi Password Manager Upgrade	98
17	IT Hardware and Software Maintenance	101
18	IT System Testing COE	108
19	Services Compliance with Market Changes and MetrixIDR Upgrades	115
20	Mobility - Digital Factory	121
21	ISOs Revenue Metering validation and reporting software phase 1 and phase 2	127
22	NYISO - PJM Energy and Capacity Daily Reconciliations - TODRS	134
23	OCS Implementation for HeavyBid and P6 Loader	139
24	Operational Technology Network Phase II	146
25	ServiceNow upgrades – ASM and APM modules	151
26	Strategic Analytics - As Billed - Revenue Analytics (SARA)	156
27	Technology Currency and Sustainability	161
28	Technology Modernization Program	167
29	XM10 Tier 1_2 Computer Equipment	173
30	XM8 Telecommunications Equipment	180

Energy Management 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset		
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic			
Project/Program Title: Allegro Replacement			
Project/Program Manager: Tatsiana Cuccio, Cinquegrana, Heidi		Project/Program Number(Level 1): 23288861	
Status: ☐ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date: 1/1/2024		Estimated Date In Service: 7/15/2025	
A. Total Funding Request (\$000) Capital: 3,466 O&M: 300		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 220		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
This project is a replacement of the existing Allegro transaction system, which is required in order integrate the risk module into our new FIS Align Procurement / Settlement System . The vendor chosen must meet the requirements of purchasing, scheduling, accounting for and reporting of financial and physical power transactions. The vendor chosen through a request for quote process will meet those requirements. In addition, the corporate effort to consolidate standalone applications will be reviewed as the selected system has the ability to process financial transactions.			
Justification Summary:			
The current Allegro system is the main tool to manage the Company's financial and physical power hedge portfolio. The current version of Allegro performs the following tasks and this software or its replacement requires enhancements and has the potential opportunity to automate processes: - Energy Management maintains a \$2 billion supply portfolio, and requires a supportable software platform to track and schedule the trade life cycle – trade entry, credit risk management, trade confirmation, invoice generation and trade settlement, and accounting. - The Energy Management business changes frequently and requires a flexible platform to accommodate new business opportunities.			

- The proposed solution will continue with automation of accounting functions such as Accounts Payable (AP), Accounts Receivable (AR), and General Ledger (GL).
- Energy Management and Energy Risk Management require strict compliance with Sarbanes Oxley (SOX) controls, and audit capabilities.
- For this process, an evaluation will be made to leverage and modify existing trade systems for financial and physical power transactions, which in theory may be significantly less costly. This would result in all trades being in a single system, which is best practices. However, this is an evaluation that will be done at that time.
- The Allegro System needs to be replaced because we are transferring the Allegro function to the new FIS Align Procurement / Settlement System which is expected to go live in early 2022. Integration of the risk module into the new system eliminates multiple data entry and touch points, reduces the chance for errors, and increases process efficiencies.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name: Department.Finance.Compliance	Risk 1 Description: The credit monitoring system sets limits on the amount of business we can enter into with a single counterparty. This feature ensures compliance that limits are not exceeded.
Risk 2 Name: Corporate ConEd.Regulatory and Compliance.Fraud	Risk 2 Description: The credit function determines which counterparties we can do business with. This reduces the opportunity for fraud or third party risk to occur.

2. Supplemental Information

Alternatives:

The alternative to this project is to not update the system which would ultimately mean lack of vendor support for the system in 2023 and to hire additional employees to process the transactions along the trade lifecycle. This is a Sarbanes Oxley system.

Risk of No Action:

The risk of no action would be the inability to provide a flexible power transaction processing platform to meet the needs of our customers.

Non-financial Benefits:

Efficient management of energy portfolio, reduced errors, proper and accurate financial reporting, and standardized reports (internal & external)

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

The financial benefits of this project are increased productivity, enhanced functionality, and continued ability to support regulatory requirements by using a vendor supported software platform.

3. Total Cost (\$000)

The total capital cost of \$3.5 M includes hiring a vendor to design, build, and deploy the replacement software, hiring of a System Integrator, UAT Coordinator, Documentation and Report Writer, software license and modernization to the cloud, and internal Con Edison IT and project management support.

4. Basis for estimate

Cost estimates were put together with the assistance of subject matter experts and costs associated with similar internal projects.

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Project start date not determined	

Technical Evaluation/ Analysis
N/A
Project Relationships (if applicable)
The current Allegro system interfaces with Pricing Database System (PDS), the Intercontinental Exchange (ICE) and Oracle EBS. The update to interfaces required for each of these systems is incorporated in the estimate below

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital				319		457
Implementation O&M*						
Regulatory Asset						

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	0.0	2,208	1,258	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor			575	275	
M&S			175	145	
A/P			850	550	
Other			320	150	
Overheads			288	138	
Total	0.0	0.0	2,208	1,258	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M				80	220

Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☒ O&M ☐ Regulatory Asset		
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: Analytics Center of Excellence - EDAP enhancements			
Project/Program Manager: Jeff Leonard		Project/Program Number(Level 1): 23287760	
Status: ☐ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date: 1/17/2022		Estimated Date In Service:	
A. Total Funding Request (\$000) Capital: 4,410.0 O&M: 58.0		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M:		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
The Analytics Center of Excellence manages and supports the Company's Enterprise Data Analytics Platform (EDAP), a central data repository and analytics engine delivering advanced analytics solutions to the enterprise. EDAP integrates Advanced Metering Infrastructure (AMI), customer, outage, work management, and other systems to build a comprehensive view of the data and performs analytics to provide users operational insights. As users' analytical skills mature and the demand for near-real-time analytics for operational use increases, EDAP must upgrade its system infrastructure to improve its resiliency and reliability, lower recovery time during outages, increase overall performance, accommodate more ad hoc analytics, and enable self-service analytics capabilities. EDAP supports key Company analytics initiatives, including Grid Mod Data Analytics and Customer Data and Analytics and is a key component to support various initiatives around DERMS, IEDR and clean energy goals. This project seeks to expand existing technical capabilities to further the Company goals of finding new opportunities for cost savings, risk reduction, and improvements to safety and customer experience. This will include the streamlining of data access and sharing across platform components from consolidating into a single cloud environment, increased flexibility by enabling new components that allow further development of custom application interfaces, increased precision through the deployment of technologies to track model accuracy over time and streamlined deployment through the building of mechanisms to integrate analytical results into operational systems and processes.			

Justification Summary:

The Analytics Center of Excellence (ACE) is the Company's centralized team supporting Data and Analytics initiatives. ACE's mission is to enable and deliver data-driven insights across the Company; a key component of the strategy for executing this mission is growing and managing the analytics technologies needed to support business use cases and enable innovation. EDAP is comprised of a suite of technologies to deliver enterprise analytics capabilities, such as big data processing, centralizing raw data, building and sharing datasets, modeling and forecasting, and self-service analysis and reporting. The platform ingests data from systems across the Company, transforms it, performs analytics, and provides insights to business users.

Over the past two years, user demand for analytics has increased dramatically, particularly for self-service analytics across large data sets, such as AMI metering, work management, outage, network, and customer information. Users not only require historical data to be readily accessible for analytics, but there is also an increased demand to have the most up to date results available for situational awareness and proactive analytics. This increase in demand is driven not only by predefined analytics projects but includes ad-hoc requests to analyze Company data to improve safety, operational excellence, and customer experience (i.e., using EDAP to investigate an issue with a smart meter installation). To meet this increased demand, support new business use cases, EDAP upgrades, enhancements and expansion are required to accommodate more users on the platform, improve its resiliency and reliability, and improve streaming analytics.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name: Corporate ConEd.Safety and Environment.Gas Distribution Event	Risk 1 Description: Analytics can be applied to predict gas leaks and prioritize their repair, as well as prioritize gas main replacement
Risk 2 Name: Corporate ConEd.Safety and Environment.Underground Transformer Failure	Risk 2 Description: Asset health and risk can be analyzed to predict transformer failure likelihood and prioritize maintenance and in-service replacements
Risk 3 Name: Corporate ConEd.Safety and Environment.Steam Main Rupture	Risk 3 Description: Analytics can be applied to predict steam main leaks and potential ruptures
Risk 4 Name: Corporate ConEd.Operations.Cybersecurity	Risk 4 Description: N/A - Analytics for cybersecurity is out of scope for this project
Risk 5 Name: Corporate ConEd.Operations.Loss of Substation	Risk 5 Description: Analytics can be applied to predict maintenance on substation assets, reducing risk of unexpected failures and replacement of assets

2. Supplemental Information

Alternatives:

- Status quo: This would impede performance and the use of data and analytics in business decisions.
- Decentralized analytics: Business units could independently address their needs for advanced analytics on a project-by-project basis, leading to increase in cost, redundancy and inefficiencies in use of people, process, and technology

Risk of No Action:

- EDAP does not increase capacity and resiliency and it cannot meet enterprise demands.
- Users may conduct analytics in isolation, outside of EDAP, without sharing benefits to other business units
- Increased data duplication, diminished data quality and inconsistent analytical results could lead to a lack of trust by users
- Propagation of overlapping platforms and toolsets could lead to increased licensing, maintenance, and support costs
- Inconsistent practices could lead to poor solution quality
- Improper utilization of existing Company analytics talent located across the organization
- Lack of centralized prioritization that identifies highest business value projects could lead to diseconomy

Non-financial Benefits:

This program will generate non-financial benefits for the Company, such as:

- Transparency: Enhanced visibility of projects and spending
- Shared knowledge: An archive of analytical models, methods, and data for reuse
- Data science and big data platform skills: Provides the appropriate skills and technologies to solve advanced analytics problems
- Consultative services: Determine the applicability of advanced analytics to problems reducing the need for external expertise
- Cultural change: Promote a corporate culture where data-driven decision-making is pervasive
- Standardization: The consistent use of management practices, data sources, tools, platforms, and analytics methods
- Efficiency: Proper utilization of resources

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

The capital request will fund the hardening of the EDAP staging platform to increase resiliency, build out data virtualization and streaming data capabilities, and increase data and computing capacity to enable more ad hoc users, as below:

Item	2023	2024	2025	2026
Labor	300	450	600	600
Overheads	100	150	200	200
Expanded capacity	770			
Staging platform hardening		570		

Data virtualization			370	100
Total	1,170	1,170	1,170	900

The O&M request will fund the cost of expanding ACE's staff to support more than 300 ad hoc users, as well as the cost of cloud-based storage and computation resources.

2. Major financial benefits

NA

3. Total Cost (\$000)

\$4,468

4. Basis for estimate

Costs were estimated based on costs of building the initial EDAP staging platform and associated costs for expanded capacity and hardened infrastructure, as well as vendor pricing for data virtualization technology. Labor is estimated to meet the needs of expanded ad-hoc and self-service analytics.

5. Conclusion

To meet business demand and various initiatives, EDAP upgrades, enhancements and expansion are required to support new business use cases, accommodate more users on the platform, improve its resiliency and reliability, and improve streaming analytics.

Project Risks and Mitigation Plan

Risk	Mitigation Plan
Budget constraints	Manage monthly budget to meet forecasts
Timeline constraints	Develop project plana and manage monthly

Technical Evaluation/ Analysis

None

Project Relationships (if applicable)

The following projects include some or all of the technologies comprising EDAP as the data and analytics components driving the outcomes of the efforts:

- Customer Data and Analytics
- Grid Modernization Data Analytics Use Cases
- Privacy Readiness

- DERMS
- AMI Business Analytics
- Central Operations Condition Monitoring and Asset Health
- IEDR

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital				-		
Implementation O&M*						
Regulatory Asset						

* * For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	1,170.0	1,170.0	1,170.0	900.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/ program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	0.0	300.0	450.0	600.0	600.0
M&S	0.0	770.0	570.0	370.0	100.0
A/P					
Other	0.0				
Overheads		100.0	150.0	200.0	200.0
Total	0.0	1,170.0	1,170.0	1,170.0	900.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M		20.0	19.0	19.0	0.0
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project X Program	Category: ☒ Capital ☒ O&M ☐ Regulatory Asset		
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: Business Enablement (PACE - Digital Factory)			
Project/Program Manager: Matthew Ruiz	Project/Program Number(Level 1):		
Status: ☐ Initiation ☐ Planning X Execution ☒ On-going ☒ Other :			
Estimated Start Date: 1/1/2023	Estimated Date In Service: 12/31/2025		
A. Total Funding Request (\$000) Capital: 2,000 O&M: 8,700	B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:		
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M:	D. Investment Payback Period: (Years/Months) (If applicable)		
Work Description:			
Increasingly, companies are implementing technologies such as Robotic Process Automation (RPA), PowerApps, SharePoint, Customer and Employee Engagement Channels, and middleware to streamline operations and reduce costs. These technologies automate low-value, rules-based business processes, thereby enabling business users to devote more time to more strategic and higher-value tasks. These technologies can also enable business users to develop applications quickly and without traditional lead times associated with complex-coding. By using these technologies, Con Edison can improve efficiencies and foster better communications with customers, suppliers, employees, and other stakeholders. As part of Con Edison's Digital Transformation, IT has established a Process Automation Center of Excellence (PACE) that provides the governance, structure, and operating model to enable businesses to use this technology throughout the company. PACE governs the use, quality, and deployment of RPA, PowerApps, and SharePoint. A center of excellence (CoE) is a team of business process management and subject matter experts that utilize best practices and tools. The CoE promotes and governs the use of a given technology, such as RPA. PACE will expand the team structure, methodology, processes, and governance to support these various platforms to effectively and successfully implement throughout the organization. Major components include: • Definition, design, testing, deployment • Design and implementation • Governance • Transition planning and management			

- Process selection
- Automation tool selection
- Organization capability and capacity assessment
- Team design and training
- Organization communications
- Platform support

Con Edison will also upgrade to Blue Prism Version 6.11 or later version for its Robotic Process Automation platform as part of its larger program. Implementation will include provisioning and set up of infrastructure related to new environments (Dev, Test, Prod), migration and automation development.

Benefits Included

- Improved capabilities for Chrome, Edge, and Firefox browser automation
- Improvements to Audit Logs
- Database conversion
- Authentication environments

Performance and usability improvements

- Process and Object Studio - only the names of all available environment variables are loaded and cached locally.
- When creating or modifying a release package, the option to select dependencies now displays all relevant direct and indirect components.
- Users can now edit an expression directly on the Expression Test Wizard window which displays when clicking the Evaluate Expression button in a stage property window.
- Users can now identify which runtime resources are connected to which application server at start up without having to log into each of the runtime resources.
- The Create Object/Process Wizard now provides the option to open the newly created item

The Company uses these enabling technologies to automate existing processes in areas such as IT, Customer Service, Finance, Supply Chain, Emergency Preparedness, and Law. Various organizations throughout the Company have implemented some form of automation technologies or are considering implementing RPA, PowerApps, and SharePoint.

Justification Summary:

These technologies align with several Company-wide initiatives. There is a demand for new cutting-edge technology that matches technology industry standards. As part of Con Edison's strategy and the organization's ability to deliver automated business value solutions, there is a need for transforming to Rapid Application Developments (RAD) to deliver products faster according to the growing business needs. This effort is underway, and a team is already undertaking business critical processes. **It is imperative at this stage to formulate a proper team structure with defined methodologies and processes.**

The growth of these platforms (low-code) where business users can build enterprise applications with point-and-click tools without direct use of coding languages has resulted in both an increase in productivity and a new set of challenges for IT. These business users, termed as 'citizen developers', have discovered they are able to use their aptitude and their understanding of business operations to create powerful applications. The applications they can be deployed within their organization to teams ranging in size from small to large, with development times as short as two weeks. The results have included dramatic advantages in terms of business process automation, digitization, and productivity

PACE will provide best practices, knowledge transfer, expertise, experience, guidance, and re-useable assets to improve the success of individual projects and the Company. The benefits of a CoE will continue to grow as the organization becomes more agile and improves processes over time.

Effectively establishing and running PACE will allow for increased auditability and consistency in performing business transactions, with fewer errors or re-work; metrics driven management of projects; improved quality and reliability and increased IT-business alignment and partnership to achieve Company goals. From a risk management perspective, governance, promoting one enterprise, and cost avoidance will be accomplished through this project/program.

Risk 1 Name: Department. Information Technology.
Promote One Enterprise

Risk 1 Description:
Without governance of a standing team, redundancy and crowd environments can lead to increased maintenance costs.

Risk 2 Name: Department. Information Technology.
Cost Avoidance

Risk 2 Description:
Governance leads to reusability and replication.

2. Supplemental Information

Alternatives:

Without a centralized governance and support team, siloed deployment of these technologies leads to inefficiencies, such as duplicated efforts, redundant tools, and less controls increasing unnecessary costs and labor-intensive fixes at scale. Organizations will go into silos to implement automation processes and onboard various tools, which will result in a mixed environment that is hard to support.

Risk of No Action:

Organizations may independently implement Enabling Technologies using disparate approaches and technologies, compromising IT support and increasing the potential for cybersecurity vulnerabilities which could ultimately impact customers. Processes that span multiple systems could be made more efficient by implementing a bot rather than modifying the multiple systems to implement process improvements (capital cost avoidance).

Non-financial Benefits:

- Maintaining a CoE with proper tools to route RPA, PowerApps, and SharePoint requests establishes a best-in-class operation that is scalable and repeatable. Documented processes can be easily rolled out to new business units and will reduce the learning curve for future groups implementing technologies. Automating low-value, rules-based business processes, will enable business users to devote more time to more strategic and higher-value tasks for our customers while also decreasing the need for complex traditional software development.
- An improved relationship between IT and Business Units, including increased collaboration and a jointly defined mandate to create impact, which will result in higher work process adherence, easy to use (minimal training needed) products and a more unified organization.
- A new collaborative, agile culture can help Con Edison transform its talent base in IT. Con Edison will be able to recruit cutting edge talent to modernize IT, which will ultimately lead to more efficient, effective, and safe service to our customers.
- Enterprise-wide standard using the new platforms will allow greater transparency into costs, scheduling, work status, and productivity metrics through a consistent data platform and advanced analytics engine.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

	Program Change Request (O&M) 2023	Program Change Request (O&M) 2024	Program Change Request (O&M) 2025	Capital Request 2023	Capital Request 2024	Capital Request 2025
Whitepaper						

Labor w/ OH	\$900	\$900	\$900	\$200		\$200
Contract Services (Resources/Software)	\$2000	\$2900	\$2900	\$800		\$800
Total	\$2,900	\$2,900	\$2,900	\$1,000	\$0	\$1,000

2. Major financial benefits

The financial benefits of establishing an RPA CoE will be come from developing automation standards. These standards will reduce development costs, reduce error processing and reduce the maintenance cost of these automations.

Additional savings will result from a central repository of best practices that can be shared across the organization. As these technologies are more broadly adapted, future groups will benefit from re-usable module code bases, existing infrastructure and existing methods of control and monitoring.

3. Total Cost (\$000)

Capital – \$2,000 : O&M – \$8,700 (000) (Note – this is not implementation O&M)

4. Basis for estimate

Basis for estimate was predicated on existing applications, automations, and share point forms with anticipated growth in each category. The components of the estimate include labor (headcount), non-labor (supplemental contract resources).

5. Conclusion

In conclusion, it is imperative at this stage to formulate a proper team structure with defined methodologies and processes to support existing and projected demand.

Project Risks and Mitigation Plan

Risk	Mitigation Plan
Budget Constraints	Manage monthly budget to meet forecasts
Time Constraints	Develop project plana and manage monthly

Technical Evaluation/ Analysis

Con Edison met with several consulting firms to learn how a CoE can be established, staffed and organized. Centralized, decentralized and Hybrid CoE models were evaluated. Various tools were reviewed. Lastly, Con Edison's business groups such as Tax, Customer Operations, Human Resources, Supply Chain and Information Technology and Finance expressed interest and are already utilizing these enabling technologies with increased need for oversight, governance, and standards.

Project Relationships (if applicable)

The program will be part of the larger Digital Factory and will be working closely to leverage synergistic capabilities in delivering products.

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
O&M				200K		200K
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital		\$1,000		\$1,000	
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor		\$100		\$100	
M&S					
A/P		\$800		\$800	
Other					
Overheads		\$100		\$100	
Total		\$1000		\$1000	

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year: (Note – this is not implementation O&M)

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	\$2900	\$2900	\$2,900	0.0
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/ project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☐ Project ☒ Program	Category: ☒ Capital ☒ O&M
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: CCTN Improvements	
Project/Program Manager: Ronald Sta. Rosa	Project/Program Number (Level 1): 23292903
Status: ☐ Initiation ☒ Planning ☒ Execution ☒ On-going ☐ Other: _____	
Estimated Start Date: January 1, 2019	Estimated Date in Service: December 31, 2026
A. Total Funding Request (\$000) Capital: \$60,000 O&M: \$2,550	B. ☐ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: None Capital: None
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: (See Telecom O&M Whitepaper and budget) Capital: None	D. Investment Payback Period: N/A (Years/months) (If applicable)
Work Description: Con Edison owns and operates a private communications network called the Corporate Communications Transmission Network (CCTN). This network enables reliable, resilient, diverse, and secure communications circuits for SCADANet, voice, video, feeder relay protection, and the complex computing and storage environment we maintain. CCTN enables computing resource consolidation, disaster recovery infrastructure, as well as cost savings by eliminating the need for public carriers, especially for expensive high-speed digital circuits. Control Centers, substations, data centers, and work out locations are hosting the fiber optic cables, network equipment, wireless, and ancillary equipment used by CCTN. Here are the components included in the Company CCTN Program: 1. CCTN Fiber Expansion 2. CCTN Network Modernization 3. CCTN Facilities Improvement 4. CCTN Expansion WiMAX "Wireless Mobile Access" During the coming budget years 2022-2026, the CCTN Fiber Expansion, CCTN Network Modernization, CCTN Facilities Improvement, and CCTN Mobile WIMAX Access Network are planned to be implemented. 1. CCTN Fiber Expansion The Company continuously expands, upgrades, and replaces fiber cables on the CCTN fiber cable infrastructure. The CCTN fiber cable are installed in communications rooms, huts, and environmental	

controlled cabinets at various Con Edison owned properties, including substations, owned or leased utility poles and transmission towers, underground infrastructure, and collocation facilities. The CCTN fiber optic cable has been installed to provide communications services that supports SCADA, Feeder Relay Protection, RTU, CORP LAN, and telecommunication services between ECC/AECC and substations. The need to expand the CCTN fiber cable infrastructure to substations and data centers that do not have CCTN will address mission critical and high bandwidth service demands.

Our CCTN Outside Fiber Plant started to be installed in the 1980's and with age, these cables are also exposed to underground and overhead environmental conditions that has detrimental effect to the cable that can cause fiber cable failures. Both the need to expand capacity to address business requirements and the replacement of deteriorating fiber optic paths continue to drive expansion projects. IT has developed an approach to maintain fiber optic cable by proactively identifying sections prone to failure and replacing them in advance. This eliminates costly projects to replace entire spans wherever possible.

In budget years 2022-2026, the following CCTN Fiber Expansions are planned:

- Identify and build new fiber cable routes and enhancements in each borough where there are no CCTN presence and communication services are required.
- Identify fiber cable routes that needs to be replaced due to age, condition of the fiber cable, and capacity upgrade.
- Requisition of fiber cables and associated materials for projects that includes new CCTN fiber cable routes and upgrade of aging and debilitating fiber cable routes to higher cable counts.

2. CCTN Network Modernization

The following Nokia /MPLS implementation is planned in budget years 2022-2026:

CCTN Network Modernization is funding the different projects to meet the CCTN growing day to day needs. It also includes the implementation of the Nokia Multi-Protocol Label Switching 'MPLS' network to replace the End of Life Synchronos Optical Network "SONet" technology. The Nokia MPLS solution provides the Company with a high-speed, reliable, and cost-effective alternative to complement public carriers. The Nokia MPLS network implementation will include the installation of the MPLS equipment at CCTN sites that supports SCADA, voice, video, feeder relay protection, and CORP LAN infrastructure that provides network reliability to company locations including Data Centers, Control Centers, substations, and workout locations.

The CCTN nodes have the communication equipment that delivers communication circuits that rely on Synchronous Optical Networks "SONet" network technology to build resilient and secure mission critical communication networks. The 'SONet' network offers reliable circuit connectivity for Time Division Multiplexing (TDM) based end user equipment to operate a variety of mission critical applications such as SCADA, voice, substation feeder tele protection, and emergency communications such as automatic ring down (ARD) and private mobile radio. The 'SONet' network technology is end of life due to electronic component obsolescence and decreased demand because of the telecommunications industry's shift to IP over MPLS. This situation is driving CCTN and other service providers to retire their 'SONet' infrastructure and migrate the TDM services to the Multiprotocol Label Switching (MPLS) infrastructure. MPLS can bridge the past to the present and scale for the future needs of the communication network that can provide better network performance, quality of service (QoS), reliability and security of a 'SONet' network and has the capabilities for future network evolution. Information Technology has established Nokia as the equipment provider in building CCTN's MPLS infrastructure. This multi-year project provides a plan to implement the new MPLS infrastructure and

perform the network migration of the CCTN circuits, however, we do not expect service interruptions as we convert these circuits to MPLS.

In budget years 2022-2026, the following Nokia/MPLS stages are planned:

- Purchase equipment and develop the project plan for the Nokia MPLS network deployment.
- Establish the Cisco DWDM and Nokia/MPLS backbone connectivity between Brooklyn, Queens, and Bronx.
- Deploy of the Nokia/MPLS network to CCTN locations, and transition services from 'SONet' to MPLS as nodes are inserted
- Remove and retire legacy equipment at transitioned locations
- Deploy Microchip GPS Time Source for frequency timing and NTP services at key CCTN locations.
- Hire 2 additional resources will be utilized to assist with the design, planning, implementation, and operation of the Nokia MPLS network and OSP Fiber.

3. CCTN Facilities Improvement

Each location that has CCTN equipment located in CCTN network communication room is equipped with AC & DC backup power systems, cabling, heating, ventilation and cooling systems, single point grounding systems and security access systems. They also provide for a redundant and diverse design for the network. Failures associated with these components will cause failures to critical communications circuits needed for energy delivery systems and computer networks. Within the course of CCTN fiber expansion, we will build stationary housing facilities rooms for our CCTN communications equipment. The new facilities will be in-building rooms, huts, indoor cabinets, or outdoor cabinets depending on the available footprint of the installation location. The facility will include the structure itself, AC and DC power plant, HVAC, racks, inside plant fiber / copper, network, and ancillary equipment to establish the node on the network.

There are several Inside Plant initiatives that ensure the reliability and availability of the CCTN. This program performs upgrades on the facilities listed below at 4-10 CCTN locations every year. The work includes:

1. Replacement of HVAC systems
2. Cable segment upgrades
3. UPS & DC Power system upgrade commensurate with the criticality of the location
4. Grounding upgrades.
5. CCTN communication room reconfiguration and expansion.

Work on the Facilities Improvement enhancement programs are typically done concurrently on an ongoing basis throughout the year and in no particular order, as conditions and circumstances allow or dictate.

Specific locations for similar CCTN facilities improvement work 2023 through 2026 will be determined at the end of each rate year.

4. CCTN Expansion WiMAX "Wireless Mobile Access"

CCTN also provides the wireless network infrastructure for the radio systems (including dispatch applications for man-down radio system) to support voice to field crews and machine to machine smart

grid and distribution automation applications. Con Edison owns multiple frequency assets in the 450 MHz, 800 MHz, 900 MHz, and higher microwave ranges that are used in these radio systems. A single network technology to overcome last mile difficulties (communication to field asset), provide capacity for data applications, and address coverage problems is necessary. WiMAX, 802.11, LTE, 5G, and other wireless technologies have demonstrated the promise to deliver high performance for these applications while not requiring direct line of sight between antennas.

This new technologies that includes LTE, 5G, and 802.11 Wi-Fi 6 are an important component of Con Edison's Wireless Mobile Access (WiMAXs) strategy because it provides the last component required to implement all wireless mobile subsystems onto a single IP system leveraging CCTN as the common core transport system.

The CCTN Wireless Radio infrastructure enhancements are ongoing and will be carried through 2026 as follows:

- Avtec system hardware and software upgrade at existing control centers
- User refresher training.
- Evaluate HVN implementation at ECC dispatch system.
- Evaluate new IP-based radio dispatch console system for potential upgrade.

The work to deploy these radio technologies will include:

- Deploy new cell sites at key WOL's
- Proof of Concept Evaluation of new technologies.
- Design and specification of new or upgrades to facilities.
- Procurement of required equipment, materials, and service, including transceivers, antennas, combiners, multi-couplers, cavity filters, LAN switches and routers, PC, and servers.
- Consulting, engineering, and technician services.
- Development of engineering packages to modify existing or install new support facilities and common plant.
- Installation of new equipment, wiring and cabling in existing ducts and raceways.
- Capacity upgrades of existing HVAC, AC and DC power to support the new technology.
- Training of personnel on the new systems.
- Continue to evaluate new technologies.

Justification Summary:

CCTN provides the Company with a high-speed, reliable, and cost-effective communication alternative to public carriers as well as provide diversity and redundancy to public carrier circuits for critical applications that require it. CCTN provides the network for SCADA, protection and data services to critical substations necessitating capital projects to improve reliability, diversity, and capacity to those locations. CCTN is expected to serve as the corporate backbone for communication services for the foreseeable future.

The projects identified in this white paper addresses departmental and corporate risks associated with:

- Failure of critical corporate and operational applications
- Infrastructure constraints
- Network reliability to company locations including Data Centers, Control Centers, substations, and workout locations.
- Critical radio system infrastructure in transmission and distribution stations to support personnel communication and safety,

Additionally, deployment of a high-speed mobile data network on the proven standard based radio frequency (RF) technology platforms like LTE or WiMAX provides the potential to diversify redundant local loops to every facility that is currently served by two or more backhaul circuits.

Deployment of the VoIP common dispatch platform will allow the needed interoperability for communications during incidents like Superstorm Sandy.

Typically, wired access networks, either fiber or copper, are affected by the same emergencies that cause severe damage to the public underground infrastructure such as major operational events or other events such as contractor damages, water main breaks, etc.

A high-speed wireless data infrastructure can provide diverse backhaul connections to facilities affected by such incidents over the air as opposed to under the ground, where recovery is significantly easier and faster.

While unlicensed wireless communications are in service at targeted sites to provide wireless local loop access, licensed spectrum is required for an effective wireless broadband system that meets the widest communications needs on a single technology.

To this end, several efforts are underway to make broadband spectrum available and to pilot a system on equipment that can be initially deployed on unlicensed spectrum and be easily reconfigured to operate on licensed spectrum.

Once a high-speed data network is built with mobile capability, it can also be used to provide voice services via VoIP technology, eventually replacing the voice radio infrastructure with a single wireless access network that can provide voice, video, and data as it is built out in greater density while leveraging the CCTN fiber core and the existing IP expertise on staff.

The projects identified in this white paper addresses departmental and corporate risks associated with:

- Critical radio system infrastructure
- Safety
- Failure of critical business applications
- Physical damage of corporate server farm
- Critical IT projects
- Failure of the Distribution Automation and Smart Grid applications

The migration of the CCTN OSP fiber cable inventory in the map-based GIS Software enhanced the information flow by reporting data in a geographical view. The system is available on the corporate network to authorized users and allows staff to quickly determine fiber routes to assist with repairing fiber breaks or designing new fiber cable routes. This map-based GIS software will integrate and correlate data such as Network Equipment, Network Facilities, and Circuit Layout Records.

Justification for the O&M Labor Ask

CCTN is an ongoing yearly program. Over the past years we have made capital investment to upgrade, improve and enhance our fiber CCTN network. In addition to already installed equipment this white paper describes the new upgrades and new installs planned during the rate case years. The equipment described in this white paper requires six additional FTEs to maintain the work that we are currently undertaking for the next 3 years.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Expanding CCTN:

Through experience, CCTN regularly outperforms the carriers on reliability, bandwidth, priority, and restoration. Typically, CCTN is designed to be more disaster resilient, with greater backup power or onsite generation.

As such, CCTN provides diversity and redundancy to public carrier circuits for critical applications that may require it. The communications diversity provided by CCTN enables the Company to maintain operations independent of the public carriers, which is critical for ‘black-sky days’, such as major storms or other unforeseen events that substantially impact communications systems including public carrier services. Communication requirements for data, voice, feeder protection, SCADA and video circuits will result in the installation and deployment of modern communication technologies to many Company facilities. CCTN provides the network for SCADA protection and data services to critical substations, necessitating capital to expand the presence of the network to meet expanding SCADA and automation needs. It serves as the corporate backbone for communication services for the foreseeable future.

The additional communication pathway created through the development of fiber-embedded primary cable is an important development in a dense urban environment because wireless communications to and from field devices can be challenging. Field device information will be communicated through the fiber to strategically located wireless communication devices for further backhaul. This may also offer cost savings by reducing the number of wireless communication devices necessary to monitor the system.

2. Supplemental Information

Alternatives

Alternative 1

The alternative to CCTN is to procure all communications from carrier services. This approach is not recommended due to frequent failure rates associated with carrier circuits, unusually long lead times associated with repair and new service delivery, and especially, extensive costs.

Alternative 2

The alternative to Wireless Mobile Access & Interoperability is to continue to operate using expensive fiber construction, existing narrowband private frequencies or carrier services wherever required in an inefficient mish mash of disparate wireless technologies.

Alternative 3

The alternative to MPLS is to maintain the current environment with its unsupported technology. As a precaution, we have acquired spares for our legacy equipment, however this approach is not recommended due to failure rates associated with the devices and the inability to scale for new capacity requirements. This would also risk sustainability of future platforms. Investments need to be made to keep the network sustainable and reliable.

Risk of No Action

Risk 1

CCTN risks include loss of service resulting from other infrastructure providers disrupting Con Edison fiber and affecting service. Other risks include the inability to fix fiber failures without considering a full replacement due to deterioration over time and increased communications failures associated with HVAC, cabling, and power loss. The resultant failures would need to be repaired on an emergency basis, increasing costs of procuring equipment, OT of employees and the loss of service while the repair is completed.

Risk 2

Wireless risks include limited communication to assets not directly on company property, limiting data acquisition and control applications. The Company's 800 MHz iDEN voice radio system will be obsolete in 4-5 years. In fact, the largest two iDEN operators have already chosen LTE as their next generation wireless broadband services platform.

Risk 3

Additionally, risks include increased communications failures associated with the unsupported and aging legacy platforms. The resultant failures would need to be repaired with limited options and potential for difficulty in obtaining replacement parts. Fiber optic lasers, used to transmit data via light, have limited life expectancies. Their failure rate is expected to increase over time resulting in more maintenance that is frequent and eventually the scarcity of replacement parts and unsupported platforms introduce cybersecurity risks since the firmware and software is no longer maintained to correct flaws in the code.

Non-Financial Benefits

Non-financial Benefits: These programs have resulted in an overall decrease in the number of trouble tickets over the past few years and corresponding reliability gain. For example, the grounding work eliminated further lightning damage to equipment at Buchanan where the radios had been replaced twice before remediation in 2011- but never since. The proposed projects and use of CCTN at Con Edison offer the following other benefits:

- Provides carrier diversity to critical communication circuits
- Offers the highest level of cyber and physical security
- Provides a higher reliability level than carrier circuits
- Scales capacity over time through card replacements
- Delivers faster recovery time from communications failures
- Provides services outside of local Telco carriers
- Avoids construction delays and costs needed for carrier services
- Improves recovery time from communications failures
- Provide reliable and diverse communications for REV, AMI, DSP, and other utility of the future applications

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

While this project does not offer immediate financial benefits, as additional company-owned infrastructure is built to support the additional communicating devices, the Company will have a clearer path to retiring the legacy communication network and implementing new technology that will support existing communication services, as well as new communication requirements.

2. Major financial benefits

The financial benefits include cost avoidance to repair failed systems. Other savings that cannot be monetized may be worth tens of thousands of dollars annually in eliminated communication failures and illustrated in prior data provided above.

3. Total cost

The total cost over the implementation period of 2023 to 2025 is estimated at \$ 60,000,000.00.

4. Basis for estimate

Cost estimates are based on experience with previous fiber jobs; labor estimates from construction management and internal forces; current pricing from vendors for fiber, innerduct, and splicing; and estimates from Regional Engineering who is responsible for assigning conduit routes.

The estimates are also based on the nominal costs of trenching for new cable (where necessary), facilities, equipment (e.g., fiber cable, routers, and optical equipment), labor and overheads, and building additional equipment and facilities for the different types of communications infrastructure. Nominal cost estimates are based on historical spending for each type of communication. In practice, the costs will vary depending on the specific deployment of the expected endpoints (e.g., incremental footage, facilities).

5. Conclusion

This project should continue because of the immediate operational benefits realized so far and for the strategic benefits described above.

Project Risks and Mitigation Plan

The major risk with any communications migration and upgrade project is the technical risk that the current technology standard will be supplanted by new technological developments and adoption. This risk is mitigated by engaging the various service & equipment providers for continued support guarantees, and implementation of backward compatible components.

Another risk is escalation in cost of materials and labor to build out outside plant physical infrastructure. This risk is almost impossible to control but the impact will be mitigated by focusing on deployment of the most operationally impactful plant that will maximize utility and benefit if all planned infrastructures cannot be built.

Technical Evaluation / Analysis

Information Technology performs planning and analysis on all technologies introduced. Solutions are investigated in conjunction with the IT strategy and vision planning process. Interaction with IT advisors, carriers, vendors, and Company employees ensure the selection of the optimal solutions.

Project Relationships (if applicable)

IT projects for all lines of business, completed or future, require and expect sufficient performance of the network. CCTN provides the network from which all applications are delivered to employees. Work Management, Damage Assessment and Mobil Dispatch are applications which could benefit from this initiative, as could communications for REV, AMI, DSP, and other utility of the future applications

3. Funding Detail

Historical Spend

	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historic Year (O&M only)</u>	<u>Forecast 2021</u>
Capital	<u>2,963.2</u>	<u>5,901.3</u>	<u>7,883.7</u>	<u>10,654.3</u>		<u>6,877.2</u>
O&M						

Total Request (\$000):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	<u>4,937.0</u>	<u>20,000.0</u>	<u>20,000.0</u>	<u>20,000.0</u>	<u>14,653.8</u>
O&M*		<u>850</u>	<u>850</u>	<u>850</u>	<u>850</u>

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor					
M&S					
Contract Services					
Other					
Overheads					
Total	<u>4,937.0</u>	<u>20,000.0</u>	<u>20,000.0</u>	<u>20,000.0</u>	<u>14,653.8</u>

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings	0	0	0	0	0

O&M Avoidance	0	0	0	0	0
Capital Savings	0	0	0	0	0
Capital Avoidance	0	0	0	0	0

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M	0	850	850	850	850
Capital	0	0	0	0	0

*If whitepaper is supporting a capital project/program this refers to implementation O&M. The ongoing O&M associated with this project is included in the Telecom O&M Whitepaper and budget.

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/ maintenance if capital isn't deployed)

Project Status:

- Initiation – New project, not authorized yet
- Planning – Project authorized, not started yet
- Executing – Project in-flight
- On-going – Annual program

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Communications Infrastructure (Grid-Modernization) Phase 2	
Project/Program Manager: Wendell Little	Project/Program Number (Level 1): PR.23317516
Status: ☐ Initiation ☒ Planning ☒ Execution ☒ On-going ☐ Other: _____	
Estimated Start Date: January 1, 2023	Estimated Date In Service: December 31, 2025
A. Total Funding Request (\$000) Capital: \$ 48,570 O&M: (See Telecom O&M White Paper)	B. ☒ 5-Year Gross Cost Savings (\$000) O&M: \$ 850 ☐ 5-Year Gross Cost Avoidance (\$000) Capital: \$ 0
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: (See Telecom O&M White Paper) Capital: \$ 0	D. Investment Payback Period: N/A (Years/months) (If applicable)
Work Description: As Con Edison deploys Grid Innovation systems, applications, and devices, many will require supporting network communications infrastructure to maximize the value of the investment. The Company will develop network communications infrastructure to manage the transport of the data generated by these Grid Innovation systems. The Company's network communications strategy must deliver sufficient capacity and diversity of network communications channels to accommodate the necessary systems and devices (sensors) with the required levels of service. This network infrastructure generally must be installed or upgraded in advance of planned device deployment. Further, this strategy must address cybersecurity and other operational requirements. To accommodate future Grid Innovations systems, applications, and devices (sensors), the Company will expand or enhance existing network communications infrastructure to meet the needs of each application. This network infrastructure expansion will span a twenty-year horizon in alignment with Con Edison's Grid Innovation plan. Optimal network communications solutions were identified through system, application, and device requirements gathering and may include: - Expanding the Corporate Communications Transmission Network ("CCTN"), e.g., new fiber - Expanding commercial carrier wireless and wireline communications - Implementing Software Defined Network Technology Expanding CCTN: Con Edison owns and operates a private communications network called the CCTN. This network enables secure communications circuits for SCADANet, voice, video, feeder protection, and the computing and storage environment. CCTN enables computing resource consolidation, disaster recovery, as well as the reduction of public carrier costs. There are over 200 Company locations which host the fiber optic and ancillary equipment	

used by CCTN. The CCTN equipment is installed in communications rooms, communications huts, and enclosures at the various facilities. These facilities are typically at Con Edison owned properties, including substations, and owned or leased utility poles and transmission towers. Since the late 1980s, over 600 miles of fiber optic cable has been installed to provide CCTN communications services. In most cases, these fiber runs were combined with electric distribution cable installations. The need to expand capacity to address Grid Innovation requirements drives this CCTN expansion project and it included modernizing the CCTN network towards modern fiber optics network technologies (for example Multi-Protocol Label Switching 'MPLS'). Enhancement options include adding AMI access points to existing CCTN facilities, extending CCTN reach or services over microwave, and building new CCTN facilities, depending on local topography and SCADA or capacity needs.

During the years of 2020 through 2022, Con Edison will build fiber routes in each borough, extending the reach of the CCTN facilities. The location of the CCTN facilities build out is dependent on the locations of the planned installation of SCADA assets.

Recently, the Company has explored innovation to include fiber optic cable and/or microducts alongside primary distribution cable to enhance communications on our distribution network. Fiber imbedded in the cable or blown through the included microducts will provide a communications pathway for data gathering. Available fiber optic cable will enable data transfer from numerous underground cable structures to a common communication point. Use of this technology for Grid Innovation infrastructure will be done on a limited basis to selectively extend the reach of communications networks. As this technology is proven effective through field trials, it may be used on a more widespread basis.

Expanding commercial carrier wireless and wireline communications:

Carrier services present another communication channel for Con Edison assets for both wireless and wireline uses. A wireless option that has proven effective in the Company's dense urban environment, and can be made suitably secure and responsive for SCADA control devices, is to use wireless modems and networks through carriers like Verizon or AT&T. Wireline solutions the Company is evaluating include Multiprotocol Label Switching ("MPLS") services over fiber optic cable. The deployment of high-speed wireline services over fiber presents another option for backhauling AMI access points. This offers more takeout points, a lower hop count, and higher performance for SCADA applications.

These options are suitable when performance requirements for certain applications exceed the design capability of the AMI network. Though effective, the downside to this approach is that it is relatively expensive to scale as each modem requires a carrier account, and it does not provide the network control or resiliency that is needed during extreme events.

During the years of 2023 through 2025, the Company expects it will deploy wireless modems and wireline communications where appropriate as needed by the operations Grid Innovations applications (for example new sensor implementations).

In practice, the communication path to bring field asset data back to upstream management systems will leverage a combination of these options. For instance, the Company could leverage the AMI network to transmit data from field assets and other edge devices to AMI access points. The backhaul network would then transmit the data through the established CCTN and/or carrier networks to decision management systems and other applications.

Implementing SD-WAN (Software-Defined Wide Area Network) technology:

As the Company looks to enable network communications for DERs, one of the technologies mandated by the governing bodies is SD-WAN. The use of SD-WAN (Software Defined – Wide Area Network) technology will be evaluated and if feasible will be implemented to further streamline the communications effectiveness among the various carrier-based technologies. The SD-WAN provides a stable and secure way to utilize public networks, like the internet for certain SCADA and telemetry applications by providing an independent control plane to manage various transmission services.

O&M

Any significant expansion of network communications infrastructure sustained over several successive years as is required to support the expected expansion in the number and complexity of applications that define Grid Innovation will inevitably result in an increase in O&M activity. The O&M increases will occur in three areas, namely, cost for new carrier services, cost for new staff, and cost for more maintenance activity.

O&M related to this project is included in the Telecom O&M budget and White Paper.

Justification Summary:

Network communications infrastructure is foundational to Grid Innovation. Deploying additional communicating devices without the requisite performance, (e.g., bandwidth, latency, etc.) and supporting network infrastructure would lead to stranded costs of the assets or even disruption of existing assets that use the communication networks. This infrastructure is a requirement of Grid Innovation and Distributed System Platform (“DSP”) projects, including Volt-Var Optimization (“VVO”), Overhead and Underground Resiliency, and Distributed Energy Resource Management System (“DERMS”). Each of these investments relies on field assets, like smart sensors and controllable network protectors, to inform Company applications and systems for planning and/or operational purposes. These Grid Innovation systems, applications, and devices will provide real-time visibility and control of grid assets and distributed energy resources (“DER”) on the system.

The holistic design of the network communications infrastructure for Grid Innovation addresses several departmental and corporate risks, including:

- Failure of Distribution Automation and Smart Grid applications
- Failure of critical business applications
- Infrastructure constraints
- Safety
- Failure of public carrier wireless services

Each of the proposed communication solutions has distinct benefits and applications, described below.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Expanding CCTN:

CCTN continues to provide the Company with a high-speed, reliable, and cost-effective communication alternative to public carriers. Through experience, CCTN regularly outperforms the carriers on reliability, bandwidth, priority, and restoration. Typically, CCTN is designed to be more disaster resilient, with greater backup power or onsite generation.

As such, CCTN provides diversity and redundancy to public carrier circuits for critical applications that may require it. The communications diversity provided by CCTN enables the Company to maintain operations independent of the public carriers, which is critical for 'black-sky days', such as major storms or other unforeseen events that substantially impact communications systems including public carrier services. Communication requirements for data, voice, feeder protection, SCADA and video circuits will result in the installation and deployment of modern communication technologies to many Company facilities. CCTN provides the network for SCADA protection and data services to critical substations, necessitating capital to expand the presence of the network to meet expanding SCADA and automation needs. It serves as the corporate backbone for communication services for the foreseeable future.

The additional communication pathway created through the development of fiber-embedded primary cable is an important development in a dense urban environment because wireless communications to and from field devices can be challenging. Field device information will be communicated through the fiber to strategically located wireless communication devices for further backhaul. This may also offer cost savings by reducing the number of wireless communication devices necessary to monitor the system.

Expanding commercial carrier wireless and wireline communications:

The commercial carrier wireless or wireline communications offer SCADA-ready latency and can be designed to meet cybersecurity requirements for SCADA applications. Wireless commercial services are typically more scalable for deployment when devices require a short lead time. Though wireline services require more lead time, there are certain locations where extending commercial carrier wireline solutions is a more cost-effective solution than extending CCTN. Where commercial carrier wireline solutions are extended, and ultimately connect to CCTN, it extends the CCTN point of presence. The use of wireline commercial carriers to extend CCTN point of presence becomes more important as an AMI mesh network expands the number of sites that are viable for commercial carrier extension, greatly expanding the usefulness of network.

Upgrades to commercial carrier wireline services are also critical for area and unit substations without existing CCTN facilities to increase the capacity in order to handle the increased demand of SCADA-enabled grid assets. Commercial carrier and broadband services provide redundancy and additional diversity among carriers in the event of network outages of company-owned networks like CCTN (and vice versa). Furthermore, these may be the only options available where the Company's networks do not provide coverage or network build out is not cost-effective.

Devices that may use commercial wireless or wireline communications include targeted network protector relays and smart sensors; distribution automation reclosers and switches on overhead circuits; underground interrupters; capacitor bank monitors; and some power quality meters to enable VVO.

O&M

Usage charges will apply for incremental wireless and wireline services needed to backhaul additional access points in the private meshed wireless access network that provides last mile connectivity to the various endpoint assets described above and for assets that communicate directly over carrier wireless networks.

The expansion of fiber optic outside plant and telecommunications facilities housing multi-point and point to point microwave terminal and MPLS and DWDM network gear will require additional technical staff to design, deploy, configure, troubleshoot, maintain, and upgrade this plant over the lifecycle of these complex systems. There will be increases in common plant like rectifiers, uninterruptible power supply units, and batteries that will also need to be maintained.

Any increase in outside plant incurs exposure to risk to damage from normal field activity and weather events. There will also be repairs associated with normal failure for equipment that is in service. Some examples of these maintenance activities include replacement and repair of fiber optic cables damaged by construction interference, electric system burnouts, rodents and crews working in manholes with fiber cable; storm damage to overhead fiber optic cables; ongoing proactive inspections and remediation including tree trimming; replacement of electronic components like optical cards, power supply units, transmitters, lightning and grounding protection and radio frequency antennas and waveguides.

O&M related to this project is included in the Telecom O&M budget and White Paper.

Alternatives

For each field device, multiple communication channels were considered. The communication channel was ultimately selected based on the following:

- o Risk of loss of communication – where the redundancy and communication channel requirements are more stringent as the risk increases when that communication channel is lost
- o Company vs. third party ownership – where company ownership provides greater control, particularly during extreme events
- o Backup power requirements – where locations with available backup power generation or batteries can meet more stringent backup requirements
- o Cybersecurity requirements – where cybersecurity requirements vary for monitoring devices vs. those that will be controlled by operators

Risk of No Action

Risks of no action include limited communication with field assets and edge devices, limiting data acquisition and control of applications, and eroding the value of the investments. Failure to consider holistic solutions to communications needs could result in unreliable communications for critical grid control assets or the inefficient buildout of network capacity. Interruptions to control devices reduce an operator's visibility and control, which limits their responsiveness to manage a dynamic grid and presents a risk to maintaining system reliability. Inefficient capacity on these networks would result in bespoke communications solutions deployed on a device basis, rather than leveraging the scale of the networks to appropriately build capacity. In addition, without a comprehensive communication strategy and funding to preserve it, the Company will not be in a position to support Reforming the Energy Vision ("REV"), DER integration, and other customer focused initiatives.

Non-Financial Benefits

In addition to enabling many of the Grid Innovation and DSP investments that deploy communicating devices, like structure observation systems and controllable network protectors, the proposed communication enhancements maintain cybersecurity and provide resiliency through diverse communications.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

While this project does not offer immediate financial benefits, as additional company-owned infrastructure is built to support the additional communicating devices, the Company will have a clearer path to retiring some legacy communications like leased Distribution Automation System (“DAS”) radio sites. The annual O&M cost for DAS sites is about \$850,000; i.e., nominally \$40K/month for vendor support and \$340K/year in site lease costs.

2. Major financial benefits

The major financial benefit is capital cost avoidance to build multiple wireless data infrastructures to support the various Grid Modernization application with diverse communications requirements. The current DAS wireless infrastructure costs about \$5,000,000 to build in the 2000-2003 timeframe.

3. Total cost

The total capital cost over the rate years is estimated at \$48M. The total O&M cost is estimated at \$1.2M over the rate years. O&M related to this project is included in the Telecom O&M budget and White Paper.

4. Basis for estimate

The estimates are based on the nominal costs of trenching for new cable (where necessary), facilities, equipment (e.g., fiber cable, routers, and modems), labor and overheads, and building additional equipment and facilities for the different types of communications infrastructure. Nominal cost estimates are based on historical spending for each type of communication. In practice, the costs will vary depending on the specific deployment of the expected endpoints (e.g., incremental footage, facilities).

5. Conclusion

This project should continue because of the immediate operational benefits realized so far and for the strategic benefits described above.

Project Risks and Mitigation Plan

The major risk with any communications migration and upgrade project is the technical risk that the current technology standard will be supplanted by new technological developments and adoption. This risk is mitigated by engaging the various service & equipment providers for continued support guarantees, and implementation of backward compatible components.

Another risk is escalation in cost of materials and labor to build out outside plant physical infrastructure. This risk is almost impossible to control but the impact will be mitigated by focusing on deployment of the most operationally impactful plant that will maximize utility and benefit if all planned infrastructures cannot be built.

Technical Evaluation / Analysis

Information Technology (“IT”) performs planning and analysis on all technologies introduced. Solutions are investigated in conjunction with the IT strategy and vision planning process. Interaction with IT advisors, carriers, vendors, and Company employees ensure the selection of the optimal solutions. Traffic model analysis measures the current performance of the AMI network and projects performance for areas where deployment is

not yet complete. This analysis measures both the average utilization of the network and the 95th percentile performance to give a measure of both the overall capacity and the peak-traffic performance.

The Company conducted workshops to determine the communication requirements of each field device to be deployed through Grid Innovation. Workshop participants included subject matter experts on CCTN, AMI, SCADA, and field assets. Requirements such as bandwidth, latency, and control were documented in a communications matrix.

Project Relationships (if applicable)

The Grid Innovation and DSP projects requiring communications infrastructure include:

- o VVO
- o Overhead Resiliency
- o Underground Resiliency
- o DERMS
- o Smart Sensors
- o Network Protector Relay Upgrades
- o DAS and iGIN SCADA Replacement

Historical Spend

	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historic year</u> (O&M only)	<u>Forecast 2021</u>
Capital						
O&M						

Total Request (\$000):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	<u>16,031</u>	16,002	16,284	16,284	16,284
O&M*		0	0	0	0

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor					
M&S					
Contract Services					
Other					
Overheads					
Total	<u>16,031</u>	16,002	16,284	16,284	16,284

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings	0	0	0	0	0
O&M Avoidance	0	0	0	0	850
Capital Savings	0	0	0	0	0
Capital Avoidance	0	0	0	0	0

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M					
Capital					

*If whitepaper is supporting a capital project/program this refers to implementation O&M. Ongoing Maintenance O&M will be included in Telecom Operating O&M budget. O&M related to this project is included in the Telecom O&M budget and White Paper.

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Project Status:

- Initiation – New project, not authorized yet
- Planning – Project authorized, not started yet
- Executing – Project in-flight
- On-going – Annual program

Information Technology 2022

1. Project / Program Summary

Type:	☐ Project ☒ Program	Category:	☒ Capital ☐ O&M ☐ Regulatory Asset
Work Plan Category:	☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic		
Project/Program Title: Construction Paving App (SmartApps)			
Project/Program Manager: Franklin Alvarez		Project/Program Number(Level 1): 25546222	
Status:	☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :		
Estimated Start Date: 1/3/2023		Estimated Date In Service: 12/31/2024	
A. Total Funding Request (\$000) Capital: 1,955.0 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 250.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
This current SmartApp system records and monitors the restoration of sidewalk and street excavations annually. These excavations are related to the maintenance of Gas, Electric and Steam services through the Con Edison service territory. This enhancement will automate and enhance the process for the completion of the contractor information through mobile forms and supply that information to the Compass / Oracle payment system. A Paving Order includes a computer-calculated due- date based on the type of restoration, service, and workdays, and calculated quantities required based on the size and type of each opening at the restoration site. Upon completion of the paving work, the contractor returns the Paving Order noting work done and any variance. Add here the Damage Assessment Form - All of Construction and sends claim information to the LAW department.			
Justification Summary:			
This current system has shared year costs O&M subscription cost of \$2.2M annually shared by Construction and Gas Operations equally. The replacement of the platform support and migration of the forms will result in overall cost reduction to the company savings of 1.5M O&M dollars annually. Additionally, we will be on the new IT roadmap which ensure support, Cybersecurity, and IT approved technology.			
Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)			
This project has relationships to Gas Central and the Construction Compass Payment System, and Layout Tracking System Layout Tracking (LOT).			

Risk 1 Name: Corporate ConEd.Regulatory and Compliance.Fraud	Risk 1 Description: Controls for validating cost and compatible units of work by contractors
Risk 2 Name: Department.Construction.Cybersecurity	Risk 2 Description: Newer system based CECONY latest Cyber controls.

2. Supplemental Information

Alternatives:

Remain on the current platform: The current platform is manual and requires change, This process is to labor intensive and would cause backlog in the processing of inspections and payments (Rejected)

Risk of No Action:

Risk 1

Corporate Risk (Cyber Security) Compliance.

Risk 2

Corporate Risk (Fraud Risk Mitigation)

Non-financial Benefits:

This deployment will provide increased transparency for our Union workforce with regards to field actives documentation and use of technology.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

This system will reduce use of the temporary clerical services and reduction in head count starting in 2022

2. Major financial benefits

This system will reduce (2.5) FTE's per year starting 2022 for a savings 325k a year.

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (1,955.0) = Total Cost (1,955.0)

4. Basis for estimate

Estimate is based on prior projects (similar size) completed using similar technology

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan
Technical Evaluation/ Analysis	
Technical Evaluation is based on the IT reference architecture guideline.	
Project Relationships (if applicable)	
This project has relationships to Gas Central and the Construction Compass Payment System, and Layout Tracking System Layout Tracking (LOT).	

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	690.0	1,265.0	0.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor		690.0	1,265.0		
M&S					
A/P					
Other					
Overheads					
Total	0.0	690.0	1,265.0	0.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings			500.0	1,100.0	
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M			250.0	250.0	

Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type:	☐ Project ☒ Program	Category:	☒ Capital ☐ O&M ☐ Regulatory Asset
Work Plan Category:	☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic		
Project/Program Title: Construction Technology Improvements			
Project/Program Manager: Stephen Conklin		Project/Program Number (Level 1): 25496811	
Status: ☒ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date: 2/1/2022		Estimated Date In Service: 12/31/2023	
A. Total Funding Request (\$000) Capital: 950.0 O&M:		B. ☒ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: 300.0 Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 50.0		D. Investment Payback Period: (Years/Months) (If applicable) None	
Work Description:			
The scope of work involves the implementation of upgrades to the Construction Public Improvement and Construction Management payment inspection process. This includes server upgrades necessary for the volume of digital documentation. Additional on premise servers will necessary to support the records management compliance efforts.			
Justification Summary:			
Currently, there is no other method or funding available for the organizational Server/ Storage upgrade necessary to support the business. This is not covered by Information Technology (IT) on the XM10 budget.			
Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)			
None			
Risk 1 Name: Department.Construction.Major Storm		Risk 1 Description:	
		Damage Assessment function is moving to digital non paper format. We will need upgrades necessary to support the volume for this function.	

Risk 2 Name: None	Risk 2 Description:
Risk 3 Name: None	Risk 3 Description: .

2. Supplemental Information

Alternatives:

Do not provide upgrades to server environment unless project related.

Risk of No Action:

Applications not working properly due to lack of hardware resources. These applications require upgrades to optimize usage by end users.

Non-financial Benefits:

Storage for new digital payment process. In addition, we will be able keep our operating systems and database servers current with the support model.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

N/A

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (950.0) = Total Cost (950.0)

4. Basis for estimate

Enterprise Architecture server request estimate

5. Conclusion

We are required to upgrade our operating system/hardware infrastructure as needed to maintain technical support. Keeping the system upgraded will mitigate cyber risks.

Project Risks and Mitigation Plan

Risk	Mitigation Plan
Technical Evaluation/ Analysis	
Operating Systems need to be keep updated on a frequent basis based on patches and security upgrades provided by software manufacturer.	
Project Relationships (if applicable)	
None	

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	280.0	350.0	200.0	200.0	200.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor					
M&S					
A/P	280.0	350.0	200.0	200.0	200.0
Other					
Overheads					
Total	280.0	350.0	200	200.0	200.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M					

Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/ project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset		
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: Construction, Gas Mobile Migration (Angular)			
Project/Program Manager: Franklin Alvarez		Project/Program Number(Level 1): 25546225	
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date: 1/1/2023		Estimated Date In Service: 12/31/2025	
A. Total Funding Request (\$000) Capital: 1,495.0 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 300.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description: IT is planning to migrate all applications from the KONY platform to angular apps and integrate the apps to Work Management solutions as applicable. KONY is a vendor platform for which we have limited knowledge and support. Hence IT is looking to move away from that platform and migrate all applications built in that platform. This project will include the conversion of Construction Mobile Office, Daily Activity Report and forms built using coned forms office application.			
Justification Summary: This current system has shared year costs O&M subscription cost of 0.54 M annually shared by Electric, Construction and Gas Operations. The replacement of the KONY platform support and migration of the forms will result in overall cost reduction to the company savings of .5M O&M dollars annually. Additionally, we will be on the new IT roadmap which ensure support, Cybersecurity, and IT approved technology			
Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)			
This project has relationships to Gas Central and the Layout Tracking System Layout Tracking (LOT).			
Risk 1 Name: Corporate ConEd.Regulatory and Compliance.Fraud		Risk 1 Description: Implement Controls for the oversight of items of work used in	

the field

2. Supplemental Information

Alternatives:

Remain in Kony Platform: - Need to work with Vendor resources and need to continue pay platform support costs.

Risk of No Action:

Kony resource availability is scarce.

Non-financial Benefits:

Complete control of the product and no vendor dependencies

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

O&M cost savings of 0.5M shared between different organizations

2. Major financial benefits

O&M cost savings of 0.5M shared between different organizations

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (1,495.0) = Total Cost (1,495.0)

4. Basis for estimate

Estimate is based on historical similar sized project built using similar technology

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis
Technical evaluation is based on IT Enterprise architecture guideline
Project Relationships (if applicable)
This project will be integrated with Work Management apps for contruction

3. Funding Details						
Historical Spend by Year (\$000):						
	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						
* * For Rate Case only						
Total Request (\$000):						
Total Request by Year (\$000):						
	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>	
Capital	0.0	920.0	575.0	0.0	0.0	
Implementation O&M*						
Regulatory Asset						
*If Whitepaper is supporting a capital project/program this refers to implementation O&M.						
Capital Request by Elements of Expense (\$000):						
<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>	
Labor		920.0	575.0			
M&S						
A/P						
Other						
Overheads						
Total	0.0	920.0	575.0	0.0	0.0	
Total Gross Cost Savings / Avoidance by Year:						

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings		300.0	300.0	300.0	
O&M Avoidance					
Capital Savings					
Capital Avoidance					
Total Ongoing Maintenance Expense by Year:					
	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	0.0	0.0	300.0	
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/ project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☐ Project ☒ Program	Category: ☒ Capital ☐ O&M
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☒ Strategic	
Project/Program Title: Data Center Improvements	
Project/Program Manager: Michael Ribarich	Project/Program Number (Level 1): 21660691/10009295 / PR.23300178
Status: ☐ Initiation ☐ Planning ☒ Execution ☒ On-going ☐ Other: _____	
Estimated Start Date: January 1, 2023	Estimated Date In-Service: December 31, 2026
A. Total Funding Request (\$000) Capital: \$ 29,565 O&M: See Computer Software and Hardware budget and Telecom O&M budget and whitepaper. FTE incremental - \$1275	B. ☐ 5-Year Gross Cost Savings (\$000) O&M: \$ 0 ☐ 5-Year Gross Cost Avoidance (\$000) Capital: \$ 0
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: See Computer Software and Hardware budget and Telecom O&M budget and whitepaper. FTE Incremental - \$1275 Capital: \$ 0	D. Investment Payback Period: N/A (Years/months) (If applicable)
Work Description: Our data centers are decreasing in size and need as our systems move to the cloud. Nevertheless, we must continue to invest our remaining data centers The Company will need to continue to maintain and upgraded them so that they can host certain critical IT assets. The data centers also provide diversity and redundancy. The corporate data centers are strategically located throughout the Consolidated Edison Co. of NY (CECONY) and Orange & Rockland (ORU) service territory. Data Centers are operational at 4 Irving Place, Van Nest, Spring Valley, 30 Flatbush and Worth Street. While strategies to consolidate data centers, employ IaaS, SaaS, PaaS and leverage co-locations are underway, ongoing capital improvements and operational support are needed for the critical physical infrastructure in the Company owned and operated data centers to maintain high availability, reliability and redundancy. Components include cooling systems, uninterruptible power systems (UPS), electric distribution, standby power, fire detection & suppression, control, environmental monitoring systems, and network cabling infrastructure. The following Data Center Improvements capital projects completed in 2021: 30 Flatbush 6th Floor – UPS module component upgrade. - TLC Auditorium – UPS battery upgrade. - Spring Valley Data Center - UPS battery upgrade. - Spring Valley Data Center - Server Migration/Consolidation Milestone 1 - Worth Street Data Center – Capacity optimization assessment.	

- Gas Control Center – 2nd UPS plant and extended battery runtime.
- Rye SC - Emergency generator monitoring improvements.
- Various – UPS network management card upgrades for environmental monitoring improvements.

The following Data Center Improvements capital projects are planned for budget years 2022-2026:

DC11 Data Center Chiller Upgrade: Chiller equipment, rigging, piping, electrical and structural modifications.

Spring Valley Data Center Consolidation: Physical infrastructure improvements to repurpose the Spring Valley Data Center to a dedicated data communications room including:

- Space planning/engineering
- Improve Power redundancies and distribution
- Cooling efficiencies
- Cabling infrastructure
- Cable pathways and racking

Worth Street Data Center Optimization: Physical infrastructure improvements to optimize performance and expedite the consolidation of legacy data centers to Worth Street:

- Power distribution and cooling capacity planning support, engineering, and reconfigurations.
- BMS redundancy improvements.
- Environmental monitoring improvements.
- Other improvements based on emerging server platform roll out schedule and requirements.

Control Center Data Center Consolidation: Physical infrastructure improvements to support relocation of server/storage equipment from legacy control centers to strategic data centers. Also upgrades to harden communications rooms at remaining control centers including:

- Worth Street - Pod 2 White Space Buildout.
- BQECC - UPS battery, Rack power distribution and environmental monitoring upgrades.
- Gas Control Center – Rack power distribution and environmental monitoring upgrades.
- MECC – UPS diversification, rack power distribution and environmental monitoring upgrades
- Environmental monitoring improvements.
- SIECC – UPS redundancy, battery expansion, rack power distribution upgrades.
- XWECC – UPS redundancy, battery expansion, rack power distribution upgrades.

Comm Rooms Critical Physical Infrastructure: Campus and local area network infrastructure expansion and improvements to support general work areas, work out locations and substations including:

- 4IP LAN Room Rack Power Distribution Upgrades
- 4IP Corporate Affairs War Room and Auditorium - UPS Battery Upgrades
- 4IP DC4 UPS Battery and Fiber Plant Upgrade
- Astoria Building 138 New Backbone Room
- Bruckner Building 3 LAN Room Betterment
- College Point and TLC Comm Room UPS Upgrades
- Eastview Consolidated UPS Battery Upgrade
- Rye HQ Phase 3 – 2nd UPS and LAN Room power distribution
- Small and Medium LAN UPS Life Cycle Upgrades

Data Center Equipment Infrastructure and Environmental Monitoring: Upgrade of physical infrastructure and environmental monitoring and capacity tools to provide new automation features, leverage efficiencies and reduce reconfigurations and downtime:

- StruXureWare Data Center Expert – Provides inventory management and real-time health data.

- StruXureWare Data Center Operations – Predicts the optimal cabinet location for IT equipment.
- Expand and automate monitoring capabilities within Facilities owned gray space areas (chiller plants, air handlers, generator plants, BMS systems) and integration with NOC monitoring tools.
- Expand and automate monitoring capabilities within IT owned white space areas (data center pods, comm rooms and LAN rooms) and integration with NOC monitoring tools.

The foregoing ambitious work description is greater than the previous rate period because Infrastructure and Environmental monitoring needs to be upgraded and expanded to mitigate and eliminate cybersecurity risks associated with the current legacy platform. Critical Physical Infrastructure is greater than the previous rate period due to legacy equipment requiring upgrades or replacement to maintain optimal performance and reliability standards. Control Center Consolidation requires new equipment to be in place during transitioning of operations so as to avoid long term outages to critical SCADA applications for all three commodity businesses. Worth Street Optimization requires upgrades and expansion of the data center foot print and IT dedicated power and cooling capacities to support server, storage and cyber security appliance deployments. The Spring Valley Data Comm project improves the reliability and sustainability of one of the Companies two Internet communication facilities by improving power and cooling capacities. The DC11 chiller has been identified by Facilities as needing replacement due to age, capacity limitations and the increasing O&M costs to maintain.

The cost to consolidate data centers requires a significant upfront capital investment to migrate from multiple legacy data centers to fewer state of the art modular, resilient, highly supportable consolidated data centers. The newer data centers will control the significant increase in O&M costs associated with continued operation of the legacy data centers. All these upgrades in the medium term and therefore cannot be postponed until the following rate period.

The annual O&M costs related to this program is included in the Computer Software and Hardware and Telecom O&M budget and whitepaper.

Justification Summary:

Data Center Improvements capital projects address solutions for enhancing, upgrading, and new construction of:

- IT dedicated back-up power mitigates the loss of computing and communications availability due to disruption of utility power sources frequently experienced during weather-related events.
- IT dedicated cooling systems mitigates the risk of failure, premature aging, or damage of IT electronic and server/storage equipment due to environmental conditions.
- Racking and cabling systems address the management of physical spaces to accommodate growth, moves, or changes in data center equipment.
- Infrastructure and environmental monitoring tools enable quick assessment and resolution of unplanned events that can adversely affect IT system availability and help to automate complex decision making for power and cooling capacity planning and outage mitigation.

The capital programs and projects funded under the Data Center Improvements budget permit Con Edison to maintain the high availability of its computer systems, reducing costs associated with downtime and avoids situations that may cause environmental and safety concerns due to system failures (e.g., fires, coolant fluid spills, refrigerant releases, etc.).

Justification for the O&M Labor Ask

Data Center Improvements is an ongoing yearly program since 2019. Over the past three years we have made capital investment to upgrade, improve and enhance our data center equipment. In addition to already installed equipment this

white paper describes the new upgrades and new installs planned during the rate case years. The equipment described in this white paper requires three additional FTEs to maintain the work that we are currently undertaking for the next 3 years.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

This program ensures the highest reliability and efficiencies at the data centers that support the operating business including existing SCADA applications and current Grid Modernization, data center modernization and consolidation and co-location strategy.

2. Supplemental Information

Alternatives

There are no alternatives to upgrading and operating data center infrastructure which is necessary to maintain high levels of reliability and availability to critical business systems. Onsite data center capacity is part of an overall hybrid strategy that includes colocation.

Risk of No Action

No action will lead to the increased likelihood of malfunctions or failures to critical business systems hosted in the data centers. It would also limit the ability to deploy corporate and user facing application enhancements.

Non-Financial Benefits

Con Edison continues to implement redundancy and diversity for the more than 3,100 servers currently supporting business applications and computer resources. The NOC utilizes infrastructure and environmental monitoring for early prediction and potential avoidance of service affecting incidents.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

A cost benefit analysis is not required.

2. Major financial benefits

The financial benefits include cost avoidance to repair failed systems out of warranty. Other savings that cannot be monetized may be worth hundreds of thousands of dollars annually in productivity loss due to downtime of data centers and unavailability of critical data.

3. Total cost

The total cost of the program over the rate years is estimated at \$29,565,000. The annual O&M costs related to this program is estimated at \$7,000,000 and is included in the Computer Software and Hardware budget and Telecom O&M budget and whitepaper.

4. Basis for estimate

Historic purchases are used as well as vendor presentations and Internet sources. The basis for the estimates is vendor rates, accommodation billing rates for internal labor, and cost estimates for equipment applied to the statements of work.

5. Conclusion

This program should be continued to ensure the highest reliability and efficiencies at the data centers that support the operating business including existing SCADA applications and current Grid Modernization, data center modernization and consolidation and co-location strategy.

Project Risks and Mitigation Plan

Escalating equipment and labor costs and evolving cybersecurity risks can potentially delay timely completion of certain aspects of the program and increase costs to implement. Mitigation strategy includes a modular approach to deployment and agility in responding to emerging threats through appropriate investment in the latest cybersecurity products.

Technical Evaluation / Analysis

Information Technology performs planning and analysis for upgrading and operating data center, and IT dedicated critical physical infrastructure.

Redundant and diverse design and construction considerations are used and implemented. The effort also factors in any plans to build new data centers, and the long-term data center and critical infrastructure requirements. Solutions are investigated in conjunction with the IT strategy and vision planning process. Interaction with IT advisors, vendors, and Company employees ensure the selection of the optimal solutions. Each implementation is done with technology evaluations and commercial RFPs before selection and rollout.

The results of prior years' preventative maintenance programs and predictive maintenance and failures are analyzed along with manufacturer recommendations to determine maintenance and support schedules and coverage.

Project Relationships (if applicable)

All current and future IT systems and business applications require infrastructure platforms to be available and supportable for reliability, security, and accessibility. Also, real estate restacking and data center consolidation.

3. Funding Detail

Historical Spend

	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2021</u>
Capital	1,037	1,502	1,718	1,860		<u>2,169</u>
O&M						

Total Request (\$29,565):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	1,698	5,565	8,000	16,000	2,585
O&M*		425	425	425	425

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor					
M&S					
Contract Services					
Other					
Overheads					
Total	1,698	5,565	8,000	16,000	2,585

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings	0	0	0	0	0
O&M Avoidance	0	0	0	0	0
Capital Savings	0	0	0	0	0
Capital Avoidance	0	0	0	0	0

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M	0	<u>425</u>	425	425	425
Capital	0	0	0	0	0

*If whitepaper is supporting a capital project/program this refers to implementation O&M.
The annual O&M costs related to this program is estimated at \$7,000,000 and is included in the Computer Software and Hardware budget and Telecom O&M budget and whitepaper.

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Project Status:

- Initiation – New project, not authorized yet

- Planning – Project authorized, not started yet
- Executing – Project in-flight
- On-going – Annual program

Information Technology 2022

1. Project / Program Summary

Type: ☐ Project ☒ Program	Category: ☒ Capital ☒ O&M ☐ Regulatory Asset
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☒ Strategic	
Project/Program Title: Data Governance Program	
Project/Program Manager: Joseph DeMarco	Project/Program Number (Level 1): 25780607
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☐ Other: _____	
Estimated Start Date: 1/1/2023	Estimated Date In Service: 6/1/2023
A. Total Funding Request (\$000) Capital: 13,888 O&M: 4,750	B. ☐ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M:	D. Investment Payback Period: (Years/months) (If applicable)
Work Description: The Data Governance Program is a strategic initiative intended to improve the governance of data cataloging, mapping, integrity, quality, appropriate use, and protections of data within Con Edison. This program looks to develop a framework that will promote Con Edison's data classification policy, support privacy legislation, data sharing for programs like IEDR and ensure security of data in line with industry data management standards. The goal is to build trust amongst customers and others with whom we share and process data. Data governance is a collaborative exercise that spans across all Company functions and lines of business. The enhanced program – to include staffing, processes, and tooling – is a collaboration between IT, business organizations, and compliance to (i) improve trust in data used to transact business activities through accurate and thorough cataloging, (ii) meet regulatory and compliance requirements through quality assurance rules and monitoring, and (iii) ensure data protection policies and controls are employed effectively through data classification. The Data Governance Program will develop and deploy a framework focused on the following needs: • Operating model where roles and responsibilities are clearly defined and understood, specifically accountability and appropriate delegation of authority. • A cross-functional program that takes an enterprise (rather than siloed) view of data issues. • A centralized knowledge sharing platform, or data catalog, allowing a collaborative approach between the business and IT to identify sensitive data and share information about key data assets in the enterprise. • A process and tool to measure and monitor the accuracy of data with appropriate escalation channels requirements for action plans to rectify poor data quality. This project will support the: • Implementation of data governance tools to validate proofs of concept, pilots, cloud costs, etc.)	

- Data Stewards staffing by business organization to facilitate data catalog content creation, data quality measurement and resolution, and compliance with data protection policies and controls.
- IT Operations staffing to develop and maintain a **data governance tool** that enables data cataloging, data quality, master data management, and data issue management workflow capabilities (e.g., design, development, deployment, services, licensing, etc.)

Justification Summary:

A strong data governance program ensures defined ownership and accountability by source system, as well as quality assurance and control for data moving downstream with the use of rules and monitoring. Additionally, defining consistent data classifications and cataloging data lineage as part of the program ensures appropriate protections are in place for data classified as sensitive, both at rest and in motion. Data of poor quality, incorrect classification, or processed/shared in an uncontrolled manner can compromise the Company's ability to build user-friendly and functioning digital customer tools, adhere to regulatory requirements, and secure data against cyber-attacks or other forms of data loss. Coordinated data governance also provides the opportunity to decrease data collection redundancies, standardize data-related processes and systems, and increase data system and resource efficiencies within and across departments.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Enhancements to the Data Governance Program are necessary to promote and enforce data management and protection controls relevant to the mitigation of operational and compliance risks involving information security, cyber security, privacy, and internal/external fraud. Failure to mitigate these risks could result in significant harm to customers, as well as financial and reputational risk to the Company. Con Edison must be innovative and strategic with respect to data management and governance, as well as other company goals such as clean energy, to maintain compliance with a quickly evolving regulatory landscape (i.e., data subject access rights) and ensure an effective control environment to combat internal and external threats of data loss. Meeting the objectives of a strong data governance program promotes trust in internal data used to meet regulatory and compliance requirements in the Company, as well as protects customer data for which the Company has been trusted by consumers as the data controller.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection

Failure to mature current data management processes and tooling produces an inconsistent, non-standardized, fragmented approach to managing data assets across the enterprise. As new core enterprise systems are implemented or existing ones upgraded - for example, applications in the customer, HR, GIS, and outage domains - it is critical to mature the data governance practices in the enterprise to ensure that data of high quality is produced and maintained and is consistently available to support critical business processes. Data stewardship, data issue management, data cataloging, and data protection controls and tooling are foundational capabilities needed to ensure that data is trusted, protected, and knowledge about it is collaboratively created, stored, and shared.

In addition, as more analytics projects are launched, more mature and robust data governance processes and tooling are imperative for data discovery activities for sourcing data into the analytics platforms, as well as, for cataloging the types of data and its meaning in the platforms.

Alternative 2 description and reason for rejection

Alternative 3 description and reason for rejection

Risk of No Action

Risks

Following are the enterprise risks if the Program is not implemented:

- Poor data quality undermines trust in data, potentially impacts operational decisions and regulatory and compliance reporting.
- According to Gartner, organizations that offer users access to a curated catalog of internal and external data will realize twice the business value from analytics investments than those that do not.
- Lack of ownership for and ability to track data issues fails to address data issues as they arise.
- Siloed knowledge about the contents of data stores increases the probability of creating duplicative data stores or reports to meet business needs, thus, resulting in increased costs.
- Not having an inventory of sensitive data assets and applicable data protection controls will likely increase the cyber and privacy risks of data exposure and could make the data assets the subject of a cyber-attack.
- Failing to define the systems of record for key data elements in the enterprise negatively impacts the customer experience - for example, not having a master source of customer contact information may result in customer interactions that do not respect customer preferences.

Non-Financial Benefits

- A centralized data issue management platform to record, track, and assign responsibility to data issues will improve workflows and communication among departments.
- Automated classification of sensitive data is a foundational capability necessary to ensure compliance with customer privacy laws.
- A centralized, enterprise data catalog process and tooling provides the following benefits:
 - Increases data understandability, acceptance, and trust
 - Decreases time spent searching for data and more on delivering value
 - Supports data lineage analysis - that is, increases the ability to trace data from source (operational databases) to target (reports)
 - Supports impact analysis by increasing the ability to measure the impact of change
 - Provides a standard, centralized platform where subject matter experts can share their knowledgeable about data sources
 - Supports business intelligence and analytics projects
- Development and measurement of data quality metrics enhances the quality of data in reporting and analytics platforms and data in transactional systems.
- Enhanced data quality increases trust in data reported to regulatory agencies.
- Data issues are identified earlier in business processes and handled before adversely affecting operations and business decisions.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

Costs that can be avoided with a comprehensive Data Governance Program include the following:

- Data breach fines. Identification of where sensitive data is located and implementation of data protection controls (for example, data access controls, data masking, data encryption) mitigates the risk and attendant fines of data being viewed, accessed and stolen by unauthorized individuals.
- PSC fines. Identification of walled data that should be separated by business functions (for example, marketing vs. transmission data) can be more easily identified and tagged accordingly.

- Data discovery time. When key data sources are well cataloged, analytics teams spend less time during the discovery phase to find the data that they need and more time actually building and testing analytics models.
- Longer data issue resolution times. Formalizing data issue management processes to identify, assign, and track progress shortens resolution time and produces higher quality data.
- Duplicative data. Cataloging reporting systems reduces redundancy and helps identify existing reports that can meet needs.

The data governance program costs will include the following:

- Contractor staffing to implement the data governance tools including technology subject matter experts and a project management resource
- Business unit data stewards staffing with the following responsibilities: data catalog and business glossary content creation, data issue management, master data management design, data quality metrics design, and quality oversight
- IT Data Governance Office staffing: responsibilities include, but not limited to data governance framework design and socialization; data catalog design and content creation; job aids creation; business unit support for data issue resolution; data protection best practices design; and collaboration with Law and Information Security
- IT operations teams to support data governance technology maintenance and upgrades
- Software licensing costs for technology solutions

2. Major financial benefits

The major financial benefits of the Data Governance Program include efficiency and cost avoidance in a number of areas and business units. Some examples include the following:

- By identifying the location of sensitive data and the necessary data protection controls to apply, the Company ensures that, for example, customer data is safe from cyber-security attacks, thus, avoiding the costs associated with the defense from illegal activities.
- Having a platform where knowledge about the key data assets in the enterprise is shared and policies are understood and applied reduces costs to store duplicate or low value data.
- The Data Governance framework includes data quality processes, metrics, and data stewards responsible to address data issues, thereby reducing the time needed to collect and cleanse data to support both transactional processes and analytics modeling.
- Call center response times are reduced when CSRs have access to timely, trusted customer and product information.

There will be savings/cost avoidance over a five-year period after implementation of the key components of the Program (sensitive data inventory, data catalog, data stewardship operating model, etc.). The remaining savings will come from productivity improvements in data issues resolution and cost avoidance.

3. Total cost

\$18,638

4. Basis for estimate

To create the cost estimates for the Data Governance Program, the following methods were used and assumptions made:

- Two dedicated IT resources to staff the Data Governance Office
- Two dedicated resources (data steward roles) in each of the following business units; total of 8 dedicated resources:

- o Electric Operations
- o Gas Operations
- o Customer Operations
- o Central Operations
- Oracle on-premises deployment of data quality solution using software included in the Oracle / Con Edison PULA software licensing agreement
- Oracle cloud deployment of Oracle Data Catalog solution
- Third party vendor estimates for cloud-based software licenses for data governance tools to deliver data governance data issue management processes and workflows
- IT standard estimating models for infrastructure costs (on-premises servers and storage)
- IT standard estimating models for contractor resources to deploy and configure cloud solutions

5. Conclusion

In summary, the Data Governance Program will enhance the processes and tooling across departments necessary to ensure valid, reliable and high-quality data is available to meet the needs of numerous stakeholders in the Company.

Among the crucial benefits the Program will provide:

- A common understanding of data.
- Improved data quality.
- An advanced ability to find and understand data to support data integration efforts and meet compliance requirements.
- Improved data management. The Program will establish codes of conduct and best practices in data management, making sure that the concerns and needs beyond traditional data and technology areas — including areas such as legal, security, and compliance — are addressed consistently.
- Increased trust and protection. Data governance enables data that is well-documented, and easier to find, and supports the need to keep data secure, compliant, and confidential.

Project Risks and Mitigation Plan

Risk 1

Limited business unit engagement results in less than optimal value from the program

Mitigation Plan

- Execute active, well-developed communication of the Data Governance Program to business units throughout the Company
- Execute quick wins to demonstrate early successes of the program
- Show program value by engaging with in-flight projects to address and facilitate data issue resolution early in project lifecycles
- Discover and socialize data governance practices that have developed organically in the Company, and succeeded in improving data quality, and share with other business units
- Leverage learnings from other utilities

Risk 2

Technical challenges in deploying new technology solutions

Mitigation Plan

- Select technologies that score highly in independent assessments (for example, Gartner and Forrester reviews) and having a significant industry installed base.

- Select technologies that have a strong community of practice to share insights and lessons learned.

Technical Evaluation / Analysis

Data management industry groups have conducted studies on the impact of immature data governance to organizations. One 2017 study by the US Data Management Association reports that “92% of businesses feel their data is inaccurate in some way. In addition, unreliable, incomplete, or poor-quality data cost organizations between 15% and 20% of their operating budgets.”

Project Relationships (if applicable)

The framework, technologies, and operating model to be delivered with the Data Governance Program will enable collaboration between IT and business organizations to increase trust in and protection of data assets. The Program's framework and technologies will improve the management of data across all data projects in the Company. The Program fosters a collaboration between the IT and the business orgs. It can be used for new projects, and for systems that want to improve the means they use to manage data. The Program advances the concept of data stewardship or ownership by delivering a framework whereby IT and the business units work closely to address data issues.

3. Funding Detail

Total Request (\$000):

Total Request by Year:

	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	<u>4,746</u>	<u>4,608</u>	<u>2,333.5</u>	
O&M	<u>1,000</u>	<u>1,150</u>	<u>1,300</u>	<u>1,300</u>

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor	<u>3,000</u>	<u>3,000</u>	<u>1,900</u>	
M&S	<u>750</u>	<u>750</u>	<u>233.5</u>	
Contract Services	<u>450</u>	<u>350</u>	<u>0</u>	
Other	<u>0</u>	<u>0</u>	<u>0</u>	
Overheads	<u>546</u>	<u>508</u>	<u>200</u>	
Total	<u>4,746</u>	<u>4,608</u>	<u>2,333.5</u>	

Total Gross Cost Savings / Avoidance by Year:

	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
O&M Avoidance	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Capital Savings	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Capital Avoidance	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

Total Ongoing Maintenance Expense by Year:

	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M	<u>1,000</u>	<u>1,150</u>	<u>1,300</u>	<u>1,300</u>

*If whitepaper is supporting a capital project/program this refers to implementation O&M

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/ maintenance if capital isn't deployed)

Project Status:

- Initiation – New project, not authorized yet
- Planning – Project authorized, not started yet
- Executing – Project in-flight
- On-going – Annual program

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☒ O&M ☐ Regulatory Asset		
Work Plan Category: ☒ Regulatory Mandated ☐ Operationally Required ☐ Strategic			
Project/Program Title: Data Integration Modernization			
Project/Program Manager: Kulkarni, Abhijit		Project/Program Number(Level 1): 25496793	
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date: 1/1/2022		Estimated Date In Service: 12/1/2022	
A. Total Funding Request (\$000) Capital: 12,927.6 O&M: 6,900.0		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M:		D. Investment Payback Period: (Years/Months) (If applicable)	
Data integration is a critical IT function and enables business transaction processing, process functions, data sharing and exchanging data within the Coned network and external partners in a safe and secure way. The current tools and technologies supporting these functions must be modernized to meet the strategic initiatives like DERMS, Privacy, IEDR and the fast-growing demands for the integration across the company. The project will implement new integration technology, tools and infrastructure and help scale to meet the high volumes of data, meet performance and timeliness requirements. The platform will come with out of the box tools that will allow transformation, improve data quality and apply governance controls. Business use cases such as asset maintenance, electric/gas system monitoring, smart sensor programs, EDAP and privacy will rely on integration capabilities delivered by the integration modernization project. The project deliverables are: - Design, develop and implement the integration platforms and operationalize for production. The project will process high volumes of AMI data and improve the timeliness and consistency in meeting business expectations. This will lay the foundation for future projects to use the platform. The platform will instrument processes that will enable a centralized access to data eliminating duplication and replication that happens today. - Implement standards: A service-oriented design will be implemented using a modern method (API) to reduce development time and efforts, automate security and support multi-cloud configurations. This will directly enable and support requirements around Distributed Energy resource Management			

(DERMS), sensor deployments, customer analytics, outage, and restoration.

- The integration modernization project will fund the selection and implementation of technology, using consulting services and vendor support. A dedicated integration team will be built to help grow talent and acquire skills and experience. In addition, the project is responsible for developing processes to operationalize the technology and help business project implementations.
- Develop best practices: The team will develop standard architectures, playbooks and blueprints that will help projects use the technology and implement business requirements.

Justification Summary:

Some of the benefits are:

- Improve resilience and reliability in providing data assets in a secure, zero trust fashion. Reduces duplication of data across consumer applications. Eliminate point-to-point integrations and increase operational flexibility.
- Enhanced speed to value as projects takes advantage of out of the box capabilities like data streaming and build programs and processes once that can be re-used and enhanced without re-inventing the wheel.
- Standardize on a modern integration platform and support mission critical projects and high value business operations like AMI, CORE, EDAP, DERMS, IEDR like projects. The platform will support on-prem and cloud solutions and handle large workloads and scale quickly to meet high volumes like we see during a storm.
- Enforce governance (security, data, process), instrument common data definitions and provide visibility and transparency as data moved across systems. This is especially relevant for Privacy, AMI and outage and restoration processes. For example, situational data from field (sensors, meters, Scada and GIS) must be processed and made readily made available to systems in a unified, timely fashion. This results in all systems having access to latest information in a consistent, accurate and timely fashion and aids better decision making.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

This project will support business projects that require sophisticated and advanced integration designs and capabilities to implement business requirements and improve operational excellence and advance the business agenda.

Risk 1 Name: Technology. Unauthorized access or loss of sensitive data,	Multiple point to point interfaces results in more HPI issues and maintenance nightmare
Risk 2 Name: Corporate ConEd. Operations. Storm restoration	Current integration technologies are unable to scale, be agile and do not lend themselves to reuse. This directly results in delays in delivery of critical information leading to poor decision-making impacting customer communications, customer experience and impact company reputation. Example: delay in providing timely outage and restoration messages

2. Supplemental Information

Alternatives:

Continue with current technologies, outdated design patterns and traditional batch integration. Current Technology is unable to meet the demands for real-time data, be flexible, meet performance and increasing data volume. The system is experiencing high workloads which are expected to grow exponentially with new project implementations.

Risk of No Action:

Risk 1

Current integration technologies are unable to scale, be agile and do not lend themselves to reuse. This directly results in delays in delivery of critical information leading to poor decision-making impacting customer communications, customer experience. Example: delay in providing timely outage and restoration messages

Risk 2

The current technologies are localized to individual applications and systems. Any change or control required on the data must be implemented manually, one integration at a time. This process is inconsistent and hard to implement in a timely fashion. As a result, data is not governed properly, not secured in time and with adequate controls efficiently and can lead to IT, business and compliance issues

Non-financial Benefits:

Non-Financial Benefits

This project will generate non-financial benefits for the Company, such as:

- Improved governance by applying security and process controls and enabling better visibility and transparency as data is processed and consumed by systems. Increased safety, compliance, timeliness, and customer satisfaction
- Centralized data sharing eliminating replication and duplication of data: An archive of common data, analytical models, methods, and data is readily available and published for consumption
- Data quality and consistency: Provide curated data tailored to business and analytical applications that solve problems with reduced effort and time to achieve objectives
- Standardize on the modern integration platform and tools and features built using best practices, processes and advance adoption and help achieve economies of scale.
- Efficiency: Proper utilization of resources and managing dynamic workloads in a timely fashion

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

	2022	2023	2024	2025	2026
Ongoing Software licensing	0	675	675	675	675
Ongoing labor to support the application (7FTE)	0	1050	1050	1050	1050

Project Implementation costs	1577.6	3850	2750	2850	1900

Additional savings could be achieved by reducing the integration technology footprint e.g. (Biztalk, SQL servers, IBM sterling etc). The data distribution hub technology implementation is expected to eliminate significant point to point interfaces thereby saving considerable cost for the future projects.

Total Gross Cost Avoidance by Year:

2. Major financial benefits

None

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (12,927.6) = Total Cost (12,927.6)

4. Basis for estimate

The capital request will fund a) integration technology platform software b) consulting and vendor services required to implement and support the environment c) develop and deploy programs to meet selected business use cases and d) develop processes to operationalize the technology and deliver project work.

The O&M request will fund the integration staff required to support the project work, maintain the platform, and provide ongoing support as a service.

5. Conclusion

For the success of application to share data in a secure, safe, timely and consistent fashion and deliver operational excellence we must invest in modernizing the integration technologies and upskill the bench strength to adopt and standardize across the company. This will drive better governance, compliance, reduce technical complexity and lower total cost of ownership over time. The project will deliver technical capabilities that will position Coned to take on DERMS, sensor deployments, IEDR and take on data and analytics to the next level.

Project Risks and Mitigation Plan

Risk	Mitigation Plan
NA	

Technical Evaluation/ Analysis

Technology solutions are carefully selected by studying products, conducting feasibility studies, and further calibrated with the short- and long-term business goals, IT strategy and planning process. A cross functional IT team, spanning cyber, subject matter experts, vendors and company employees participate in the decision-making process. In addition, standard RFP/ RFI processes are leveraged to implement the technology and deliver business capabilities.

Project Relationships (if applicable)

This project will support business projects that require sophisticated and advanced integration designs and capabilities to implement

business requirements and improve operational excellence and advance the business agenda.

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

* * For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	1,577.6	3,850.0	2,750.0	2,850.0	1,900.0
Implementation O&M*		1,725.0	1,725.0	1,725.0	1,725.0
Regulatory Asset					

*If Whitepaper is supporting a capital project/ program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	0.0	750.00	1,000.0	1,000.0	700.0
M&S					
A/P	0.0	3100.0	1,750.0	1,850.0	1,200.0
Other	1,577.6				
Overheads					
Total	1,577.6	3,850.0	2,750.0	2,850.0	1,900.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M		1,725.0	1,725.0	1,725.0	1,725.0
Capital	1,577.6	3,850.0	2,750.0	2,850.0	1,900.0

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program		Category: ☒ Capital ☐ O&M ☐ Regulatory Asset	
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: End User Computing			
Project/Program Manager: Anuja Nakkana		Project/Program Number(Level 1): 10025295	
Status: ☐ Initiation ☐ Planning ☐ Execution ☒ On-going ☒ Other :			
Estimated Start Date: 1/11/2011		Estimated Date In Service: 12/31/2023	
A. Total Funding Request (\$000) Capital: 23,014.8 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 0.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
The purpose of this project is to holistically address end user computing technologies. End user computing encompasses a variety of user facing technologies including desktops and laptops, desktop operating systems and applications, smartphones, mobile and web applications, and virtual desktops. These solutions look to deliver technology that will meet productivity, efficiency, cost savings, performance, and security goals. In the past we had separate projects to address different components and with evolving technology we have decided to create a single program. This project will include multiple areas of technology namely: • Evaluating end user technologies for Coned adoption (device capabilities, software, and mobile features etc.) • Software to support end user computing capability and experience (collaboration, device provisioning, patching etc.) • Expanding and investing in enterprise end user technologies that are essential to performance, security, and scale Evaluating end user technologies for Coned adoption: Each year new products and solutions are researched with industry experts and vendors before being evaluated, piloted, and implemented in the Con Edison environment. The project will fund selection of new technologies aligned to the IT strategy, drivers and business goals and plan for their adoption and implementation. This positions IT to think and plan for technologies that will enable these capabilities to meet business needs, such as the evaluation of the latest biometric authentication technology to improve our end user			

security posture.

Software to support end user computing capability and experience: The goal of this software is to provide a standard and up to date, set of desktop tools that incorporate the latest technology to improve accessibility, support the remote work environment, and collaboration. This work stream will involve:

- Upgrade from Windows 10 to Windows 11 platform version
- Implement new Virtual Private Network infrastructure to better support remote mobile clients by providing a scalable secure (multifactor) authentication and access for 15000+ users
- Evaluate the latest biometric authentication technology and plan for future deployment
- Refresh Remote Access technology and get ahead of obsolescence in a timely fashion
- Evaluate multi-cloud management, monitoring, and automation tools

Expanding current enterprise technologies: The project will fund the software, hardware, and a team of resources to implement support and manage the expanding Microsoft Office 365 tools, secure printing, and faxing. This project area will continuously improve and enhance the software and hardware, and scale in a structured systematic way.

Justification Summary:

Technology is changing at a rapid pace and cyber risk has been increasing at much higher speeds. To stay competitive and operate in a secure and efficient manner, End User Computing capabilities must evolve with nimbleness and meet changing user and business expectations.

Many technologies, foundational and emerging are implemented and converge to deliver a seamless user experience. For example, end user computing devices must maintain latest software and be secured and scanned; they must take advantage of cloud capabilities to scale on demand and perform; be fitted with new emerging capabilities like augmented and virtual reality on end- user devices with agility to name a few which have become a norm in the current environment to improve safety for all. To achieve these the following broad technology areas are addressed in this project.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

All current and future business applications require desktop software to be up to date and supportable. Company policies require the computing environment to adhere to cybersecurity policy and software compliance policies.

Automation technologies and processes related to RPA and BCO are evaluated, selected, and used to help manage and maintain a safe and secure computing environment for users minimizing disruptions.

Risk 1 Name: Department. Information Technology.
Cybersecurity

Risk 1 Description:

Improve ability and secure devices better to defend against cyber attack

Risk 2 Name: Department. Information Technology.
Unauthorized access or loss of sensitive data

Risk 2 Description:

Secure access and reduce risk of losing sensitive information and misuse

2. Supplemental Information

Alternatives:

The alternative is to remain at the current technology and wait until the business processes disruption forces technology change and likely, a sub-optimal technical decision leading to longer term risk, costs, and re-work. Substandard versions in end user computing environment can result in slowness effecting user experience, productivity, and increase cyber risk. Which if not addressed in a timely fashion leads to obsolescence and technical debt.

Risk of No Action:

See alternatives section

Non-financial Benefits:

Financial savings, in many cases, are dependent on the introduction of End User Computing advancements and resulting business efficiencies. For example, the ability to provide real-time video streaming to a central server enables immediate access to subject matter experts (SMEs) and senior management. Problems can be addressed before they become emergencies or unnecessary work is prevented. Another example would be the ability to provide reliable and state of the art voice communications to employees in the office and field.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

The project with budget evolving technologies, sophisticated tools, and cloud investments to support the enterprise and scale, vendor and expert services to automate and implement safely and deliver in an agile fashion. As seen below the highest increase is seen in year 1, 2023 owing to upfront software and hardware costs incurred followed by a more reasonable increase for services, evolution, and ongoing breakthrough technology evaluations.

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
New user technology	473	1,001.30	2,000.00	3,000.00	4,000.00
End user SW env	582	704.5	1,000.00	1,500.00	2,000.00
Enterprise scale	304	1,650.00	1,650.00	1,650.00	1,500.00
Total by Year:	<u>1359</u>	<u>3355.8</u>	<u>4650</u>	<u>6150</u>	<u>7500</u>
Pct increase (approx.)	-	60%	30%	25%	18%

2. Major financial benefits

Financial benefits can be realized through the productivity improvements introduced by new capabilities, nimbleness to adapt and provide scalable and reliable end user hardware like tablets (mobile phones, computer devices and software's for better remote work collaboration). Technology associated with mobile app development will enhance field force productivity.

3. Total Cost (\$000)

23,014.8

4. Basis for estimate

Historic purchases and Internet research are used as well as planning sessions with key vendors and internal SMEs

5. Conclusion

This project will deliver a secure scalable and forward-looking end user computing environment by providing the following

- a) Adopt and implement forward looking technology advances with agility and in a timely fashion to meet corporate goals safely and deliver to business expectations. This is critical to continue mitigate cyber risk, scale and provide a secure, functioning, and acceptable end user computing environment and positive user experience
- b) Provide a reliable secure platform by implementing a private virtual network and taking advantage of emerging features and capabilities from leading technology leaders like Microsoft (Windows 11 upgrade, Office 360, Teams, Azure Cloud, Halo lens etc.)
- c) Build cross functional team and acquire skill sets and bench strength to help develop processes to implement, deliver the goals above and continue maintain and support the technology investments.

Project Risks and Mitigation Plan

Risk	Mitigation Plan
NA	

Technical Evaluation/ Analysis

Information Technology performs planning and analysis on all technologies introduced. Solutions are investigated in conjunction with the IT strategy and vision planning process. Collaboration between IT advisors, vendors, and Company employees helps to select the optimal solutions. Each implementation is done with technology evaluations and commercial RFPs before selection and rollout.

Project Relationships (if applicable)

All current and future business applications require desktop software to be up to date and supportable. Company policies require the computing environment to adhere to cybersecurity policy and soft ware compliance policies.

Automation technologies and processes related to RPA and BCO are evaluated, selected, and used to help manage and maintain a safe and secure computing environment for users minimizing disruptions.

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	Forecast 2021
Capital	1765.7	1766.3	828.6	1255.6		1440.4
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	1359	3355.8	4650	6150	7500
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor		700.0	700.0	1000	1000
M&S					
A/P		1,654.5	1,950	2,150	2,500
Other	1,359	1,001.3	2,000	3,000	4,000
Overheads					
Total	1,359	3,355.8	4,650	6,150	7,500

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	0.0	0.0	0.0	0.0
Capital	1,359	3,355.8	4,650	6,150	7,500

4. Definitions

Total Funding Request: All funding requested for program or project over program/ project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology

2022

1. Project / Program Summary

Type: ☒ Project ☐ Program				Category: ☒ Capital ☒ O&M		☐ Regulatory Asset	
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic							
Project/Program Title: Enterprise Architecture Modernization							
Project/Program Manager: Anuja Nakkana				Project/Program Number(Level 1): 25546220			
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :							
Estimated Start Date: 1/16/2023				Estimated Date In Service: 9/30/2024			
A. Total Funding Request (\$000) Capital: 1,500.0 O&M: 3,400.00				B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:			
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M:				D. Investment Payback Period: (Years/Months) (If applicable)			
Work Description							
Enterprise architecture (EA) strives to simplify the application and infrastructure portfolio across the organization while taking a proactive role in bringing new, innovative technology. It is essential to meeting the IT vision, strategy, and business goals. Enterprise Architecture is a standard IT methodology for analyzing, planning, designing, and implementing IT solutions. It is the equivalent of Distribution Engineering or Central Engineering for IT. Key deliverables are the architecture and design standard documents across various IT domains including security, networks, applications, and infrastructure. These architecture and design standards provide the path forward on how the organization should and can adopt newer technologies. It also assists in optimizing investments and reducing risk. This furthers the Company goal of using technology to enable business capabilities and improve safety, operational excellence, and customer experience. Over the past year, user demand for EA services and tools has increased exponentially. As we increase our cloud deployments, adopt platform solutions (platforms like WMS or CRM), and mature in self-service analytics to meet business and technology innovation, EA plays a critical role to properly design these solutions. These services help future proof technology in areas such as edge computing, sensors, security (zero trust architecture), WMS standardization, CRM and more. With an evolving utility landscape, enterprise architecture is playing a critical role for new initiatives like DERMS, IEDR and privacy. The project will meet the following implementation objectives: Define and design architecture processes and implement architecture applications needed to operationalize EA.							

- Onboard EA resources to support application implementation.
- Develop and upskill the talent pool within the EA org, through training.
- Define EA governance processes.

Justification Summary:

Enterprise Architecture is required to:

- Improve Application Portfolio Management to reduce the number of applications, costs, and risks.
- Improve Technology & Risk Management to reduce complexity and resolve security vulnerabilities, compliance issues, and the inability to support the business, in a timely fashion.
- Documented architectures and standards to meet the business goals of a future state.
- Reduce delivery times to keep up with a fast-changing utility business environment.

The project will fund expert services, a core team, and the tools to design and implement processes and deploy across the enterprise and support steady state operations. This will result in adoption of standards, improved technology and application portfolio management and systematic introduction of new technologies. The enterprise architecture specific tools will accelerate and ease implementation using industry best practice and methodologies.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

This project will support all company IT projects and initiatives involving technology investments.

2. Supplemental Information

Alternatives:

Refer risk of no action, next section

Risk of No Action:

If this project is not completed it could result in:

- Increased cost of ownership due to lack of standardization
- Poor solution quality, increasing support costs with inefficient use of technology.
- Unstructured growth in technology application portfolio resulting in increased cost, complexity, and risk.
- Challenges in resolving security vulnerabilities in a timely fashion, leading to higher cyber risk and exposure.
- Difficulty in meeting business goals and future state in a safe, secure, and agile fashion.
- Long and unreliable technology delivery times in fast-changing utility business environment can potentially impact business adversely.

Non-financial Benefits:

This program will generate non-financial benefits for the Company, such as:

- Transparency: Enhanced visibility of projects and spending
- Shared knowledge: An archive of EA models, methods, and data for reuse
- Consultative services: Determine the applicability of advanced EA solutions to problems reducing the need for external expertise
- Cultural change: Promote a corporate culture where data-driven decision-making is pervasive
- Standardization: The consistent use of reference architectures, approved set of tools, SW products and technology platforms, and analytics methods across the enterprise
- Efficiency: Better utilization of resources, simplified architectures, and the reduction of technology products

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

	2023	2024	2025	2026
EA Software	600	600	300	0
Consulting Services for Implementation	600	800	1000	1000
Ongoing labor to support the application (2FTE)	300	300	300	300

2. Major financial benefits

Over time we expect to quantify and measure savings from portfolio consolidation and rationalization.

3. Total Cost

Total Cost (4,900.0)

4. Basis for estimate

The capital request will fund the hardening of the EA application and build out consolidated EA framework.

The O&M request will fund the cost of expanding EA staff for the application implementation and ongoing support.

5. Conclusion

Required competency to meet the business requirements and goals in a standardized, structured, and systematic fashion at optimum cost.

Project Risks and Mitigation Plan

Risk	Mitigation Plan
NA	

Technical Evaluation/ Analysis

Technology solutions are carefully selected by studying products, conducting feasibility studies, and further calibrated with the short- and long-term business goals, IT strategy and planning process. A cross functional IT team, spanning cyber, subject matter experts, vendors and company employees participate in the decision-making process. Business teams play an equal role in selecting technologies to meet and implement business capabilities. In addition, standard RFP/ RFI processes are leveraged to implement the technology and deliver business capabilities.

Project Relationships (if applicable)

This project will support all company IT projects and initiatives involving technology investments.

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	600.0	600.0	300.0	0.0
Implementation O&M*		600.0	800.0	1000.0	1000.0
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor				0	
M&S					
A/P		600.0	600.0	300.0	
Other					
Overheads					
Total	0.0	600.0	600.0	300.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M		600.0	800.0	1000.0	1000.0
Capital		600.0	600.0	300.0	0

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset	
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic		
Project/Program Title: Enterprise Unifier Software Project - Phase 2		
Project/Program Manager: Michael Policastro	Project/Program Number(Level 1): 25524258	
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :		
Estimated Start Date: 6/1/2023		Estimated Date In Service:
A. Total Funding Request (\$000) Capital: 14,150.0 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 1,240.0		D. Investment Payback Period: (Years/Months) (If applicable)
Work Description:		
The project will continuously improve the Company's project management capabilities for capital construction projects by expanding and implementing our project management software platform, Primavera. This platform supports improved schedule management, cost management, contract management, project lifecycle governance, and document management. The major elements of work for this project include: - Expand the Primavera Unifier on the Oracle Cloud, to support: - o Leveraging the system implemented and sustain standard project management capabilities within the Company - o Better transparency and reporting for project attributes ☐ This includes project/program/portfolio reports for better transparency - o Increased functionality for project lifecycle governance system ☐ Establishing a document management repository for key project management documents - o Increased functionality for construction collaboration - Software integrations - Organizational change management and training - O&M costs associated with the addition of two FTEs to the group to provide ongoing support and administration of the software product.		

Justification Summary:

This project will bring industry leading project management tools to a broader base of project managers and project teams. The project supports adherence to enterprise standard processes and procedures established by the "Capital Projects Playbook", which will foster improved project management overall and lead to greater consistency and efficiency in the Company's execution of capital projects.

Lastly, this project continues to leverage the value of the Company's agreement with Oracle to use their products, thereby enabling further efficiency out of this technology.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name:

Risk 1 Description:

2. Supplemental Information

Alternatives:

While other project management software products exist in the market, it is preferable to maintain consistency on a single platform when possible. Thus we expect to utilize Oracle Primavera products to support project management, to maintain platform consistency and implement an enterprise wide solution.

Risk of No Action:

As for the implementation of other Primavera products, the risk of no action will result in a missed opportunity to further standardize our project management tools. If Unifier does not continue to expand and grow with the business and their needs, they may decide to move ahead on their own in ways tailored to their specific needs rather than as part of a coordinated enterprise approach.

Non-financial Benefits:

Typical non-financial benefits for project management software implementation include:

- o Improved Project Management Maturity
 - Including all projects in one system of record improves reporting capabilities
 - Increased team collaboration drives improved project planning, scheduling, estimating and overall execution
 - Systemization of processes improves compliance to project management policies and

procedures

- o Improved Project Performance
 - Accelerated work delivery supported by greater collaboration and mobility
 - Standardized reporting provides earlier signaling of cost and schedule variances
 - Better data quality, along with reporting, will improve enterprise visibility into project performance
- o Cost and Schedule Alignment
 - Increased functionality between Cost and Schedule Alignment
 - More accurate cost reporting and analysis will provide a critical feedback loop to improve estimating accuracy for future projects
 - Utilize Unifier to drive schedule activity completion
- o Improved Risk & Issue Management
 - Better visibility to project risks and issues providing enhanced ability to proactively manage them and reduce project changes
 - Documentation of historical risks and issues to support future project planning
- o Project Management Efficiency
 - Reduced manual data collection and entry and more time analyzing data and making decisions
 - Reduced administrative burden developing project reports – integrated tools will support automated reporting

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

Based on available industry and vendor data the anticipated categories of financial benefits for project management software implementation are:

- Improved Project Performance – More projects delivered on-time and on-budget.
- Capital Budget Efficiency – Overall reduction in project execution costs.
- Project Management Staff Efficiency – Reduction of manual data entry/collection and administrative tasks.

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (14,150.0) = Total Cost (14,150.0)

4. Basis for estimate

- The estimate includes various components as follows:
 - o Software Implementation including installation, configuration, migration, integrations, testing, deployment, training and change management
 - o Steady State Support
 - o 2 additional FTEs
 - 1: user admin, upgrades,
 - 2: tech person, BP development, bug fixes

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

The EPMO led a project management tools assessment in 2017, with the assistance of a consultant, to identify the current state of project management tools and systems, identify a future vision, and a roadmap. The EPMO continues to assess and refine the project roadmap on an on-going basis to include value-added functionality based on the needs of the business, as well as benchmark with many other utilities and gain additional insight from our software and consulting partners.

Project Relationships (if applicable)

This project will build on the Enterprise Program Management Software Project, Oracle Primavera. As the use of Unifier grows and expands, there will be a need for future integrations and business processes to be developed to continuously grow Unifier's user base and to utilize the tool to its full potential.

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	5,500.0	4,000.0	3,100.0	1,550.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor		900.0	900.0	400.0	200.0
M&S					
A/P		4,300.0	2,800.0	2,600.0	1,300,000.0
Other		300.0	300.0	100.0	50.0
Overheads					
Total	0.0	5,500.0	4,000.0	3,100.0	1,550.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M		1,200.0	40.0	0.0	0.0
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/ project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: Project ☒ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset		
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: Fraud Data Analytics Platform			
Project/Program Manager: Sumit Singh		Project/Program Number(Level 1): 25496795	
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date: 1/3/2022		Estimated Date In Service:	
A. Total Funding Request (\$000) Capital: 6,800.0 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 362.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description: • FIG will maintain the existing fraud data analytics platform at the enterprise level. The platform performs automated fraud monitoring and alerting. The following was completed in 2021; • Refined and stabilized the system to improve the alerts • Implemented proactive monitoring and workflow process to respond to alerts • Developed long term strategy and met with partners to begin developing future use cases • Developed in-house fraud data analytics capability and expertise by working with various business groups and understanding the business processes and begin a governance process The following is a list of currently proposed activities for 2022; however, as systems and technology improves, these may be substituted to meet the Company's needs: • Build new interfaces to include additional procurement systems or Oracle modules such as Sundry, iExpense • Build new interface to ingest data from the new HR payroll data sources • Evaluate and design new interface to ingest Contractor information from EDW and Oracle cloud • Configure existing interfaces to accommodate data from systems that migrate to Oracle cloud • Labor to support the above initiatives The following is a list of currently proposed activities for 2023; however, as systems and technology improves, these may be substituted to meet the Company's needs: • Procure additional infrastructure to support the platform • Build interface to ingest Contractor information from EDW and Oracle cloud • Evaluate and design use cases and interfaces for Stores Operations, including inventory and fixed assets, non-Oracle Treasury systems and Law Case Management system • Configure existing interfaces to accommodate data from systems that migrate to Oracle cloud • Labor to support the above initiatives The following is a list of currently proposed activities for 2024; however, as systems and technology improves, these may be substituted to meet the Company's needs: • Build use cases and interfaces for Stores Operations, including inventory and fixed assets, non-Oracle Treasury systems and Law Case Management system • Evaluate and design use			

cases and interface to ingest data from Compass and other Construction Management systems • Configure existing interfaces to accommodate data from systems that migrate to Oracle cloud • Labor to support the above initiatives

The following is a list of currently proposed activities for 2025; however, as systems and technology improves, these may be substituted to meet the Company's needs: • Build use cases and interface to ingest data from Compass and other Construction Management systems • Lifecycle replacement for hardware supporting the platform • Evaluate new data sources and pilot use cases • Evaluate systems migrated to Oracle cloud and configure interfaces to accommodate data from them • Labor to support the above initiatives

The following is a list of currently proposed activities for 2026; however, as systems and technology improves, these may be substituted to meet the Company's needs: • Evaluate new data sources and pilot use cases • Evaluate systems migrated to Oracle cloud and configure interfaces to accommodate data from them

• Labor to support the above initiatives

O&M Work Description: To achieve enterprise-wide Fraud Data Analytics program, an expansion of the Financial Integrity organization by one FTE is proposed. In addition to the labor cost, O&M cost also include licensing cost associated with the software solution. As the solution is expanded, operational costs are required to maintain technical skills, manage and support the data analytics product.

Justification Summary:

Auditing Financial Integrity Group (FIG) partnered with IT to build and implement a fraud data analytics platform to enable ongoing automated fraud monitoring and alerting. The platform is a commercially available solution from SAS, a market leader in fraud data analytics.

The implementation of platform was completed in 2020, which involved creation of secure data storage, secure client-server database environment, interfaces for data sources, strong analytics software for large volume data cleansing, multi-dimensional data mining, advance statistical modeling, data visualization and distribution, and repetitive test scheduling. A phased approach was used for implementation and for initial phase Oracle EBS (Financial and Supply Chain), and Oracle HR (HR, Time & Labor, Payroll) were selected as source. The initial implementation covered procurement and vendor activity. Additional data requirements will be identified through FIG's fraud risk assessment planning and prioritization processes and will be addressed in subsequent phases.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Fraud is an enterprise risk and is reviewed under ERM strategy

Risk 1 Name: Corporate Coned. Regulatory and Compliance. Fraud

Risk 1 Description:

Risk 2 Name: Corporate ConEd. Regulatory and Compliance. Fraud

Risk 2 Description:

Risk 3 Name: Corporate ConEd. Regulatory and Compliance. Fraud

Risk 3 Description:

FDA provides opportunity to detect fraud quickly and help controllability

2. Supplemental Information

Alternatives:

Do nothing

FIG has made significant investment in SaS Data Analytics platform. If we don't expand the use of the tool, then we will not be able to better detect fraud. This approach will hinder us from proactive fraud risk management and monitoring. This option is not recommended as it opens Con Edison to limited fraud visibility.

Risk of No Action:

Fraudulent behavior may cause financial and reputational loss, regulatory exposure, and public embarrassment that could result in reputational damage to the Company. There could also be criminal prosecution and/or significant penalties imposed on employees and the Company. In addition, this could lead to low employee morale.

Regulatory Risk (Financial Misstatements): Fraud risks not caught/prevented in a timely manner can lead to financial misstatements and associated issues.

Corporate Risk (Fraud): The Corporate Risk of a Rogue Employee - Rogue employee(s) and/or vendor(s) violate laws/regulations for personal gain. Variances in account balances, as an example, can be an indicator that there is a discrepancy that required research. By having the analytics platform, where forensic analytics can be performed to detect patterns and anomalies to determine whether any unusual activity is going on, tests can be scheduled, and risk alarms can be automatically generated timely.

Reputational Risk: Fraudulent activities not identified in a timely manner will have an adverse impact on the company's reputation.

Non-financial Benefits:

A proactive fraud risk management program will increase overall employees' fraud awareness and consciousness, which will help the company to detect and prevent fraud from happening.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

Association of Certified Fraud Examiners (ACFE) is the world's largest anti-fraud organization. According to the ACFE's 2018 Report to the Nations, proactive data monitoring and analysis is among the most effective anti-fraud controls. Organizations that undertake proactive data analysis techniques experience frauds that are 52% less costly and 58% shorter than organizations that do not monitor and analyze data for signs of fraud.

2. Major financial benefits

ACFE estimates organizations worldwide lose 5% of revenues to fraud and 53% of victim organizations have not recovered any of their losses due to fraud. The company is proactively managing fraud risks and implementing a

forensic analytics enterprise-wide. Without a robust data analytics platform solution, FIG will not be able to churn in-depth forensic analytics and build an automated ongoing monitoring process to prevent and detect fraud risks enterprise-wide

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (5,100.0) = Total Cost (5,100.0)

4. Basis for estimate

Estimate is based on the Phase 1 of the project in 2020.

5. Conclusion

To achieve enterprise-wide Fraud detection and look at fraud holistically, additional phases are required. The more systems we connect to, the better visibility we will be able to get.

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Planning and analysis on all technologies introduced will be performed with IT advisors, vendors, and Company stakeholders to ensure the selection of optimal solutions.

Project Relationships (if applicable)

N/A

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital				1,659		
Implementation O&M*				65		
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	1,700.0	1,700.0	1,700.0	1,700
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	0.0	250.0	250.0	250.0	250
M&S	0.0	400.0	400.0	400.0	400
A/P					
Other	0.0	950.0	950.0	950.0	950
Overheads	0.0	100.0	100.0	100.0	100
Total	0.0	1,700.0	1,700.0	1,700.0	1700.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	161.0	316.0	334.0	348.0	362.0

Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Hitachi Password Manager Upgrade	
Project/Program Manager: Angela Mistretta	Project/Program Number (Level 1):
Status: ☒ Initiation ☐ Planning ☒ Execution ☐ On-going ☐ Other: _____	
Estimated Start Date: 1/15/2023	Estimated Date In Service:
A. Total Funding Request (\$000) Capital: \$665,000 O&M: \$185,000	B. ☐ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: \$185,000 Capital:	D. Investment Payback Period: (Years/months) (If applicable)
Work Description: The Hitachi Password Manager application provides self-service and help desk assisted password reset and account unlock capabilities for Active Directory and mainframe user accounts (IMS, CIS, TSO and CICS) for employees and contractors. The Hitachi application was fully implemented in April 2020 and replaced an end of life, home grown application. In accordance with the vendor's application roadmap and support cycle, it is expected that an application upgrade would be required in 2023 and every 2 years thereafter. In addition, the Windows server operating system and SQL database will need to be upgraded to the latest version to maintain Microsoft support for patching, bug fixes, etc.	
Justification Summary: An upgrade will be required in year 2023 due to obsolescence of application technology components. The Windows Server 2012 operating system will reach end of life in October 2023. The application version will also need to be upgraded in accordance with the vendor's application roadmap. In addition, the Microsoft SQL version 2014 will be end of life in July 2024. Ongoing operational and application maintenance support is required to ensure application stability and availability. Maintenance includes IT labor resources, license compliance, and hardware and software upgrades and patching in accordance with vendor roadmaps and support cycles.	
Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)	

The Hitachi Password Manager application enables self-service password reset and unlock capabilities. Self-service password management capabilities reduce the need for Help Desk analysts to manually handle such requests and assists the Service Desk with managing the call volume and meeting SLAs and KPIs. Ongoing maintenance support is critical to the successful operation and availability of the application.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection

There is no reasonable alternative due to risks associated with technology obsolescence. Patches and bug fixes are not provided for end of life, unsupported application and technology components. This will result in increased exposure to cyber threats.

Alternative 2 description and reason for rejection

Alternative 3 description and reason for rejection

Risk of No Action

Risk 1

Patches and bug fixes are not available for end of life, unsupported application and technology components. This will result in increased exposure to application outages and cyber threats.

Risk 2

Potential for missed SLA's and KPIs.

Risk 3

The Service Desk may have to increase staff to manually reset and unlock passwords if system becomes unavailable for extended periods of time.

Non-Financial Benefits

Improved customer service and satisfaction.
Empowering employees to help themselves.
Increase productivity at the Service Desk.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits 3. Total cost 4. Basis for estimate . 5. Conclusion
Project Risks and Mitigation Plan <i>Evaluate and describe any risks that might extend the project timeline, prevent completion, or lead to cost overruns. Explain plan to minimize these risks.</i>
Risk 1 Mitigation plan Risk 2 Mitigation plan
Technical Evaluation / Analysis
Project Relationships (if applicable)

3. Funding Detail

Historical Spend

	<u>Actual 2016</u>	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2020</u>
Capital						
O&M						

Total Request (\$000):

Total Request by Year:

	<u>Request 2021</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>
Capital			<u>665</u>		
O&M*				<u>185</u>	

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>
Labor			<u>130</u>		
M&S					

Contract Services			<u>125</u>		
Other - Hardware			<u>300</u>		
Overheads			<u>110</u>		
Total			<u>665</u>		

Total Gross Cost Savings / Avoidance by Year:

	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>
O&M				<u>185</u>	
Capital					

*If whitepaper is supporting a capital project/program this refers to implementation O&M

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Project Status:

- Initiation – New project, not authorized yet
- Planning – Project authorized, not started yet
- Executing – Project in-flight
- On-going – Annual program

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☒ O&M
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: IT Hardware and Software Maintenance	
Project/Program Manager: Allisyn Glasser	Project/Program Number (Level 1):
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☐ Other: _____	
Estimated Start Date: 01/2022	Estimated Date In Service: 12/2026
A. Total Funding Request (\$000) Capital: O&M:	B. ☐ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: \$240,511,000 Capital: \$30,141,100	D. Investment Payback Period: (Years/months) (If applicable)
Work Description: The Company makes many technology investments each year for the continued operation of the computing and network infrastructure used to support data centers, applications, and networks. In addition, over the past few years, the Company is increasingly relying on cloud services to play a large part in our IT strategy. Whether for cost savings, process efficiencies, speed to market, redundancy, or resiliency, the cloud provides expanding capabilities that the Companies would like to leverage more. In either case, the Company protects the investments through maintenance and support contracts, managed services or subscription contracts for the hardware, software or cloud services. Maintenance and Support Contracts Maintenance and support contracts allow the Company to keep the hardware and software up to date, patch cybersecurity vulnerabilities, replace hardware failures, and take advantage of new release features within the products. This allows sustainability and supportability of the environment over time and increases reliability and availability of the network, business applications and infrastructure. Technology solutions can be purchased through capital investments which include a negotiated maintenance period. Once that period has expired, the contract becomes an expense to the Company, in addition newer solutions may only offer a cloud model. During the following five years, maintenance on the following products will expire and new expenses for maintenance will begin: - Increases in PC hardware maintenance due to growth of inventory; - Cisco network equipment and servers due to network growth; - Microsoft Enterprise Agreement to maintain server, operating system, integration, and database software versions as well as support; - Server backup solution;	

- Data center colocation;
- Virtual Private Network technology upgrade and device mobility growth;
- Server and storage infrastructure growth.

Managed Services

In order for the Company to maintain reliable on-premise corporate data centers, the Company is partnering with a Managed Service Provider 'MSP' to maintain the data centers and provide emergency coverage across all data centers. The MSP is responsible to perform all inspections, preventative maintenance, work with vendors to perform repairs to any data center equipment (power, HVAC, batteries, cabling, etc.) and provide onsite coverage for data center emergencies. The corporate data centers host critical IT systems and expanding the MSP support across all of the data centers will ensure reliable data center operations.

Subscription Contracts

For cloud services these subscriptions fund various foundational tools and innovative projects. Microsoft Azure is our primary cloud for various services including our data and analytics platform, private cloud (Infrastructure as a Service (IaaS)) to extend our data center footprint, and Microsoft 365. These services provide scalable solutions which are designed to be provisioned quickly. The Microsoft services were a major investment and have provided improved security, collaboration experience, the ability to deploy applications in days and provides improved productivity and disaster recovery since the applications are accessible from anywhere. In addition, Microsoft Office 365 is the current corporate standard for desktop productivity and security tools software. Key benefits and functionality of the platform include:

- Seamless integration with the programs we already know and use, including Outlook, Word, Excel, OneNote, and PowerPoint;
- Web-enabled access to email, important documents, contacts, and calendar on any device – including PCs, iPhones, Android phones;
- Collaboration and online meeting solutions by using Teams and SharePoint online which have been essential for remote work and external communications;
- Improved security tools to help protect email, documents, and networks;
- Reliability, availability, and performance, with a 99.9% financially backed uptime guarantee

Justification Summary:

The value of the Company's technology investments is maintained through support and subscription contracts for its various hardware and software platforms and cloud services. The agreements are used to provide access to platforms, assist during issues, keep the software up to date, patch cybersecurity vulnerabilities, replace hardware failures, and take advantage of new release features within the products. IT provides critical services, and these contracts reduce risk and allow for the sustainability and supportability of the environment and increases reliability and availability of the network, business applications, infrastructure, and PCs. Without having these contracts in place, the Company will incur a significant risk.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

This program supports future growth, allows for security and support for all applications, networks and major IT initiatives.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection

Do Nothing. See below.

Alternative 2 description and reason for rejection

Alternative 3 description and reason for rejection

Risk of No Action

Risk 1

Failure to maintain these contracts will introduce significant risk to the availability of the technology solution and the business functions it provides. It also introduces a cybersecurity risk and compromise the capability to interact with external stakeholders.

Risk 2

Risk 3

Non-Financial Benefits

- Increased safety, reliability, efficiency, or customer satisfaction
- Improved processes, workflows and communication among departments

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

There are 3 main drivers of the costs.

- Increase in investments in hardware and software result in an increase in maintenance and support agreements. Maintenance typically runs 20% per year on the original investment.
- Expansion of cloud services including M365. In addition, we can capitalize a portion of M365 services which equates to the \$30.14M capital request.
- Data center investments including managed services and collocation.

2022 - 2026 Budget Significant Variations					
Rate Case Items	2022 vs. 2021 CECONY	2023 vs. 2022 CECONY	2024 vs. 2023 CECONY	2025 vs. 2024 CECONY	2026 vs. 2025 CECONY
\$Millions					
	\$24.8	\$44.1	\$48.2	\$49.1	\$49.7
	\$21.2	\$24.8	\$44.1	\$48.2	\$49.1
Variance	\$3.6	\$19.3	\$4.1	\$0.9	\$0.6
PROVIDE COMPUTER HARDWARE MAINTENANCE	\$2.9	\$12.8	\$1.5	\$0.5	\$0.4
Data Center Operations	1.4	9.4	0.0	0.0	0.0
Storage Arrays	0.3	1.4	0.4	0.0	-0.6
Equinix Datacenter Colocation	0.7	1.2	0.5	0.5	0.5
Nutanix Datacenter HW	0.7	0.5	0.3	0.0	0.0
UPS/PDU Datacenter PM	0.5	0.0	0.0	0.0	0.5
Other	0.0	0.3	0.3	0.0	0.0
CISCO SmartNet	-0.7	0.0	0.0	0.0	0.0
PROVIDE COMPUTER SOFTWARE MAINTENANCE STANDARD	\$0.7	\$4.5	\$2.3	\$0.2	\$0.2
Cloud Computing	1.1	3.2	2.0	0.0	0.0
Miscellaneous Increases/(Decreases)	-0.4	1.3	0.3	0.2	0.2
		1.0	0.0	0.0	0.0
Labor		1.0	0.3	0.2	0.0
Total Variance	\$3.6	\$19.3	\$4.1	\$0.9	\$0.6

2. Major financial benefits

None

3. Total cost

\$270,652,100

4. Basis for estimate

The basis for the estimate consists of current spend with anticipated growth for major enterprise initiatives.

5. Conclusion

These types of agreements are required for the supportability, security, and reliability of all our applications and infrastructures.

Project Risks and Mitigation Plan	
Risk 1	Mitigation plan
NA	
Risk 2	Mitigation plan

Technical Evaluation / Analysis

IT performs planning and analysis on all technologies introduced. Solutions are investigated in conjunction with the IT strategy and vision planning process. Interaction with IT advisors, vendors and Company employees select optimal solutions. Each implementation is done with technology evaluations and commercial RFPs before selection and rollout.

Project Relationships (if applicable)

This program impacts all applications and initiatives.

3. Funding Detail

Historical Spend

	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historic Year (O&M only)</u>	<u>Actual 2021</u>
Capital						
O&M	<u>12,627,000</u>	<u>13,352,000</u>	<u>17,024,000</u>	<u>20,562,000</u>	<u>19,207,000</u>	<u>21,158,000</u>

Total Request (\$000):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital			<u>30,141,100</u>		
O&M*	<u>24,837,000</u>	<u>44,084,000</u>	<u>48,274,000</u>	<u>49,158,000</u>	<u>49,700,000</u>

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor					
M&S					
Contract Services			<u>30,141,100</u>		
Other					
Overheads					
Total					

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M	<u>24,837,000</u>	<u>44,084,000</u>	<u>48,274,000</u>	<u>49,158,000</u>	<u>49,700,000</u>
Capital			<u>30,141,100</u>		

*If whitepaper is supporting a capital project/program this refers to implementation O&M

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Project Status:

- Initiation – New project, not authorized yet
- Planning – Project authorized, not started yet
- Executing – Project in-flight
- On-going – Annual program

Information Technology 2022

1. Project / Program Summary

Type:	☐ Project ☒ Program	Category: ☒ Capital ☐ O&M	☐ Regulatory Asset
Work Plan Category:	☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic		
Project/Program Title: IT System Testing COE			
Project/Program Manager:	Eric Benezra, Anuja Nakkana, Ken Genuard	Project/Program Number(Level 1): 25524252	
Status:	☐ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other :		
Estimated Start Date: 1/1/2023		Estimated Date In Service:	
A. Total Funding Request (\$000) Capital: 5,625.0 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 1,562.5		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
The Testing Center Of Excellence (hereafter referred to as "Testing COE") is a consolidated and centralized governance model for application testing practices, intended to be implemented across an organization. Upcoming or in-flight major enterprise application initiatives require a centralized governance model for a common sustained/repeatable process to testing, requirement, defect management, and knowledge management. In addition, to expedite testing and improve processes the Testing COE can assist with the regulatory requirements geared to improve system readiness and storm restoration capabilities leading to better customer experience. These regulations were a direct result of Winter Storms Riley/Quinn in 2018 and subsequently, Tropical Storm Isaias in 2020. Based on current OMS testing requirements the Company has engaged a 3rd party (Cognizant) to perform an assessment of the end-to-end testing process for OMS. The assessment has so far revealed opportunities to streamline the processes. For example, it takes 4-6 weeks of preparation time and engagement from 30+ subject matter experts across multiple IT disciplines to design and execute the test. In addition, recommendations are forthcoming to modernize the OMS testing tool set, introduce additional automation, and create dedicated performance testing environments for critical systems. The goal of the CoE will be improve in these areas and automate testing process across all applications. To meet customer expectations and regulatory requirements, a robust, mature and well-designed testing process, function, and service is needed to thoroughly test the readiness of systems. Below are several key areas of focus: Assessment of current state and tools used across IT portfolio to identify best practices and where to modernize			

or improve

- Standardize on testing tools and processes across the IT organization
- Develop best practices for types of testing and best approach for a given project (i.e. waterfall, agile, etc.)
- Staffing a full-time organization
- Develop training material and templates for knowledge transfer
- Develop artifacts such as reports, dashboards, and score cards to enable transparency and visibility
- Ensure system integrators that perform testing align with this process

Justification Summary:

Below are additional benefits of a Testing Center of Excellence:

- Impartial quality assessment
- Unbiased & fresh view of code quality through thorough testing.
- Sizable decrease of risks in centralizing software testing for development projects and business as usual requests.
- Audits & checklist driven framework to drive high-quality product delivery.

Cost and Organizational benefits:

- Demand consolidation and optimization
- One-time setup expenses, associated with building & managing testing processes, O&M Cost savings in consolidating testing tools purchases, maintenance and test environment consolidation.
- Access to best practices.
- Access to specialized skills like performance & automation on demand.
- Effective knowledge management framework to cross leverage best practices, support several types of testing using common, consistent and standardized processes.
- Faster cycle time and repeatable testing processes; Overall efficiencies gain with all 3 levers - People, Process & Technology

Further to the above, end-to-end testing is a Key Risk Indicator (KRI) for the Company and is tracked as a part of the Corporate ERM matrix.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name: Corporate ConEd.Strategic.NY Regulation	Risk 1 Description: Following the Riley/Quinn Winter Storms in March 2018, the NYPSC directed all NYS utilities to conduct semi-annual end-to-end testing of their OMS suite of applications. This requirement was added as a Key Risk Indicator (KRI) for the Company and included in the Corporate ERM matrix. It has also been incorporated into the Company's Emergency Response Plan (ERP). Following Tropical Storm Isaias, the NYPSC took this requirement a step further and directed all NYS Utilities to conduct end-to-end testing of their OMS systems simulating an outage impacting 90% of their customers. To meet this new requirement now and into the future, the Company must continue to invest in a robust testing environment and processes. To that end, an investment in a dedicated organization to plan, perform, manage and own testing practices, ensure alignment across the broader IT organization, and modernize testing tools is paramount to achieving this objective.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection

An alternative to not standing up a Testing COE is to continue to maintain a siloed approach to testing similar to the current state process where individual teams across IT BSD maintain their own testing process, schedule, and tools without the benefit of a holistic wide area end to end view of the application ecosystem. This will continue to contribute to inefficiencies in people and process and will likely contribute to project delays as there is no dedicated centralized team managing testing as it stands today. This approach should be rejected as the inefficiencies of the current process have led to the exploration of a Testing COE to allow the Company to evolve its testing practices.

There is risk in the current process in that it is disjointed in nature leading to the possibility of inadequate test coverage and inefficiency in execution. This will lead to undiscovered defects contributing to poor customer experience (both internal and external) and potentially impacts to the Company brand/reputation. It could also lead to regulatory fines and/or additional regulatory scrutiny for lack of compliance with end-to-end testing requirements

Alternatives:

Risk of No Action:

Risk 1

Please see Alternative described above which outlines the risk of no action.

Continuing with the current state will:

- Increases risk of project delays resulting in missing milestones/corporate KPIs, extended carrying costs, as well as incurring fines from regulators.
- Exposes critical systems to failure during emergency events affecting customer experience.
- Propagation of overlapping platforms and toolsets could lead to increased licensing, maintenance, and support costs
- Testing will continue to be performed in silos, outside of the Testing COE, without sharing benefits to other areas

Non-Financial Benefits

The non-financial benefits of a Testing COE can be summarized in three key areas of focus: product quality improvement, best in class testing tools and practices, and strengthening business partnerships/regulatory compliance.

- **Product Quality Improvement:**
 - One of the key aspects of a standardized approach is the infusion of defect prevention techniques that seed quality attributes across the lifecycle.
 - For instance, templated requirements gathering, requirements validation, automated build validation, unit testing, early performance testing are few of the techniques that ensure defects are captured before the testing phase.
 - Audits and governance supported by metrics and scorecards, defect management and root cause analysis enable accountability and result in improved product quality
 - Business/IT partnership driven framework increases objectivity and alignment leading to enhanced customer experience and high-quality product delivery.
- **Leveraging best in class capabilities/practice through a dedicated team:**
 - Commitment of a dedicated specialized team with key skills such as performance & automation on demand.

- Effective knowledge management framework to cross leverage best practices, support several types of testing using common, consistent and standardized processes leading to a high standard product
- Return on Tool investments (and utilization) will be maximized leveraging on-demand license provisioning.
- Ensuring regulatory compliance through a dedicated focused lens on testing
- TCoE will act as an innovation hub where ideas can be shaped as innovations to suit the Company's landscape as well as utility industry. Similarly best practices, testing accelerators, and knowledge artifacts can be made available across the organization and influence faster and higher quality releases.
- **Increased Business Efficiency and Flexibility:**
 - TCoE will enable a business-oriented testing approach. Test design and scenario development will be based on business flows and mapped to functionalities. This BA/QA approach enables stronger ties with business partners, especially during requirements and UAT phases.
 - TCoE operations ensures compliance to several regulatory requirements including SOX (where applicable), data compliance, as well as requirements pertaining to NYPSC for end to end testing.
 - Faster cycle time and repeatable testing processes; Overall efficiencies gain with all 3 levers - People, Process & Technology

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

Organizations that have adopted a Testing COE have reported an average cost reduction of 35% over 3 years (source: <https://www.cigniti.com/blog/testing-center-of-excellence-does-your-business-have-one-and-seven-reasons-why-you-need-it/>)

2. Major financial benefits

A Testing COE will lead to more transparency around defects and associated impacts. This will allow for more accurate assessment of total cost of ownership for a given system/interface/tool. Additionally, a Testing COE will result in less fragmented testing processes across the Company. Reducing or eliminating testing silos leads to greater efficiencies in execution and results. A Testing COE will also result in cost avoidance as a dedicated team with broad oversight using modern standardized testing toolsets is more likely to discover defects in lower environments and ensure timely resolution. This keeps defects out of production systems which reduces support costs (internal SME's, vendors, etc.).

3. Total Cost \$7,187,500

See "Basis for estimate"

4. Basis for estimate

- System integrator + PMO – design, tools, setup, change management (12 – 24 months) - **\$2.875M**
- Coned Core Resources: 3 technical FTEs + System manager - \$750K/year for 2 years - **\$1.875M**
- Staff Augmentees (starting year 2024) - **\$875K**

Considerations included:

- Hardware setup (on prem) - **\$300K**
- O&M Cloud - \$200K /year (2 years) - **\$400K**
- Ongoing 20% O&M - \$250K for 2 years (**\$620K + \$942.5K**) - **\$1.562M**

5. Conclusion

A Testing Center of Excellence enables a centralized, standard, consistent and repeatable testing function and process that positions the Company to deliver a high quality, reliable and robust product that is thoroughly tested. This directly helps meet operational excellence objectives and improves the confidence in the Company's technology systems and their capability to handle planned and unplanned events.

Project Risks and Mitigation Plan

Risk	Mitigation
Major storm events and/or corporate emergencies could lead to project resource shortages and delay implementation of Testing COE	Build contingency into timeline/budget, use dedicated resources where possible
Inadequate budgetary estimates to stand up Testing COE	Build contingency into timeline /budget, contain scope, develop project plan with refined budgetary estimates once project is initiated
Project resource skills sets difficult to attain	Source externally where needed
Designated resources do not have adequate training	Upskill resources, OJT, staff augmentation to fill critical knowledge gaps

Technical Evaluation/ Analysis

An assessment was done by Capgemini on the Company's current testing practices. Their findings showed a lack of any standards or formal structure around testing causing inefficiencies, higher costs, and inconsistent results. It was concluded that setting up a TCoE would lead to reduced cost, improved quality and reliability of technology solutions, and increased agility /speed to market to meet demand.

An assessment was also performed by Cognizant which yielded similar themes to the Capgemini assessment. There is an overall lack of efficiency in testing design and execution and current testing practices require a significant amount of human capital to carry out. A focus on increased automation/orchestration, modernizing testing tool sets, and process efficiency are key findings, all of which are goals of the TCoE.

Project Relationships (if applicable)

While capital projects in flight when the TCoE is implemented will not be impacted (unless a gap / immediate needs is identified), newly initiated projects requiring testing services will be required to utilize the TCoE for all testing services. Completed projects with systems/platforms already in maintenance mode will be expected to leverage and transition over

to the TCoE for testing services.

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital					N/A	
Implementation O&M*					N/A	
Regulatory Asset					N/A	

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	2,500.0	2,500.0	625.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor					
M&S					
A/P					
Other		2,500.0	2,500.0	625.0	
Overheads					
Total	0.0	2,500.0	2,500.0	625.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					

Capital Avoidance					
Total Ongoing Maintenance Expense by Year:					
	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M			620.0	942.5	
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

Type: ☒ Project ☐ Program	Category: ☒ Capital ☒ O&M
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Forecasting Services Compliance with Market Changes and MetrixIDR Upgrades	
Project/Program Manager: Nurjahan Rahman / Carlos Villalba	Project/Program Number (Level 1): 21542721
Status: ☒ Initiation ☐ Planning ☐ Execution ☐ On-going ☐ Other: _____	
Estimated Start Date: 1/1/2023	Estimated Date In Service: 12/31/2026
A. Total Funding Request (\$000) Capital: \$1,187 O&M:	B. ☐ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: Currently \$50,000/year, increasing by \$170,000/year starting in 2023 Capital:	D. Investment Payback Period: (Years/months) (If applicable)
Work Description: Metrix IDR is an application that produces the daily electric and steam hourly load forecasts. The Company's system operations office relies on these forecasts to plan daily operations and the Company's electricity supply office uses it to plan short term electric purchasing and generation scheduling. The objectives of this project include the following enhancements: - Continuing to develop and implement new forecast models for REV with assistance from Itron, the vendor of the MetrixIDR application - Integration of additional meters for new networks and 1,500 feeders, as well as 5-min forecast for feeders and networks - Development of associated model performance reports and statistics by substation, network, and feeder, in addition to model error monitoring - Integration of multiple weather vendors - Build an interface with EDAP to provide selected customer's group forecasts. The interface should be dynamic enough for the users to build any selections as required by the business needs. For example, forecasting only load for office buildings and forecasting electric vehicle charging, distributed generation, non-wire solutions and batteries. Furthermore, pricing data from NYISO enables efficient timing of charging and reduced cost of charging. In addition, there are forecasting opportunities for commercial building and residential customers (using AMI Data) - Upgrade the MetrixIDR application to the latest version and upgrade its underlying infrastructure as required. This will result in additional capabilities to query data from production using API/	

- Integration of ConnectDER with MetrixIDR to collect actual and forecasted solar production data for regions to eliminate forecast errors due to DER programs in NYS. Additionally, explore and implement Google's Sunroof Project for solar irradiance data.
- Integrate MetrixIDR with NYISO notifications for transmission line and generation outages, wind, and solar forecast to better forecast zonal pricing or NYISO LBMP

The project is scheduled to start in early 2023 and complete all tasks by 12/31/2026.

Justification Summary:

Providing an accurate forecast is a key component in supporting operational excellence and facilitating decision making in many parts of the Company. Forecasting accuracy leads to improved system operation efficiencies and lower energy supply costs. If a forecast is too high, more energy will be procured than needed. If a forecast is set too low, energy will be procured at a premium in the real-time market of the NYISO.

Regional planning groups are in need to perform a more detailed assessment of feeder capabilities based on forecasts and number of customers enrolled in Demand Response programs. Forecasting Services is planning to provide these planning groups with additional tools necessary to meet these challenges.

Decisions to commit generation units are also sensitive to forecasts. Fuel purchases necessary to commit to dispatch have significant impacts on reliability and supply costs.

Should a distribution network market materialize through the development of REV and AMI, robust 5-minutes forecasting models will be necessary to support the operation of a distribution network market.

Forecasting Services aims to provide the operators, the users of the commodity forecasts and the future REV needs, at least two forecasts from two different sources for reliability and verification. Without this upgrade, the new small control areas would not be able to dispatch internal resources efficiently and potentially result in a brownout or an entire load area blackout.

Microsoft Report server, a companion of MetrixIDR, is used to furnish daily and for specific triggers multiple reports and statistics, which is used by many groups around the Company regarding its commodity operations. These systems need to be upgraded, as required, to address cyber security and to improve the users ability to more easily consume data by enhancing data visualization capabilities.

This program will help Con Edison:

- Keep up with any regulatory changes which could impact energy costs to its customers
- Provide state-of-the-art software to assist Energy Management in managing approximately \$3.5 billion in wholesale energy transactions
- Increase efficiency by making data and results available in a standardized format that can be used to generate reports automatically for internal use, settlements, and regulatory reporting
- Decrease the possibility for errors by automating processes, as appropriate.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Energy Management has a long- range plan to consolidate applications into a few end-to-end platforms for the purchase, scheduling, settlement and accounting of power, gas, and financial instruments.

This program is the initial step of the end-to-end process. MetrixIDR provides the short-term forecast for electricity that is used to schedule power at the NYISO.

This project directly mitigations two departmental risks, which include Inaccurate Demand Forecasts and Relationships with Stakeholders.

Alternatives

Alternative 1 description and reason for rejection

If system changes are not implemented, a manual process will need to be developed which is more labor intensive and vulnerable to human error, as the existing system will no longer be supported by the vendor. All of Energy Management's daily forecast models are in MetrixIDR.

Alternative 2 description and reason for rejection

The Company could use an outside vendor that charges annual fees of around \$25,000 per model. Currently, MetrixIDR runs approximately 200 models hourly and is planning to add 1,500 more. While the Company can benefit from the vendor's dedicated expertise, the cost of the operation increases significantly and the flexibility of the Company to create and test new forecasts for the renewable resources is limited and costly. Further, it leaves analysts and forecasters exposed to forecasting techniques and unable to provide quality customer service to their internal customers.

Risk of No Action

Risk 1

MetrixIDR is used for Electric System daily forecasting and planning. Maintaining and upgrading this system as well as increasing functionality for evolving markets, especially the consideration of modeling and forecasting of intermittent solar, batteries, and wind resources, are essential to the System Operation Organization, which is the prime user of this application.

Risk 2

Forecasting Services has the expertise to expand and automate existing forecasting models for all commodities and assist regional operations and engineering with the necessary data. If Forecasting Services does not provide the regions with the data, these departments will seek vendors to provide them with the information and the Company will not be taking advantage of the economies of scale resulting from adding forecasts to the existing tools.

Non-Financial Benefits

This project will improv forecast reliability and accuracy which leads to improved system reliability, enabling distribution area and network hourly forecasting, and incorporating REV developments.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

If these upgrades are not implemented, the Company will need to hire six additional employees. Two employees to compile and manage network data, coordinate with Distribution Operations, and interface with other REV supporting staff. Another four employees will be needed to create and manage network level and DER forecasting models daily, and to help manage the database, as much of the data verification and compilation will be performed manually. This would be six additional employees if MetrixIDR and the report server are not upgraded.

With the upgrade and development of REV and AMI, we are already looking at increasing our staff by two additional full-time employees.

Furthermore, the vendor makes periodic upgrades to the software. Any software version upgrades introduced by the vendor must be implemented to avoid any disruption in software support.

In this case, the Company faces the risk of not being able to provide the commodities forecast until a new system is implemented.

3. Total cost

Total capital cost of the program is approximately \$1.2 million.

4. Basis for estimate

Assumptions include incremental internal labor from Energy Management and IT for duration of the project as well as contract services for various vendor support.

5. Conclusion

The MetrixIDR system is a critical application that directly impacts operational decision making. Without these necessary upgrades the Energy Management business will not be able to continue to support operations in their forecasting needs. In addition, the Energy Management business will be burdened with the manual management of the various models needed for REV which will require increase in staffing.

Project Risks and Mitigation Plan

Risk 1

Mitigation plan

Technical Evaluation / Analysis
Project Relationships (if applicable)



Historical Spend

	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2021</u>
Capital					
O&M	50	50	50	50	50

Total Request (\$000):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital		<u>\$408</u>	<u>\$180</u>	<u>\$148</u>	<u>\$450</u>
O&M*					

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor		\$168	\$47	\$40	\$185
M&S					
Contract Services		\$140	\$100	\$80	\$155
Other					
Overheads		\$100	\$33	\$28	\$110
Total		<u>\$408</u>	<u>\$180</u>	<u>\$148</u>	<u>\$450</u>

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M		\$170	\$170	\$170	\$170
Capital					

*If whitepaper is supporting a capital project/program this refers to implementation O&M



Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Project Status:

- Initiation – New project, not authorized yet
- Planning – Project authorized, not started yet
- Executing – Project in-flight
- On-going – Annual program

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset		
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: Mobility – Digital Factory			
Project/Program Manager: Matthew Ruiz		Project/Program Number(Level 1): 23317067	
Status: ☐ Initiation ☐ Planning ☐ Execution ☒ On-going ☒ Other :			
Estimated Start Date: 1/1/2023		Estimated Date In Service: 12/31/2025	
A. Total Funding Request (\$000) Capital:\$41,250 O&M:\$6,400		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M:		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
As part of Con Edison's Digital Transformation, the Information Technology (IT) team is enhancing the Digital Factory program which brings business units and IT together to build impactful software products for the Company field operations employees and external customers. The Digital Factory will continue to be a key part of Con Edison's overall Digital Transformation and will spearhead the development of enterprise-wide IT capabilities to develop, integrate, secure, deploy, maintain, and monitor mobile applications. The Digital Factory will introduce new roles and software development framework using Agile DevOps (Development Operations) methodology to support the Company's growing need to build turn-key applications more efficiently and inexpensively, resulting in safer, more reliable, and cost effective solutions. Digital Factory is a program that will operate as follows: • Design Thinking and user centric approach that will focus on our employees and customers including automation of low value-added work and streamline external customer engagement through enhanced self-service functionality and automation. • Agile development with a focus on delivering a solution in smaller phases, so that the business can start realizing benefits earlier and increase capabilities. • Business Case model that focuses on cost reducing, safety, and operational excellence initiatives that align with the business vision and goals. • Cutting-edge DevOps technologies and platforms with reusable components that will speed up the development lifecycle.			

These platforms will enable shorter development cycles (reducing costs) and increased deployment frequency (process consistency and avoidance of errors) in close alignment with business objectives (alignment with our cost reduction goals). Additionally, Digital Factory will leverage a user-centric approach that aligns tools to the way real people live and work. The Digital Factory will dedicate IT and business resources to redesign core work processes for safety, reliability, efficiency, and consistency, jointly owning the success of product solutions (lowering change management costs and increasing adoption in the operations groups).

The Digital Factory will also build a new mobile platform of reusable (build once and re-use in multiple products, for example, a login screen) technology components (which will increase deployment speed, development speed, application security, and speed up time to market. The platform will leverage:

- Cloud technology
- Common application development framework that enables re-use of code and features
- Catalog of reusable application programming interfaces (APIs)
- Leverage single sign-on for mobile with security controls at platform level vs. application level

Using this approach of Design Thinking, DevOps, cutting-edge technologies and re-usable technology components to develop software products that will drive adoption, process adherence, higher productivity, and higher quality work in the field.

Justification Summary:

Mobile technology and advanced analytics are no longer optional, they are required. Recent advancements in software development tools, cloud technology and analytics are increasing and reducing the technology development lifecycle of software products. The Digital Factory has changed the way technology is deployed at Con Edison, fostering a collaborative approach between IT and the Business.

The Digital Factory will continue to alter the way IT can drive value in the business and will work collaboratively with an executive steering committee to build an enterprise mobile roadmap to ensure focus on the highest-impact business processes. Major use cases (and their potential impact through mobile and other digital solutions) could include:

- **Inspection** (decreased drive time, more accurate asset information in the field, mobile documentation, and analytics for reporting)
- **Construction** (more efficient collaboration across operations and engineering, more efficient management of municipalities, permits, and approvals, more efficient and “right-sized” deployment of resources)
- **Job Briefing** (decreased safety violations and risk for our employees)
- **Procedural Documentation** (greater consistency of processes and avoidance of fines)
- **Vehicle inspection** (decreased safety violations and avoidance of injuries and fines)
- **Crew location management** (more efficient routing crews decreasing drive time and increasing dispatch to “shovel-ready” work)
- **New Business** (increased Customer Satisfaction [CSAT] and streamlined permit and approvals process)
- **Outage Management – Site Safety and Damage Assessment** (increased CSAT, increased site safety, streamlined corporate communications)
- **Energy Efficiency Demand Management** (improve sales efficiency, increase customer participation and engagement, greater operational efficiency)
- **Component Infrastructure and Reusability** (component library for reusability and agility to scale across multiple mobile applications.)

The Digital Factory will implement a business case methodology to evaluate the products that will be part of the scope with ability to calculate and track business benefits. The methodology will consist of:

- **Qualitative Factors such as:**
 - **Support other corporate priorities** (e.g., Safety, Customer Experience, Sustainability)
 - **Business value** of future version after MVP
 - **Employee and customer engagement**
- **Quantitative Factors such as:**

Cost reduction (operational or capital costs, internal and external/contractor spend

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Mobile application development will promote one enterprise through resusability of components which will contribute to cost avoidance on enterprise development efforts.

Risk 1 Name: Department. Information Technology.
Promote One Enterprise

Risk 1 Description:
Standard application development controls development costs and avoids redundancy through maintaining one set of standards.

2. Supplemental Information

Alternatives:

Current application development methods are slow to deploy applications and slower to capture impact. Smaller, focused mobile solutions require a nimbler approach that the Digital Factory will deliver – Con Edison could continue to partner with third-party software providers for mobile solutions, but this increases vendor dependency, and these solutions may not completely meet the unique needs of our business. Building our own skills in this area will pay dividends far into the future.

Risk of No Action:

Current application development processes do not drive consistent adoption, process alignment, or business impact as quickly. Current IT software development methodology is dependent on third-party technology and proprietary development frameworks Customization to third party technology and proprietary development frameworks increase development costs and reduce speed to market.

Non-financial Benefits:

- . The Digital Factory offers several non-financial benefits to Con Edison:
 - o An improved relationship between IT and Business Units, including increased collaboration and a jointly defined mandate to create impact, which will result in higher work process adherence, easy to use (minimal training needed) products and a more unified organization.
 - o A new collaborative, agile culture can help Con Edison and O&R transform its talent base in IT. Con Edison will be able to recruit cutting edge talent to modernize IT, which will ultimately lead to more efficient, effective, and safe service to our customers.
 - o Enterprise-wide standard mobile applications using the new mobile platform will allow greater transparency into costs, scheduling, work status, and productivity metrics through a consistent data platform and advanced analytics engine.

- o A number of “micro-apps” for Con Edison and O&R employees that improve their operational efficiency and job satisfaction (e.g., mobile contractor approvals, mobile JSSE, mobile permit management, carpool app, etc.).

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

Please see funding details and basis for estimate below. Justification for implementation costs are based on historical spend and benchmarking with strategy vendor. Fund allocation will be utilized for company and contractor analysts, developers, and designers.

2. Major financial benefits

Based on the business case methodology and the analysis that we have done so far; Con Edison is estimating financial savings associated with increase in operational efficiency and streamlining business processes.

3. Total Cost (\$000)

Capital – \$41,250 : O&M \$6,400

4. Basis for estimate

The estimate of the effort has been created with the help of a vendor who has done extensive work in this space at other utilities that have gone through digital transformation. The funds will be used for labor associated to increased headcount, and contract services supplemental support.

5. Conclusion

To summarize, current application development methods are slow to deploy applications and slower to capture impact. Smaller, focused mobile solutions require a nimbler approach that the Digital Factory will deliver – Con Edison could continue to partner with third-party software providers for mobile solutions, but this increases vendor dependency, and these solutions may not completely meet the unique needs of our business. Building our own skills in this area will pay dividends far into the future.

Project Risks and Mitigation Plan

Risk	Mitigation Plan
Budget Constraints	Manage monthly budget to meet forecasts
Time Constraints	Develop project plans and manage monthly

Technical Evaluation/ Analysis

We have worked closely with our strategy vendor to benchmark against what other utilities and other industries are doing in digital transformation. The Digital Factory approach has proven implementations with benefits realized. The

goal of the Digital Factory is to work with latest technologies in the market and to do continuous evaluation of new technologies and how they can be leveraged to increase efficiencies.

Project Relationships (if applicable)

The Digital Factory will be working closely with the RPA (Robotic Process Automation) CoE and the Analytics CoE and leverage those capabilities in delivering products.

Coordination with work management system implementations and enhancements.

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Actuals 2021</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2022</u>
Capital			\$9,600	\$8,400	\$1,000	\$6,973
O&M						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	\$6,973	\$13,750	\$13,750	\$13,750	\$11,000
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	\$2,269.7	\$4,475.7	\$4,475.7	\$4,475.7	\$3,999
M&S					
A/P	\$3,493.7	\$6,889.3	\$6,889.3	\$6,889.3	\$5,056
Other					
Overheads	\$1,209.6	\$2,385	\$2,385	\$2,385	\$1,945
Total	\$6,973	\$13,750	\$13,750	\$13,750	\$11,000

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	\$1,000	\$1,600	\$2,000	\$2,800	\$2,800
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: Project ☒ Program ☐	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset	
Work Plan Category: ☒ Regulatory Mandated ☒ Operationally Required ☐ Strategic		
Project/Program Title: ISOs Revenue Metering validation and reporting software phase 1 and phase 2		
Project/Program Manager: Boris Yuditskiy / Carlos Villalba	Project/Program Number(Level 1): 25496808	
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☐ Other :		
Estimated Start Date: 1/1/2022	Estimated Date In Service: 12/1/2026	
A. Total Funding Request (\$000) Capital: \$704.5 (2022, 2023, 2026) O&M: \$200	B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☒ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: \$1,300 (2 FTEs for 5 years) Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: 0 O&M: \$200	D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:		
This project covers CECONY and ORU, however the cost estimates for Capital and O&M are only CECONY's share. Phase 1 (2022 – 2023) - The objective of this phase is to enhance and upgrade the pool of software scripts utilized by Forecasting Service / Con Edison Metering Authority for required NYISO reporting of the information below and to perform the following capabilities: - Automatically upload data for all zones (H,I,J), generation, tie lines (both external & internal), and distributed energy resources to the NYISO/PJM WBS - Perform the monthly O&R Substation Output Report, TOL calculation for specified generators and share data with TODRS, Zone Load (H, I, J) calculation - Select best available metering information based on a data source hierarchy coupled with Generator Status, Breaker Status, Source Quality, NYISO dispatch, NYISO PTS system data, etc. for Zone Load Calculation and all uploads - Incorporate the NYISO/PJM correction schedules, (2-day, monthly, four month, etc.) for timely update of data - Track data submitted to the NYISO/PJM as per their data requirements - Run queries, flag maintenance/repair/replace deadlines for equipment, track changes to the system, and keep a timeline to make sure things are resolved within NYISO required deadline - Compile the Yearly Meter Inventory as per NYISO Requirement		

- The new system user interface will allow an inexperienced analyst to generate the reports and perform basic troubleshooting of the process
- Better prepare the Company for the many new transmission and generation interfaces that will be built to support the Climate Leadership and Community Protection Act
- Tie into existing systems MV90, EDAP, MDMS, MAMS, PI, TODRS, NYISO/PJM WBS, EDNA, and any data that is provided via e-mail to perform above functions

Phase II (2026) - The planned enhancements of phase 2 include:

- Create a report for all CECONY generators Light and Power (L&P) and share data with TODRS
- Identify meter issues and integrate with Company's WMS
- Provide automatic alerts if any source is experiencing issues such as alarms, data quality changes, data mismatch, data errors based on company specified metrics (feeder & equipment ratings, max generation, interconnection agreements, etc.), and if any maintenance, repair, or replacement to equipment is due
- Calculate Load Loss in our service territory in accordance with the NYISO tariff

Justification Summary:

This software enhancements and upgrade will aid in the rehabilitation, consolidation, standardization, and streamline Metering Authority functions. The software will perform the daily and repetitive manual functions of collecting, validating, and reporting energy demand data to the NYISO and PJM from transmission revenue class meters located at transmission ties with neighbor utilities and local generating stations.

This function is required by FERC on the NYISO-TO Agreement Revenue Manual, NYDPS on the 16 NYCRR Part 92, FERC on the NERC MOD 31, FERC: PJM Manual 28; and NJ BPU.

The vendor software will perform the NYISO and PJM Metering Authority functions while still allowing for oversight by the user. It will eliminate some manual operations and allow the Company to adapt the reporting process to meet market and internal needs. This, in turn, will benefit market participants by improving the accuracy of financial settlements, since transactions will be more transparent and will allow for Company personnel to readily troubleshoot and resolve metering issues reported by generating companies and neighboring utilities. The vendor software will provide an enterprise solution across both CECONY and O&R that will allow for synergies across Company's and allow for business continuity. In addition, will enable the analysts to focus on other issues that arise related to this function, for example: follow-up on repairs, investigate meter challenges, transmission loss estimations, and work on new interconnections.

Forecasting Services will purchase off-the-shelf software that will require input/output data from EDAP, EDNA, MAMS, MDMS, MV90, TODRS, NYISO WBS, and OSI PI existing systems. The new software's interfaces with the existing systems will be developed by Con Edison IT. Server hardware or a cloud based user interface will be required to host the new software. This new software along with the interfaces will be used to calculate and report power generation and transmission tie feeder information to the NYISO and PJM for market participant billing settlement.

CECONY and O&R are responsible for approximately 45% of the load in New York State's Control Area (NYCA). Con Edison's and O&R revenue class metering is submitted next day to the NYISO and PJM to provide accuracy in the financial settlements of energy purchased and generated. Because the process is manual and tedious, it is highly susceptible to errors due equipment malfunctions or human error. Thus, the current process poses a risk of non-compliance to the Company from a functional and regulatory standpoint.

When no adjustment is required, Energy Management releases the information to the NYISO. If the file needs to be adjusted, Energy Management manually adjusts the information and then releases the information to the NYISO. This process is completed daily to comply with NYISO Metering Manual 25 Requirements. With the system enhancements and upgrade, Energy Management can streamline the existing process and account for future upgrades to internal and external systems.

The decision to incorporate vendor software will allow us to eliminate Excel spreadsheets with embedded coding that is not accessible to the end user to determine if it collects the correct data, or if it's being modified through calculations.

This presents an issue when employees leave the Company or department because the developers of these Excel spreadsheets are not around to troubleshoot when there are problems.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

With the onset of the Automated Metering Infrastructure initiative, we recognize the need to upgrade our meter data collection, validation, and submission capabilities. As mentioned, legacy programs are being phased out or no longer in service. The energy landscape across the utility industry is changing, specifically impacting Con Edison infrastructure is the addition of Energy Storage and Demand Energy Response devices. The metering authority will be responsible for the accurate submission of load data for billing and reconciliation of these new systems. By adopting these technologies, we will more fully integrate clean energy into our delivery system so that we can continue meeting our customers' energy needs. IT will be a critical partner in this effort by helping to adopt technology and automation solutions that can handle rules-based and repetitive tasks without human intervention. This will go on to enhance relationships with external customers and minimizes risks inaccurate record keeping and counterparty data.

Risk 1 Name: Department.Energy Management.Fraud	Risk 1 Description: Currently daily report submissions are not recorded and are assembled in an Excel sheet. An analyst could agree with a generating company on a kickback in the amounts reported. 1 MW difference per hour is equivalent to \$20,000 a month.
Risk 2 Name: Department.Energy Management.Compliance	Risk 2 Description: Con Edison must submit daily revenue class metering information, failing to do so for more than 90 days on one meter, results in a non-compliance with the NYISO-TO FERC regulated agreement, affects financial settlements, and accuracy in reporting for NERC MOD 31.
Risk 3 Name: Department.Energy Management.Inaccurate demand forecasts related to Electric/Steam/Gas	Risk 3 Description: Failing to account and report correctly for all the energy leads to inaccuracy in the forecast. The same data that is sent to the NYISO and balanced, it is the same data used to calculate the weather adjusted peak and produce the forecast. Analyst should have more time to analyze NYISO calculated losses for Con Edison and large hourly deviations.

2. Supplemental Information

Alternatives:

1) The Company can hire a third-party metering service provider or MSP. This company will need access to all our metering data and will independently report directly to NYISO and PJM. It could be challenging to keep our metering data confidential and potentially increase our vulnerability to third party risk. It may be difficult to implement this option since the MSP will need to have intrinsic knowledge of our electric system and details of our substations.

2) Increase the number of people performing this function to allow rotational responsibilities. It needs additional 2 FTE, one for O&R and one for CECONY. The disadvantage is that reporting errors may still occur and it is hard to keep the continuity. Initially the two FTEs should be electrical engineers and with a good knowledge of a programming language.

Risk of No Action:

Immediate non-compliance and financial losses.

Non-financial Benefits:

Retention of employees, improved accuracy and timing of reporting, and more efficient use of employee time, and improve regulatory compliance.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

Examples of the benefits of this project include:

- 1) New interconnection of Cricket Valley L&P was not reported for about 6 months. The L&P was around 2 MW hourly or $2 \times 720 \times \$30/\text{MW} \approx \$40,000/\text{month}$.
- 2) KIAC daily challenge while Revenue Meter is not working has been 5 MW hourly that cannot be verified likely losses on the feeders $\approx \$5 \times 720 \times \$30/\text{MW} \approx \$100,000/\text{Month}$.

3. Total Cost (\$000)

See table below.

4. Basis for estimate

Based on PCI vendor which is a leader in metering balancing systems and recent project OH, server costs, and maintenance.

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan
Complexity of CECONY System & Data Access/Availability	The complexity of the CECONY Power System, availability of information in the OSI PI System, and issues with existing meter infrastructure may delay completion and increase cost. To mitigate this risk, we will perform work ahead of the project, which consists of the following: determine which meters are relevant to reports as well as fixing outstanding issues; compilation & validation of PI system tags as well as primary, secondary, and tertiary reporting sources; development of knowledge base of CECONY system to understand Generation & Tie Line impacts & reporting.

Technical Evaluation/ Analysis

Project Relationships (if applicable)

Related to a Project in ORU.

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000): 485

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	256	268	0	0	181
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	30	28			10
M&S	0.0				
A/P	188	204			150
Other					
Overheads	37	36			21
Total	256	268	0.0	0.0	181

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M		50	50	50	50

Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☒ Strategic	
Project/Program Title: NYISO - PJM Energy and Capacity Daily Reconciliations - TODRS	
Project/Program Manager: Mukta Shil/Carlos Villalba	Project/Program Number (Level 1): 21542732
Status: ☐ Planning ☐ Design ☐ Engineering ☐ Construction ☒ Ongoing ☐ Other: _____	
Estimated Start Date: 1/2/2023	Estimated Date In Service: 12/30/2027
A. Total Funding Request (\$000) Capital: \$1,653 (2023 - 2026) O&M: See chart below	B. ☐ 5-Year Gross Cost Savings (\$000) ☒ 5-Year Gross Cost Avoidance (\$000) O&M: \$1,500 (3 FTEs) Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: Capital:	D. Investment Payback Period: (Years/months)
Work Description: The Transmission Owner Data Reporting System (TODRS) liaises between wholesale and retail markets reconciling small retail meters with market settlements at the ISOs (NYISO and PJM). Because the markets (NYISO, PJM, and CECONY and ORU retail programs) change continuously, these changes trigger modifications on the existing code, requires building of new TODRS SQL code, and the addition of new interfaces with all billing and customer information systems around the Company and external ISOs. With this in mind, it is challenging to anticipate the markets next changes and how it will directly impact TODRS. In the last few years alone the following changes were required to be made to TODRS: - Value Stack or Value of Distributed Energy Resources (VDER) program - NYSERDA report requirements to calculate Zero-Emissions Credits (ZEC) - Street Lighting software interface - Use of new AMI metering data - Changes in reconciliation of Unaccounted for Energy (UFE) in PJM by New Jersey Bureau of Public Utilities (BPU) - Adding Multiple peak days to Installed Capacity Calculations - Adoption of Company's SDPID - New CC&B customer information system integration created by special accounts system changes to accommodate Net Metering program - ESCOs communications improvements - Changes in the NYISO Cyber-security protocols - Microsoft upgrades of Visual Studio 2013 to 2015 - Enable Community Solar	

This white paper requests funding for 2023 – 2026+ to address anticipated market changes, regulatory policies, and system needs that will require enhancements to TODRS, they TODRS application software upgrades include:

- Policy to incentivize Electric Vehicles
- Moving energy aggregation to either CC&B or EDAP systems to handle AMI metering volume
- Implement load shapes, not in accordance to PSC service class definitions, to increase the accuracy of the reports when AMI information is not available
- Community Solar data interface
- Policy incentivizing the electrification of the gas system
- Enable community wind and create data interface
- Implementation of Reforming the Energy Vision (REV)
- Reconciliation of retail meters at the feeder level
- Improve fraud detection and prevention at the time of reports submission

Justification Summary:

As the NYISO, PJM, and NYSEDA reporting requirements change to accommodate our clean energy future, it is essential to upgrade the system. The Company will not be able to manage these changes without hiring additional employees and increasing other resources to manually comply with new requirements. Without the foregoing TODRS upgrades, the Company will be forced to make daily ad-hoc manual changes to keep up with the evolving markets. As such, the Company would need to hire three employees to compile and manage manually customer consumption data and input these data into TODRS.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

This software reports monthly to the NYISO on large amounts of energy data in the wholesale market. Therefore, continuous improvement enhances the Company's ability to better mitigate controllability for multiple department risks as follows:

- **Inaccurate Record Keeping and Counterparty Data**
 - Because TODRS reports involve a large amount of monthly energy data and data from more than 150 ESCOs, the risk of misreporting is high if small errors are made. For example, three years ago, a small code error resulted in an \$8 million overcharge to some ESCOs. At the wholesale level these types of issues can only be resolved with FERC approval after the NYISO market settles;a process that will take several months. The financial cost of the amounts not settled is paid by customers until the issue is resolved. As such, the Company needs to be proactive and ensure the market participants are served properly and timely.
 - AMI data Aggregation using EDAP or CC&B: This task is a process improvement using Company's exiting IT infrastructure and may increase the reliability of the calculations.
- **Fraud**
 - Implementing additional approval processes and peer verification to enhance fraud detection and prevention.
- **Compliance (Federal and State orders and market changes)**
 - Implementing the aforementioned proposed enhancements will permit the Company to quickly address the market changes in TODRS architecture and capabilities. It will help maintain the current levels of reliability on the calculations and will avoid adding FTEs to the group to perform such calculations manually for the merging markets.

2. Supplemental Information

Alternatives

The alternative would be to delay the necessary upgrades and to manually adjust the input data and perform only essential activities to continue to support evolving regulatory reporting requirements. Additional FTEs will depend on the complexity of the report and calculation changes.

Risk of No Action

The risk of no action is that manual processes will be required to extract and modify data from systems that have been changed and/or modified, to accommodate market participants' requests, and to continue support evolving regulatory reporting requirements. The manual processes will be labor intensive, requiring the need for three more full-time employees, and manual processes increases the risk of human error.

Non-Financial Benefits

The non-financial benefits of this project are to assist the Company in meeting evolving regulatory reporting requirements, and market changes to improve market transparency and accuracy with Retail Access participants/ESCO and other market participants, and to continuously improve forecasting performance.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

The benefits of this project are in keeping up with ESCO and market participants' requests for information and new market demand and opportunities, due to market development and AMI implementations.

3. Total cost

4. Basis for estimate

The estimate was prepared in partnership with IT, discussions with the company that help develop TODRS, and benchmarking against recent historical costs for TODRS upgrades. .

5. Conclusion

Please see Justification Summary above.

Project Risks and Mitigation Plan

The primary risk is to do nothing and end up having to hire 3 FTEs to perform manual adjustments in TODRS. This could lead to timeliness and data entry errors, which could have significant financial impacts to Full Service Customers and ESCOs.

Technical Evaluation / Analysis

In 2014, an outside consultant developed the technical requirements and work scope associated with TODRS. This system was designed for future expandability to enable market participant web user interface, as well as to support the REV developments and AMI implementations.

Project Relationships (if applicable)

This project is closely related to AMI project, MetrixIDR, and Metering Authority. It collects billing information from all billing systems in the Company, including street lighting and CC&B.

3. Funding Detail

Historical Spend

	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historic Year (O&M only)</u>	<u>Forecast 2021</u>
Capital Request						
O&M						
Retirement						

Total Request (\$000):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	\$313	\$414	\$411	\$414	\$414
O&M	\$0	\$0	\$0	\$0	\$0

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor	\$35	\$28	\$28	\$28	\$28
M&S	\$0	\$0	\$0	\$0	\$0
Contract Services	\$268	\$336	\$333	\$336	\$336
Other	\$0	\$0	\$0	\$0	\$0
Overheads	\$10	\$50	\$50	\$50	\$50
Total	\$313	\$414	\$ 411	\$414	\$414

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M					
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Information Technology 2022

1. Project / Program Summary			
Type: ☒ Project ☐ Program	Category: ☒ Capital ☒ O&M		
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: OCS Implementation for HeavyBid and P6 Loader			
Project/Program Manager: Alicia DeMarco		Project/Program Number(Level 1):	
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☐ Other :			
Estimated Start Date: 1/1/2022		Estimated Date In Service: True	
A. Total Funding Request (\$000) Capital: 2,107.6 O&M: 297.0		B. ☐ 5-Year Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year Ongoing Maintenance Expense (\$000) Capital: O&M:		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
The Consolidated Edison Enterprise Estimating Software HeavyBid, and P6 Loader software is currently located on a third-party private cloud software. The intent of this project is to move these applications to the Oracle Cloud already in use by other Con Edison Oracle products. This approach is in line with the strategic approach of the Oracle Enterprise wide PULA agreement's objective to streamline the number of applications and cloud services providers. This consolidation provides increased cyber security, simplification of integrations and interfaces with currently used Oracle Primavera SaaS / Unifier applications, and significant cost savings. The process will require creating multiple instances for development, test, and production environments to support end user application usage and periodic upgrades due to releases, as required by the Oracle PULA agreement. Infrastructure will be built in the cloud environment to support installation of the applications. Citrix and terminal user licenses will be purchased to support secured access to			

cloud applications. There will be an upfront maintenance cost associated with purchase of the applications that constitutes the subscription of the services with the vendor. This includes implementation cost, licensing and negotiated upfront subscription costs for 5 years with the vendor. Approved Property Records Account Ruling CE-2020-AR-000156-RO.	
Justification Summary:	
The HeavyBid and P6Loader applications will be installed in the Oracle Cloud to integrate with Oracle Primavera SaaS cloud applications already in use. This implementation will streamline the use of cloud applications by using the same cloud for all project management applications to increase performance and security. Eliminating the need to coordinate with various vendors for integrations, and operations provides increased leverage of Oracle Service Provider (OSP). For cost reduction and avoidance, deletion of the separate cloud host (LoadSpring) provides \$87,000 (23%) savings of annual O&M costs, totaling over \$434K by 2026.	
Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)	
n/a	
Risk 1 Name:	Risk 1 Description:

2. Supplemental Information	
Alternatives:	
Continue with separate cloud hosting solution (as-is) or host it on premise. There is a lack of cost savings to stay as-is and increased costs involved in hosting the applications on premise.	
Risk of No Action:	
Continue as-is with no cost savings. The potential increase to service interruptions due to the applications being kept on separate cloud services. The risk also increases for time to find and resolve service interruptions and issues as they occur.	
Non-financial Benefits:	
All project management applications (Primavera P6, Unifier, P6 Loader and HeavyBid) will be housed with one Cloud vendor. Integrations will reside with one cloud vendor. Eliminating the need to coordinate with various vendors for integrations and operations provides increased leverage of OSP.	

Summary of Financial Benefits and Costs (attach backup)	
1. Cost-benefit analysis (if required)	
n/a	
2. Major financial benefits	
The benefit is to consolidate the use of cloud applications to one vendor and save 23% O&M annual costs. Additional cost savings are implied with the consolidation of vendor relationships when service issues arise and troubleshooting or resolution would be required.	
3. Total Cost (\$000)	
2,107.6	
4. Basis for estimate	
The following items were considered in the basis for estimate: • Licensing costs for Citrix • Cognizant support cost after go-live • Historical pricing for resources/effort • Oracle consulting costs for infrastructure • Vendor costs for HeavyBid and P6Loader • Cloud application costs (short and long-term)	
5. Previous budget variances	
n/a	
6. Conclusion	
Based on the need and evaluation, it has been determined that this project will improve and streamline operational efficiency, increase cyber security, and reduce O&M costs.	
Project Risks and Mitigation Plan	
Risk	Mitigation Plan
n/a	
Technical Evaluation/ Analysis	
Worked with Oracle cloud team to evaluate the feasibility of all project management applications being integrated into one cloud environment.	
Project Relationships (if applicable)	

Enterprise Project Management Software Project – This project is closely related to Unifier which is currently implementing additional functionality which includes integration with HeavyBid and P6Loader. Additional functionality will be added to Unifier as which will require additional interfaces with projects and software already in use.

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals</u> <u>2017</u>	<u>Actuals</u> <u>2018</u>	<u>Actuals</u> <u>2019</u>	<u>Actuals</u> <u>2020</u>	<u>Historic</u> <u>Year*</u> (O&M only)	Forecast 2021
Capital						
Implementation O&M**						

* For Rate Case only

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	918.3	297.3	297.3	297.3	297.3
Implementation O&M**					

**If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	122.5				
M&S					
A/P	426.0				
Other	369.8	297.3	297.3	297.3	297.3
Overheads					
Total	918.3	297.3	297.3	297.3	297.3

Total Gross Cost Savings / Avoidance by Year:

	<u>Request</u> <u>2022</u>	<u>Request</u> <u>2023</u>	<u>Request</u> <u>2024</u>	<u>Request</u> <u>2025</u>	<u>Request</u> <u>2026</u>
O&M Savings		86.7	86.7	86.7	86.7
O&M Avoidance					
Capital Savings					
Capital Avoidance					
Total Ongoing Maintenance Expense by Year:					
	<u>Request</u> <u>2022</u>	<u>Request</u> <u>2023</u>	<u>Request</u> <u>2024</u>	<u>Request</u> <u>2025</u>	<u>Request</u> <u>2026</u>
O&M		297.3	297.3	297.3	297.3
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Appendix:

The following covers conversations with vendors in multiple meetings to provide cost estimates. No separate quote received in writing other than information compiled in this spreadsheet.

Cloud Service & Edition		Current	Year 1	Year 2-5
Deployment Cost (Estimates)			\$ 225,000.00	
IT Costs to integrate into Con Ed	IT Analyst			
Project Management Cost		1	\$ 70,000.00	
IT Analyst and Architect Cost		1	\$ 35,000.00	
IT Manager Cost		1	\$ 17,500.00	
HCSS and Emerald Costs			\$ 100,000.00	
Contingency Costs 10%			\$ 44,750.00	
Subtotal			\$ 267,250.00	
Total			\$ 492,250.00	
Licensing Costs & Support (O&M - exept year 1)				
Loadspring		180,849	128,712	
Oracle Cloud Infrastructure			25,637	102,547
Cognizant (infrastructure, HB, P6Loader)			40,000	160,000
Citrix Licenses			28,500	114,000
HeavyBid		146,200	146,200	584,800
P6 Loader (Emerald)		57,000	57,000	228,000
Total		\$ 384,049	\$ 426,049	\$ 1,189,347
	Total Implementation (Capital)		918,299	
		New Annual O&M Cost		297,337
		Annual Cost Savings		86,712

Cloud Service & Edition	Usecase	Quantity	Metric	Unit-Price	Term (Months)	List-Price	Comments
IaaS-Compute X7 Virtual Instances	Compute for Active Directory (Prod and DR)	2	OCPU/Hr	\$ 0.0638	12	\$ 1,139.2	
IaaS-Compute X7 Virtual Instances	Compute for Citrix Farm, File Server & P6-Loader(Includes Dev, Test, Prod, DR)	26	OCPU/Hr	\$ 0.0638	12	\$ 14,809.8	
Windows Server Licensing	OS Licensing for Servers	26	OCPU/Hr	\$ 0.0920	12	\$ 21,355.8	
Oracle Database Cloud Service	Oracle Database for P6-Loader	4	OCPU/Hr	\$ 0.3226	12	\$ 11,520.7	
IaaS: Block Storage	Storage for Compute Servers(includes FileServer Storage)	3000	GB/Month	\$ 0.0255	12	\$ 918.00	
Object Storage	File-Server Backups	5000	GB/Month	\$ 0.0255	12	\$ 1,530.00	
Total						\$ 51,273.4	
ConEd Yearly UCC						\$ 25,636.72	
Monthly UCC						\$ 2,136.39	
Yearly After ULA 2 PaaS						\$ 25,636.72	
Citrix Licenses	Con Ed's responsibility (\$66,800	50 /year			12	\$ 12,000.00	
Terminal Server Licenses	Con Ed's responsibility (\$110 / li	150 /year			12	\$ 16,500.00	
Con Ed Yearly Licenses						\$ 28,500.00	
Monthly Licenses						\$ 2,375.00	
Cognizant support cost	Support Price – USD 12 K to 15 K per month.				Con Ed Yearly support	\$ 180,000.00	\$ 40,000.00
Monthly Support						\$ 15,000.00	
* Pending confirmation with VMO team. Costs expected to be \$40K for this support							

We have requested an architecture diagram from Oracle (still pending) that will document the new interfaces.

Please click here [OCS Implementation for HB & P6Loader](#) to view the answers to questions regarding Strategic Impact, Risks, and other IT project questionnaire information that does not download to the White Paper.

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset	
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic		
Project/Program Title: Operational Technology Network Phase II		
Project/Program Manager: Peter Haviaras/Nariman Nasser	Project/Program Number (Level 1): 25496815	
Status: ☐ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other:		
Estimated Start Date: 2023		Estimated Date In Service: 2023-2025
A. Total Funding Request (\$000) Capital: 2,500.0 O&M:	B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 1,200.0	D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:		
Central Engineering has several remote monitoring systems that reside either on the Con Edison corporate network or their own standalone networks. Most of these applications are not using the current established Verizon Wireless VPN communication over SCADANet. Con Edison have established the Operational Technology Network (OTN) for housing data acquisition applications on a secure and dedicated infrastructure environment. This project is continuing the effort to build out the alternate OTN data center and to migrate existing systems, not limited to Transmission Operations and Substations applications onto a secure, dedicated network segment with secured communications on SCADANet. The company also has the Enterprise OSISoft's PI expansion effort which can leverage this OTN environment to house it. OSISoft's PI System is used for the real-time monitoring and visualization of critical operations in Electric, Gas and Steam that makes critical time sensitive decisions every day. Currently, OTN is already housing the Pump House data from the substation used by the Central Engineering group. High-level implementation: - Build out the alternate data center site - Procure hardware & software for OTN - Setup hardware & software - Migrate application This OTN will continue to grow as more business systems are added to this network. Per company's direction on data center consolidation at Worth Street, this OTN infrastructure environment requires to be part of the consolidation planning and migration. OTN is currently using DELL and will need to migrate to the Nutanix hardware which is the company's new standard. This		

includes the firewalls and switches upgrade as well.

Justification Summary:

To align with company's data center consolidation and standards and to avoid risk of building evacuation of the OTN primary infrastructure site located at 30 Flatbush, and 4 IP DR site, OTN must be included in the consolidation effort and infrastructure upgrade.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name: Department.Information Technology.Failure of critical business application	Risk 1 Description: Ensures continuity of the operational data network to continue to function
Risk 2 Name: Department.Substation Operations.Equipment Failure	Risk 2 Description: The operational data network provides on-line monitoring for power transformers. Maintenance of this system will help ensure we can monitor the equipment and intervene before a major equipment failure.
Risk 3 Name: Corporate ConEd.Operations.Cybersecurity	Risk 3 Description: It provides a secured segmentation for data acquisition applications.

2. Supplemental Information

Alternatives:

Continue to function with out of support equipment and risk hardware failures.

Risk of No Action:

Existing OTN infrastructure will be end of support by 2022-2023 and need to be upgraded.

If OTN is not part of the data center consolidation at Worth Street, another location needs to be identified to house it. At this point, there is none.

Non-financial Benefits:

- Increase system reliability and provide redundancy
- Reduce cyber security risks by providing secured firewalled environment for data acquisition applications
- OTN environment can be leverage for the future clean energy telemetry data acquisition

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (2,500.0) = Total Cost (2,500.0)

4. Basis for estimate

The estimation was based on anticipated hardware and software license requirements, and continued resource supports need for the equipment upgrade and data center consolidation efforts.

5. Conclusion

Hardware refresh for OTN is vital to support and maintain the environment for business continuity to minimize recovery time, cyber safety, and negative impacts. OTN must be part of the company's data center consolidation initiatives to avoid risk of building evacuation at 30 Flatbush, and equipment obsolescence.

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Interaction with IT, business, and vendor to perform analysis on the recovery time objective (RTO) and implement disaster recovery (DR) procedure to ensure business continuity. Each DR procedure will be evaluated. IT includes OTN for the IT Infrastructure and data center consolidation initiatives.

Project Relationships (if applicable)

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	1,000.0	1,000.0	500.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor					
M&S					
A/P					
Other	0.0	1,000.0	1,000.0	500.0	
Overheads					
Total	0.0	1,000.0	1,000.0	500.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	250.0	400.0	400.0	400.0	
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/ project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☒ O&M
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☒ Strategic	
Project/Program Title: ServiceNow upgrades – ASM and APM modules	
Project/Program Manager: Rohini Chand	Project/Program Number (Level 1):
Status: ☒ Initiation ☒ Planning ☐ Execution ☐ On-going ☐ Other: _____	
Estimated Start Date: 6/30/22	Estimated Date In Service: 2/30/23
A. Total Funding Request (\$4,445,000) Capital: \$1,925,000 O&M: \$2,520,000	B. ☐ 5-Year Gross Cost Savings (\$000) O&M: \$ ☐ 5-Year Gross Cost Avoidance (\$000) Capital: \$
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: Capital:	D. Investment Payback Period: N/A (Years/months) (If applicable)
Work Description: Information Technology adopted an Information Technology Service Management (“ITSM”) framework, outsourced IT activities to a Managed Service Provider and implemented an ITSM platform, ServiceNow, in 2020. This framework requires continued operational improvements which are achieved through the maturation of our ITSM platform, ServiceNow. This project calls for the implementation of ServiceNow’s supplemental modules: Automated Service Mapping and Application Portfolio Management. The Automated Service Mapping module provides IT with visibility into the relationship between infrastructure components and applications, and the services they provide to the company. This service visibility will allow IT to resolve service outages, optimize service architecture, and assess the service impact of infrastructure changes. Application Portfolio Management builds a comprehensive inventory of IT applications and allows IT to perform the following: business capability planning; application rationalization and technology risk management. IT will use the data gathered by this module to make decisions aligning technology solutions with business strategy. These modules will enhance IT’s ability to provide reliable services that fuel nearly every aspect of the business, promote operational efficiencies and support strategic decision making regarding the Company’s IT technologies and data. The modules also play a key role in the Company assessing IT assets impacted by cyber related vulnerabilities and remediating those vulnerabilities more efficiently. O&M The implementation of ServiceNow modules will result in additional O&M increases for ServiceNow license costs and costs for new resources to provide ongoing support.	

Justification Summary:

The implementation of Automated Service Mapping and Application Portfolio Management is the next step in IT's roadmap for increasing visibility into IT's entire operations. It will ensure business continuity, infrastructure, and application compliance, and expand operational agility. Additional benefits are below:

1. Reduce restoration times for IT system outages by quickly understanding the affected service(s) and component(s)
2. Drive operational resilience by quickly determining systems status (availability and performance)
3. Enhance our security posture by providing Cyber Security teams the ability to quickly identify critical infrastructure, services and applications affected by a security vulnerability
4. Visibility of applications that pose security and support risks due to obsolescent technology
5. Ability to identify relationships and dependencies between applications and infrastructure components
6. Automated normalization and reconciliation of data across multiple sources to create service mappings (currently a manual effort)
7. Improved data accuracy and broader identification of infrastructure and application attributes that can be leveraged by IT teams

2. Supplemental Information

Alternatives

- Alternative processes to this effort include the current model of manual data collection and maintenance of application and infrastructure data in the ServiceNow database
- Siloed strategic decision making and technology road map planning using potentially inaccurate, outdated data, which can result in service outages and increased security risk
- Customization and implementation of static fields in the ServiceNow platform to store manually maintained data

Risk of No Action

Risks of not implementing ServiceNow Automated Service Mapping and Application Portfolio Management include:

- Increased costs associated with the manual collection and maintenance of application and infrastructure attributes
- Manual collection of data leads to unreliable and inaccurate data, such as duplicates and misclassification
- Extensive manual work to enable visibility into the organization's application portfolio landscape and into infrastructure changes, affecting strategic decision making and application rationalization
- Inability to leverage process and automation capabilities of the ServiceNow platform
- Decreased customer satisfaction when inaccurate data triggers redundant approval requests, and failure to obtain required approvals for infrastructure or application changes
- Inaccurate risk and impact assessments for changes where the IT components affected are not related to a business service
- Risks of increased troubleshooting efforts and delayed issue resolution for impacted business services where service-affecting infrastructure components must be manually and physically identified
- Increased complexity and cost of future ServiceNow upgrades due to customizations

Non-Financial Benefits

In addition to providing a comprehensive, consolidated, top-to-bottom view of business service to infrastructure component relationships in the of the Company's Information Technology department, the proposed implementation improves data accuracy, provides valuable information for technology road mapping, project & resource planning, application rationalization.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

3. Total cost: \$4,445,000. The estimated capital cost for implementation is \$1,925,000, which includes license and support fees. The estimated O&M cost is \$2,520,000 over the rate years for license and support fees.

4. Basis for estimate

The basis for estimate:

- Subscription license costs provided by Managed Service Provider (Cognizant) for Automated Service Mapping and Application Portfolio Management modules
- Managed Service Provider and Company resource labor costs associated with requirements design, project implementation and ongoing support.

5. Conclusion

This project should receive funding to provide operational benefits, long term strategic benefits, and increased value realization of the IT Service Management framework and platform in which Information Technology has already invested.

Project Risks and Mitigation Plan

Project risks are primarily resourced based and related to ensuring the project team can secure dedicated time with stakeholders to attend design workshops, provide information to create relationship mappings, and create Application Portfolio Management dashboards.

Technical Evaluation / Analysis

This project proposes expansion of a technology platform that Information Technology has already evaluated, implemented, and for which a blended support team of Managed Service Provider and Company resources already exists.

Modules supplied by the vendor, ServiceNow, provide the highest level of compatibility and scalability with our instance of ServiceNow and allow us to leverage efficiencies of the support team's existing ServiceNow technical skill and expertise.

Project Relationships (if applicable)

NA

3. Funding Detail

Historical Spend

	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historic year</u> (O&M only)	<u>Forecast 2021</u>
Capital				\$833,000		
O&M				<u>\$1,402,000</u>		\$1,166,605

Total Request (\$4,445,000)

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	<u>\$700,000</u>	<u>\$1,225,000</u>			
O&M*		150,000	\$790,000	\$790,000	\$790,000

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor	<u>\$200,000</u>	\$175,000			
M&S		\$600,000			
Contract Services	<u>\$500,000</u>	\$450,000			
Other					
Overheads					
Total	<u>\$700,000</u>	<u>\$1,225,000</u>			

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings	0	0	0	0	0
O&M Avoidance	0	0	0	0	0
Capital Savings	0	0	0	0	0
Capital Avoidance	0	0	0	0	0

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M					
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Project Status:

- Initiation – New project, not authorized yet
- Planning – Project authorized, not started yet
- Executing – Project in-flight
- On-going – Annual program

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program		Category: ☒ Capital ☐ O&M	
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic			
Project/Program Title: Strategic Analytics - As Billed - Revenue Analytics (SARA)			
Project/Program Manager: Hock Ng/Heidi Cinquegrana		Project/Program Number(Level 1): 25546339	
Status: ☐ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date: 1/10/2024		Estimated Date In Service: 6/30/2027	
A. Total Funding Request (\$000) Capital: \$5,685 (2024 – 2026) \$2,490 (2027) O&M: See section C.		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: \$200 (Starting 2027)		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
Electric, Gas and Steam Forecasting (together, referred to as “EGS Forecasting”) currently uses multiple sources to obtain the information required to perform monthly variance analysis of volumes and revenues and to generate forecasts. ESG Forecasting employees reach out to several departments and manually pull data from many different Company systems. These processes are time-consuming, and are potentially prone to error, since some of the steps are manual. The proposed solution is to the develop a single and complete source of enterprise data used to support customer, sales, and revenue analytics that is housed in a user-friendly system that can automate the pull of critical data from across the Company’s systems, automate the reconciliation process, and simplify and expedite the forecasting process. This project will also include exploring the potential use of AMI data to improve forecasting accuracy. Currently, EGS Forecasting obtains data on a monthly basis using Microsoft Access, which queries the point-in-time data-extract pulled from the company’s billing system. Access is a tool generally used for small databases with limited users. A key source system is REVSTAT, a revenue statistics reporting system that houses summarized data for electric and gas. REVSTAT only allows for data to be obtained by service code. However, an enterprise scale reporting repository that obtains more detailed information, for example, by account number, is needed for breaking down revenue data into smaller sub-categories to better analyze the data and its components. We are looking for the product to provide the following capabilities:			

- Act as a repository of volume and revenue data that can be queried to extract customer usage information / patterns across multiple dimensions (e.g., time range, frequency, service classification, geographical location, other available AMI data)
- Automate data gathering, monthly variance analysis and reporting.
- Research monthly billing and provide a listing of accounts and the energy billed when the number of days exceed 34 days (bulk billing on one bill). For example, if a bill is for the period from Jan 2021 to Sept 2021, the system should flag that a multiple billing has occurred. Similarly, the system should also flag when multiple bills occur in a month. The system should also have the ability to capture and include the original billing in its adjustment of monthly billing if a cancelation resulted in the multi or bulk billing.
- Gas Accounts - The system needs to review the daily actual HDD, the heating slope, and base usage factors that are provided to the billing system, to properly adjust historical usage when bulk billing occurs.
- Electric Accounts - Same issue with bulk and multi bills as with gas, but over both heating and cooling seasons. The system would be required to provide information on the actual HDD and CDD from the billing system to match the period of the bulk billing. The system should also have the heating and cooling slopes that the econometric models have determined for each service class. Additionally, it should provide the adjustment that should be made to the monthly volumes so the historical usage in the econometric models is corrected.

Justification Summary:

The current manual process is not sustainable and will challenge our agility in addressing the ever evolving regulatory and technology landscape and to meet our customers expectation. The proposed solution is to the develop a single and complete source of enterprise data used to support customer, sales, and revenue analytics that is housed in a user-friendly system that can automate the pull of critical data from across the Company's systems, automate the reconciliation process, and simplify and expedite the forecasting process. This project will also include exploring the potential use of AMI data to improve forecasting accuracy.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name: Department. Finance. Quality of Forecasts & Quality of Internal Financial Reporting

Risk 1 Description: This project looks to leverage AMI data to improve its forecasting, automate the pull of data from many sources, automate the reconciliation process, and use a platform to perform the forecast and analytics. The output of this project will significantly reduce the likelihood and improve the controllability of this risk event.

2. Supplemental Information

Alternatives:

Risk of No Action:

The current manual process is not sustainable and will challenge our ability to be agile in addressing the ever evolving regulatory and technology landscape and to meet our customers expectation. The risk of operator error will continue at the current level, and the specific knowledge base of the employees that work on the reconciliation process need to be preserved.

Non-financial Benefits:

The goal of this project is to create one single source of enterprise data that will result in the following:

- Customer Benefits – A more in-depth understanding of customer usage patterns and better impact analysis reporting for making decisions at the service class and customer level.
- Organizational Improvements – Enhancing data flow and analytics transparency across the Company and developing new insights from time spent more on analytics as opposed to data gathering.
- Financial and Regulatory Risk Reduction – Improve tracking and reporting of bill components and the accuracy and timeliness of monthly, quarterly, and annual revenue reporting process.
- Value-added Analysis: Reduce administrative tasks to allow more time to be spent performing greater value data analytics, and to improve forecasting models.
- Improved Forecast Accuracy: Reduced data error will lead to greater forecast accuracy that will have downstream positive benefits for finance, accounting, and operations. A more accurate forecast will lead to less under purchasing or over purchasing of commodities on same-day energy needs.
- Improved Analytical Capabilities: Easier access to customer usage data across more dimensions allow more granular analysis to determine potential impact of certain scenarios (e.g., covid, network issues)
- Improved ability to have agile forecasting capabilities to meet the growing expectations of our regulators, customers, and stakeholders. A more accurate energy forecast will provide better hedging on future energy needs which will reduce costs on future energy needs to meet our customers' needs.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

Indirect financial benefits for the Company's operations and customers include:

- Improved financial forecast accuracy, which allows for better cash-flow management.
- Improved commodity forecasts lead to more precise procurement of gas and electric supplies, reducing the costs to customers.
- Improved commodity forecasts also allow for a more efficient hedging strategy.

3. Total Cost (\$000)

Please see table below.

4. Basis for estimate

Based on analysis of budget for similar projects and discussions with subject matter experts.

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Project Relationships (if applicable)

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Actuals 2021</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2022</u>
Capital				-		
Implementation O&M*						
Regulatory Asset						

* * For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

		<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital		0.0	0.0	1,196	2,055	2,433
Implementation O&M*						

Regulatory Asset																																																																																							
*If Whitepaper is supporting a capital project/program this refers to implementation O&M. Capital Request by Elements of Expense (\$000): <table border="1"> <tr> <th>EOE</th> <th></th> <th><u>Request 2022</u></th> <th><u>Request 2023</u></th> <th><u>Request 2024</u></th> <th><u>Request 2025</u></th> <th><u>Request 2026</u></th> </tr> <tr> <td>Labor</td> <td></td> <td></td> <td></td> <td>450</td> <td>600</td> <td>600</td> </tr> <tr> <td>M&S</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>A/P</td> <td></td> <td></td> <td></td> <td>468</td> <td>1,040</td> <td>1,381</td> </tr> <tr> <td>Other</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Overheads</td> <td></td> <td></td> <td></td> <td>278</td> <td>415</td> <td>452</td> </tr> <tr> <td>Total</td> <td></td> <td>0.0</td> <td>0.0</td> <td>1,196</td> <td>2,055</td> <td>2,433</td> </tr> </table> Total Gross Cost Savings / Avoidance by Year: <table border="1"> <tr> <th></th> <th></th> <th><u>Request 2022</u></th> <th><u>Request 2023</u></th> <th><u>Request 2024</u></th> <th><u>Request 2025</u></th> <th><u>Request 2026</u></th> </tr> <tr> <td>O&M Savings</td> <td colspan="6" rowspan="4">Not Applicable</td> </tr> <tr> <td>O&M Avoidance</td> </tr> <tr> <td>Capital Savings</td> </tr> <tr> <td>Capital Avoidance</td> </tr> </table> Total Ongoing Maintenance Expense by Year: <table border="1"> <tr> <th></th> <th></th> <th><u>Request 2022</u></th> <th><u>Request 2023</u></th> <th><u>Request 2024</u></th> <th><u>Request 2025</u></th> <th><u>Request 2026</u></th> </tr> <tr> <td>O&M</td> <td colspan="6" rowspan="2">Not Applicable</td> </tr> <tr> <td>Capital</td> </tr> </table>							EOE		<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>	Labor				450	600	600	M&S							A/P				468	1,040	1,381	Other							Overheads				278	415	452	Total		0.0	0.0	1,196	2,055	2,433			<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>	O&M Savings	Not Applicable						O&M Avoidance	Capital Savings	Capital Avoidance			<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>	O&M	Not Applicable						Capital
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Capital Avoidance																																																																																							
		<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>																																																																																	
O&M	Not Applicable																																																																																						
Capital																																																																																							

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset		
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic			
Project/Program Title: Technology Currency and Sustainability			
Project/Program Manager: Vishal Varma	Project/Program Number(Level 1): 25219251		
Status: ☐ Initiation ☐ Planning ☐ Execution ☒ On-going ☒ Other :			
Estimated Start Date:	Estimated Date In Service: 12/31/2025		
A. Total Funding Request (\$000) Capital: 24,000.0 O&M:	B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:		
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: 15,000.0 O&M: 0.0	D. Investment Payback Period: (Years/Months) (If applicable)		
Work Description:			
Technology Currency and Sustainability is a recurring program that constitutes upgrading of the technologies across servers, databases, desktop operating systems and underlying technology stack of the application. Technologies must be upgraded to be compliant with manufacturer's support and receive security/vulnerability patches. Through this capital investment, there are 4 main initiatives. 1. Con Edison IT is working on significant upgrade of its server Operating Systems to the minimum OEM supported O/S. This will provide continued compatibility with the latest implementation of server Operating Systems deployed at Con Edison. 2. Databases – Scope of activities: The objective of this project is to purchase and install the latest databases, test, and remediate Con Edison software applications on these databases. This will provide continued compatibility with the latest implementation of Microsoft’s SQL and Oracle databases deployed at Con Edison. 3. Desktop – Scope of activities: The intent of this project is to purchase and install Windows 10 Enterprise 2016 LTSB to be installed on all desktops and laptops at Con Edison. This includes efforts to identify, test, and remediate Con Edison applications to provide continued compatibility on the latest implementation of Microsoft’s Operating System. 4. Underlying Technology Stack The intent of this project is to enhance/upgrade the underlying technology of the application for shelf life sustainability. This includes efforts to identify, configure, develop, implement, test, and remediate Con Edison applications to provide continued compatibility on the latest implementation of technology.			

Justification Summary:

The software that runs on the servers must be compatible with the operating system running on that server for it to operate successfully. If the server application software is not compatible with the new server, the operating system must be upgraded or replaced to keep applications in production. Upgrading the software to the latest version increases the useful life of the system, supports the energy commodity operations and therefore helps support the safe and reliable service to customers.

Con Edison's server and database platform relies on the core software that enables it to be functional. The underlying software must be maintained and kept currency to sustain a secure environment, protect customer information and prevent unauthorized access. This program is critical to maintaining the security of the server environment and continued availability of the business system portfolio and allows us to better protect customer information.

Con Edison's standard windows platform. The efforts of the program will allow Con Edison to meet the Windows 10 deployments and replace the devices with obsolete OS versions. In addition, remediating business applications to utilize the platform will allow provide our applications to remain functional and maintained in the event of future changes.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name: Corporate
ConEd.Operations.Cybersecurity

Risk 1 Description:

Upgrade of servers are required to mitigate risk from cyber vulnerabilities and intrusion

Risk 2 Name: Department.Information
Technology.Significant IT projects

Risk 2 Description:

These servers are hosting critical business applications that support electric, gas and steam infrastructure

Risk 3 Name: Department.Information
Technology.Unsupported technology in computer
systems

Risk 3 Description:

Operating systems on servers and desktops has attained or are close to end of life, which will impact the ability of the existing application to continue to be in production.
Manufacturer support will not be available.

2. Supplemental Information

Alternatives:

There is no alternative to upgrading the underlying technology or hardware to the latest software version.

Risk of No Action:

The risk of no action may result in:

- Reduced availability and security for critical business applications.
- Key applications that remain on an unsupported technology inhibit our ability to meet customer demands in a timely fashion and may result in higher costs for vendor support or security patching.
- Higher incremental support costs from Microsoft. The current extended support agreement from Microsoft calls for substantial increases to secure unsupported technologies, such as SQL Server 2000.

Non-financial Benefits:

- The project allows Con Edison to avoid security risks from outdated and unsupported applications
- Upgrading applications to the new operating system will allow critical corporate applications to remain operational and secure. In addition, this effort will further require that applications be implemented based on the same standards, easing the knowledge transfer between developers and result in a more streamlined maintenance of corporate systems.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast (2,200.0) + Next 5 Years Est. (24,000.0) = Total Cost (26,200.0)

4. Basis for estimate

IT uses historical spends for application remediation based on previous database, applications, server upgrades, and then refines estimates based on specific applications that require remediation.

5. Conclusion

Project Risks and Mitigation Plan

Evaluate and describe any risks that might extend the project timeline, prevent completion, or lead to cost overruns. Explain plan to minimize these risks.

Risk	Mitigation Plan

Technical Evaluation/ Analysis

The effort to remediate systems will improve our levels of performance, scalability, security, and monitoring. More importantly, the remediation of business applications will allow for the full migration to SQL Server 2008, which is covered under Microsoft's Extended Support, sustaining our ability to implement timely security updates.

Project Relationships (if applicable)

Not applicable.

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						2,200.0
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):
Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	3,000.0	6,000.0	6,000.0	6,000.0	3,000.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	0.0				
M&S					
A/P					
Other	3,000.0	6,000.0	6,000.0	6,000.0	3,000.0
Overheads					
Total	3,000.0	6,000.0	6,000.0	6,000.0	3,000.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	0.0	0.0	0.0	0.0

Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

1. Project / Program Summary			
Type: ☒ Project ☐ Program		Category: ☒ Capital ☐ O&M	
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☐ Strategic			
Project/Program Title: Technology Modernization Program			
Project/Program Manager: Shihab Hasnat		Project/Program Number(Level 1): Various	
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date: 1/1/2023		Estimated Date In Service: 12/31/2025	
A. Total Funding Request (\$000) Capital: \$89,000,000 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M:		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
Con Edison's IT department manages a portfolio of approximately 500 applications in support of our Electric, Gas, Steam and Shared Services organizations. Over the next 3 years, IT is investing in capital projects to modernize, upgrade, replace, consolidate, and retire applications within this portfolio. IT's leadership is focusing on: - Standardize, rationalize, consolidate, and modernize the application portfolio - Migrate on premise applications that traditionally require upgrades every 1 to 3 years, to cloud based applications that typically get upgrades quarterly as applicable - Automate support processes, such as patching, monitoring, testing and production promotions - Keep applications current in terms of their technology stack to avoid potential cyber threats Through this capital investment, there are 2 main initiatives. - Retire and/or replace approximately 150-200 of the 500 applications over the next 3 years. We expect the remaining portfolio of approximately 300 applications to be our revised long-term baseline/steady state portfolio of applications. IT has completed a technical currency analysis on the remaining 300 steady state applications. Technology currency is the ongoing process of understanding how current an item of hardware or software is, compared to the latest available version. Managing technology currency is a vital part of			

operational resilience as organizations attempt to balance the cost associated with maintaining technology currency versus the risk posed. Technical currency includes versions of servers, databases, desktop operating systems, as well as application upgrades and consolidation that are necessary to comply with technology standards, cyber compliance, vendor compliance and PSC mandated requests. We estimate that approximately 50% (150) require modernization and technical upgrades to keep the applications functionally viable and technically safe. Many of the applications have underlying technologies that are more than several versions behind current.

We estimate a 3-year effort with approximately 50 applications per year being upgraded. The main drivers of the technology upgrades/enhancements effort are:

1. Increase operational efficiencies by keeping applications functionally current
 2. Reduce technology obsolescence to mitigate Cyber risks
 3. Avoid losing vendor/software support for obsolete technologies
2. We will also evaluate if standardization or consolidation to a single enterprise technology is needed. Duplicative platforms result in increased license, maintenance, and support costs. For example, with application modernization newer tools like Azure Dev Ops and Git Hub are the new standard. A project to migrate all IT code from Team Foundation Server to Azure Dev Ops is included in this program. In addition, we have various tools that perform customer related functions. As an integrated project to larger customer related initiatives, we have included the consolidation of these technologies to a new standard.

Justification Summary:

The objective of this project is to enforce enterprise application standards through consolidation and reduction of obsolete technology. Duplicative platforms and obsolete technology results in increased costs for licenses, maintenance and support. In addition, obsolete technology leads to cyber risk and falling behind from a functionality perspective leads to inefficient use of software and ultimately leads to increased support costs. These upgrades are required as systems vendors keep phasing out support for the existing operating systems, databases, and applications and release new versions to provide enhanced security and increased functionality.

The main drivers of this effort are:

- Increase operational efficiencies by keeping applications functionally current
- Consolidate and rationalize various applications
- Reduce technology obsolescence to mitigate risks
- Avoid losing vendor/software support

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Our long-range plan is to have a rationalized, and technically current set of steady state applications to support the enterprise. This strategy includes modernization, retirements and consolidation of the application portfolio as well as maintaining technical currency to avoid cyber threat and functionality decline.

Risk 1 Name:

Risk 1 Description:

2. Supplemental Information

Alternatives:

None.

Technology currency is the ongoing process of understanding how current an item of hardware or software is, compared to the latest available version. Managing technology currency is a vital part of operational resilience as organizations attempt to balance the cost associated with maintaining technology currency versus the risk posed. Servers, databases, desktop operating systems, as well as application upgrades and consolidation are necessary to comply with technology standards, cyber compliance, vendor compliance and PSC mandated requests.

Risk of No Action:

Risk 1

Cyber Risk: Not keeping technologies up to current versions lead to cyber security vulnerabilities. Key applications remain on an unsupported technology requiring separate support resources, technologies, and infrastructure and leave the systems vulnerable for cyberattacks. In addition, security updates are not provided and vendor support ends after a certain point, increasing the cyber risk on existing code if not migrated to a new standard.

Risk 2

Increased Cost: Higher incremental support costs from hardware and software vendors. Older version maintenance eventually leads to incremental support costs.

Risk 3

Reduced availability of critical business applications. Software code must be upgraded or rewritten to meet business SLA's.

Non-financial Benefits:

Upgrading to the new standards will keep the applications and technologies current, operational and secure.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

Reduction in vendor support and resources costs.

3. Total Cost (\$000)

\$89,000,000

4. Basis for estimate

There are 2 main components are included in the estimate.

- IT MSP Cognizant has conducted an assessment on our current technologies that need to be upgraded based on obsolescence. Using that as a guideline, IT will partner with Cognizant to establish forecasting and then refine estimates based on specific applications that require remediation. IT will establish a three-year plan to ensure completion of this important effort. Cognizant infrastructure support costs are approximately 30% of the total costs. A total cost of \$39M for outsourced and insourced applications has been estimated. As mentioned above our goal is to modernize 50 applications per year.
 - o \$24M for outsourced applications over the three-year period. This includes \$6M per year to Cognizant and \$2M per year internal labor.
 - o \$15M for the insourced applications. This includes \$5M per year for internal labor.
- A total of \$50M has been estimated for enterprise application rationalization and consolidation for technologies such as customer facing tools, messaging tools, mobility platforms and Azure Dev Ops, Git Hub and Code QL. Specialized skill sets and resources are warranted to develop and rewrite application code pipelines or migrate, test, and implement.
 - o An estimate for the migration of an application like TFS is ~\$5M dollars per year. This is inclusive of a project manager, development team (3 resources) as well as the IT and Cognizant resources to test the applications.
 - o We assumed 3-4 application consolidations per year at \$5M per application.

5. Conclusion

The project is critical for supporting daily business operations and moving to the latest software and hardware technologies and environment will help improve cyber compliance, application software management costs and reliability.

Project Risks and Mitigation Plan

Risk	Mitigation Plan
Compliance with end-of-life technologies	Work with vendors to identify timelines and develop and manage to project plans

Technical Evaluation/ Analysis

NA

Project Relationships (if applicable)

This impact all projects, initiatives and systems.

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

* * For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2021</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	0.0	32,000.0	29,000.0	28,000.0	0.0
Implementation O&M*						
Regulatory Asset						

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2021</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor			10,000.0	10,000.0	10,000.0	
M&S						
A/P			22,000.0	19,000.0	18,000.0	
Other						
Overheads						
Total	0.0	0.0	32,000.0	29,000.0	28,000.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2021</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings						
O&M Avoidance						
Capital Savings						
Capital Avoidance						

Total Ongoing Maintenance Expense by Year:

	<u>Request 2021</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M						
Capital						

4. Definitions

Total Funding Request: All funding requested for program or project over program/ project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

1. Project / Program Summary			
Type: Project ☒ Program		Category: ☒ Capital ☐ O&M	
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic			
Project/Program Title: XM10			
Project/Program Manager: Allisyn Glasser		Project/Program Number(Level 1): 20189302,10026339,10025947,10025111,10026908,10026509	
Status: ☐ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date: 1/11/2012		Estimated Date In Service:	
A. Total Funding Request (\$000) Capital: 97,704.3 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 0.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description: Items in XM-10 are critical computing components that support the infrastructure necessary to provide reliable and resilient data centers, networks and devices that support employees and applications. Device refreshes are required to support newer applications and the demand for computing resources is continually increasing due to the complexity of applications and cyber security scanning tools. XM10 supports all devices such as desktops, tablets, laptops, MDTs and printers. In addition to devices, XM10 supports infrastructure equipment, data centers and networks. The cost of running state of the art data centers continues to grow. Many applications specifically related to storm or event management require the appropriate redundancy and resiliency in place. It is essential that we continue to harden these environments with the appropriate investments and upgrades in server and storage infrastructure, mainframe, Internet facing technologies and networks (Local Area Networks (LANs), Wide Area Networks (WANs), wireless and fiber channel networks).			

In addition to providing reliable and resilient access to corporate systems, as the threat landscape continues to increase these investments are required to stay on current technologies to prevent against cyber concerns.

Key initiatives in 2023- 2025 include:

- Yearly refresh of devices including the desktop, laptop, tablet, printer, plotter, and MDT inventory
- LAN switches upgrades
- Expansion of departmental network segmentation
- Implement the next generation of Wi-Fi Infrastructure
- Refresh corporate service DMZ network hardware which allows for safe exchange of data to customers and partners
- Cloud DMZ implementation
- Refresh data center IP and fiber channel networks
- Data center retirement –Spring Valley
- Worth Street data center upgrades
- Collocation, leasing of a data center building, expansion
- New application infrastructure expansion
- Storage array upgrades
- Hyperconverged infrastructure expansion
- Back up, retention and disaster recovery technology expansion
- Hypervisor upgrades
- Server technology conversions and upgrades
- Server automation and container implementation
- Virtual Desktop Infrastructure (VDI) implementation
- Mainframe upgrades
- Firewall upgrades

Justification Summary:

Without the equipment in XM10, Con Edison's ability to provide reliable access to Company computing systems would be adversely impacted. This equipment is essential to the operation of the Company's daily business activities and is integral to all Company organizations. XM10 equips employees with technology and devices to access information and systems in the office, field, and remotely and ensures the core IT infrastructure is supportable, reliable, and accessible.

With the increased focus on technology modernization and N-1 versioning we need to efficiently manage various upgrades for devices and infrastructure.

The programs under the XM-10 budget support:

- Safety – private communications which provide isolation from public sources of vulnerability and enable Con Edison to respond rapidly to emergency situations and critical incidents over secure and segmented channels. These private communication systems provide reliable performance and highest priority for life-sustaining alerting and feeder relay protection. The equipment will be maintained in a vendor-supportable state and refreshed prior to its end-of-life cycle, which includes periodic security patches and hardware upgrades through our purchasing channels.
- Operational Efficiency – the communication, data computing, and networking infrastructure provides a stable and efficient platform for the applications and processes used by the various operating businesses to achieve and maintain high levels of

operational efficiency around telemetry, applications used by customer-facing personnel, workout locations, and backhaul from field assets. • Customer Enablement - the customer-centric applications used in the customer contact centers depend on the capital improvements work in our datacenters, wide and local area networks, and communications applications to provide a secure and reliable experience. This program addresses the need to meet current customer expectations for more information delivered in a variety of easily consumable formats such as mobile platforms, while also maintaining the security, integrity, and confidentiality of sensitive customer information.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)	
XM10 investments are essential to supporting the Company, especially CLCPA goals, grid modernization and operating strategies. As we look at new applications, ways to engage customers or even analytics around demand response, DERs or EVs, these infrastructure components are critical to support the growth, ongoing enhancements and future upgrades.	
Risk 1 Name: Unsupported technology in computer systems	Risk 1 Description: Replacement of old computer equipment. Required for software support, older equipment greater risk of security concerns, additional maintenance costs, and new technology required for in the field work.

2. Supplemental Information
Alternatives:
Failure to invest in this equipment would result in increased failures to access information and resources and introduce unbudgeted and unplanned costs to recover from failures and poses a cyber threat. Computer and network hardware are purchased in bulk and competitively bid to take advantage of volume discounts to optimize spend.
Risk of No Action: - o Increased Cybersecurity risks due to running unsupported equipment - o Performance issues while accessing Company systems - o Obsolete infrastructure due to not keeping up with latest technology - o Ability to provide business information in a timely fashion to employees would be impacted due to an unreliable environment. - o Decrease in the availability, reliability, and security of the company's resources - o Inability to implement new systems

Non-financial Benefits:

- o Essential for operations and support of Company processes
- o Increased employee productivity through system efficiencies
- o Stability to provide better performance of energy delivery systems and response to customer needs
- o Optimized operation of the corporation on a day-to-day basis with streamlined internal and external employee communication

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

XM10 requires a consistent increase to reduce our device obsolescence program and maintain N-1 versions on mainframe, networking and infrastructure components.

There are various major areas of spend to determine XM10 funding needs including devices, infrastructure equipment (network, back up, server and storage equipment), associated software licenses and labor for equipment handling. We have seen an increase of 25% for infrastructure growth throughout the years. For devices we are looking to replace approximately 3200 devices per year. We currently have approximately 22% of our devices that are obsolete.

Description	2021 Actuals	2023	2024	2025
Labor	\$ 675,000	\$ 843,750	\$ 1,054,688	\$ 1,500,000
Devices	\$ 3,000,000	\$ 4,000,000	\$ 4,000,000	\$ 4,000,000
Server and Storage Infrastructure	\$ 4,000,000	\$ 5,000,000	\$ 6,250,000	\$ 7,687,500
Software Licenses	\$ 1,500,000	\$ 1,875,000	\$ 2,343,750	\$ 2,679,688
Back Up Equipment	\$ 1,000,000	\$ 1,250,000	\$ 1,562,500	\$ 1,953,126
Network Equipment	\$ 750,000	\$ 937,500	\$ 1,171,875	\$ 1,339,844
SCADA Equipment (ScadaNet Project)	\$ 384,500	\$ 480,625	\$ 600,781	\$ 625,977
New Data Center Build Out and Equipment (Worth St. and NY5)		\$ 9,563,625	\$ 8,966,906	\$ 8,164,366
Total	\$ 11,309,500	\$ 23,950,500	\$ 25,950,500	\$ 27,950,500

2. Major financial benefits

NA

3. Total Cost (\$000)

97704299.9999	
4. Basis for estimate	
IT uses historical spend as well as reviews future planned growth to determine estimates. XM10 has continued to grow with the demand for technology to run our business.	
5. Conclusion	
XM10 is required to maintain effective, reliable, and secure technology operations for the Company.	
Project Risks and Mitigation Plan	
Risk	Mitigation Plan
none	
Technical Evaluation/ Analysis	
Technology solutions are carefully selected by studying products, conducting feasibility studies, and further calibrated with the short- and long-term business goals, IT strategy and planning process. A cross functional IT team, spanning cyber, subject matter experts, vendors and company employees participate in the decision-making process. Business teams play an equal role in selecting technologies to meet and implement business capabilities. In addition, standard RFP/ RFI processes are leveraged to implement the technology and deliver business capabilities.	
Project Relationships (if applicable)	
XM10 supports all major technology projects and operations.	

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital	21,191.0	15,722.5	8,831.1	23,887.4		10,745
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2021</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	13,704.3	8,259.0	23,950.5	25,950.5	27,950.5	24,950.5
Implementation O&M*						
Regulatory Asset						

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2021</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	1,000.0	1,000.0	5,000.0	6,000.0	7,000.0	5,000.0
M&S						
A/P	12,704.3	7,259.0	16,950.5	17,750.5	18,550.5	17,950.5
Other						
Overheads			2,000.0	2,200.0	2,400.0	2,000.0
Total	13,704.3	8,259.0	23,950.5	25,950.5	27,950.5	24,950.5

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2021</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings						
O&M Avoidance						
Capital Savings						
Capital Avoidance						
Total Ongoing Maintenance Expense by Year:						
	<u>Request 2021</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	0.0	0.0	0.0	0.0	
Capital	13,704.3	8,259.0	23,950.5	25,950.5	27,950.5	24,950.5

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: XM 8 Communications Equipment	
Project/Program Manager: Darrel Johnson	Project/Program Number (Level 1): XM0008
Status: ☐ Initiation ☐ Planning ☐ Execution ☒ On-going ☐ Other: _____	
Estimated Start Date: Ongoing	Estimated Date In Service: Ongoing
A. Total Funding Request (\$000) Capital: \$21,875 O&M: (see Telecom O&M whitepaper and budget).	B. ☐ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: (see Telecom O&M whitepaper and budget). Capital:	D. Investment Payback Period: (Years/months) (If applicable)
Work Description: The budget for XM8 is an ongoing yearly budget that provides the means for upgrades and expansion of the telecommunications equipment to support Company wireless and telephone networks, end user customized telecom solutions and subscriber equipment upgrades. This telecommunication technology enables employees to communicate and access business systems including the various process management systems: electric, gas, steam operations work processes, monitoring, and control systems, as well as a number of other systems like financial, human resources, and legal. Information Technology's Communications Operations Department is the control agent for XM8. The following equipment is covered under XM8: - Telephony and video equipment replacements and upgrades - Capacity increases and monitoring of various telephony and radio communications systems - Radio System capacity upgrades and technology refreshes - Handheld radio replacements - Antenna installations and replacements at Company cell sites - Voice over IP (VOIP) equipment - Conference room audio/video equipment - End user subscriber telephony equipment and terminals - Customized end-user telecom solutions	

Work planned in 2022-2026 includes:

- Upgrades to telephony network and devices
- Continue end of life replacement of handheld radios for Electric, Gas, and Steam. This is typically an ongoing exercise to keep up with the latest technology devices and is expected to continue throughout the entire rate period.
- Continue migration of VoIP technology at West End Avenue and substations ringdowns (direct dial point to point)
- Upgrade VoIP gateways
- Upgrade VoIP phones at multiple location to accommodate VoIP switch upgrades
- Upgrade voice recorder systems
- Upgrade conference room A/V equipment
- Upgrade mobile command center and trailer telecom equipment
- Deploy LEO satellite end points
- Pilot and implement new tactical communications
- Evaluate new and deploy Land Mobile Radio (LMR) technologies

In 2021, the following work was completed:

- Upgrade 12 CUBE's and 4 SME's devices on telephone platform
- Enhance VoIP communication by deploying approximately 800 Cisco softphones
- Replaced 30 handheld radios and deployed an additional 50 radios to support Gas operations
- Installation of one Unlicensed Microwave radio system
- Replaced 10 VG's and 7 PRI's gateways that support VoIP platform
- Evaluated new IP based dispatch console systems
- Integrated existing radio dispatch console system with a major carrier
- Upgraded telecom systems in Mobile Command Centers and completed designs for newly built command trailers

Justification Summary:

The XM8 general equipment category upgrades, expands and implements voice and telephony telecommunications tools that leverage both wireless and wired technology. This includes telephones, radios, antennas, and associated electronic components necessary to provide private voice and data services as needed by operating areas. It also encompasses special custom designs to provide backup tactical communications to support restoration associated with major events like storms.

Equipment covered in XM8 is essential in enabling critical communications for the different operating units (electric, gas, steam) during normal operations and more importantly during storm events for customer restorations.

Reasons for significant incremental increase

Reasons for the significant increase are a complete replacement of the mobile land radio system, significant expansion in-building cellular systems in preparation for 5G and continued upgrade and replacement of collaboration telecom equipment at all conference rooms to replace the legacy Polycom system with Teams native infrastructure to ensure seamless interoperability with the Microsoft Teams cloud service that was successfully used during the pandemic.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Due to the dispersed nature of the operations across all commodity businesses, the communications and mobility capabilities provided by the equipment and systems of this program underpins and is indispensable to corporate long-range plans in the day-to-day activities and particularly during emergencies when mission critical tactical communications is the foundation of an effective and rapid restoration effort.

2. Supplemental Information

Alternatives

Alternatives include increased reliance on carriers and expense increases for ongoing lease costs for telephony and field communications. Yet even under that scenario, telephones including desk phones, wall phones, console phones and cell phones would need to be purchased. Telecommunications equipment is purchased in bulk and competitively bid to take advantage of volume discounts. Information Technology has initiated programs, such as equipment standardization, to optimize these costs. Using the same manufacturer (i.e., Motorola, Ericsson) has allowed the Company to obtain larger discounts. Information Technology has been utilizing contract negotiation best practices for price and duration of contracts.

Risk of No Action

No action would likely result in multiple communications equipment failures including telephone systems, data circuits, radio systems, and protection circuits as a result of the inability to purchase spare parts and maintain supportability of the communication systems. In that case, availability of critical communications systems would be severely reduced. Reliable communications systems and distribution automation systems are required to support field customer restoration activities and the automation of the distribution system to maintain electric, gas, and steam services. This equipment is essential to provide both system reliability, customer service as well as employee safety.

Non-Financial Benefits

The proposed projects offer the following other benefits:

- o Provides carrier diversity to critical communication circuits
- o Offers security controls
- o Provides a higher reliability level than carrier circuits
- o Scales capacity over time through card replacements

- o Improves recovery time from communications failures
- o Provides services outside of the Telco carriers
- o Avoids construction delays and costs needed for carrier services

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

The financial benefits include cost avoidance to maintain legacy equipment and subscriber devices due to lack of vendor expertise.

3. Total cost

The total capital costs are estimated at \$21,875,000 for the rate years. Ongoing O&M costs associated with this project is included in the Telecom O&M whitepaper and budget.

4. Basis for estimate

Estimates are generated from Company engineering resources using recent cost information, maps, existing street conditions, and historical projects factoring cost increase for technological improvements in next generation equipment. Any purchases are made through competitive bids.

5. Conclusion

This project should continue because of the immediate operational benefits realized so far and for the strategic benefits described above.

Project Risks and Mitigation Plan

The major risks to XM8 equipment and systems are the unavailability of direct replacement for some of the older technologies and appliances that have been migrated to purely software-based solutions, middleware and cloud services which do not provide the resilience and durability and mission critical performance under challenging circumstances. There is also the risk of greater cyber vulnerability as the end devices depend more and more on code. These risks are managed by careful, early, and thorough evaluation of the replacement technologies and more emphasis on cyber risk assessment as opposed to focus on raw performance. Custom solutions must balance cost and long-term supportability by shortening the life cycle of the new systems by more frequent technology assessments.

Technical Evaluation / Analysis

XM8 equipment has an extended life and is replaced in 10–15-year increments. This equipment is mostly carrier grade communications equipment to support voice and other communication requirements. Information Technology performs planning and analysis on all technologies introduced. Solutions are investigated in conjunction with the IT strategy and vision planning process. Collaboration between IT advisors, carriers, vendors, and Company employees helps to ensure the selection of optimal solutions.

Project Relationships (if applicable)
IT projects, completed or future, require and expect sufficient performance of the telecom network, systems, special purpose applications, subscriber equipment and services.

3. Funding Detail

Historical Spend

	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2021</u>
Capital	<u>3,155</u>	<u>2,640</u>	<u>1,922</u>	<u>2,400</u>	<u>1,805</u>	<u>2,426</u>
O&M						

Total Request (\$21,875):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	<u>2,054</u>	<u>3,875</u>	<u>9,000</u>	<u>9,000</u>	<u>2,500</u>
O&M*					

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor					
M&S					
Contract Services					
Other					
Overheads					
Total	<u>2,054</u>	<u>3,875</u>	<u>9,000</u>	<u>9,000</u>	<u>2,500</u>

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M					
Capital					

*If whitepaper is supporting a capital project/program this refers to implementation O&M. Ongoing O&M costs associated with this project is included in the Telecom O&M whitepaper and budget.

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Project Status:

- Initiation – New project, not authorized yet
- Planning – Project authorized, not started yet
- Executing – Project in-flight
- On-going – Annual program

Information Technology Panel

Exhibit IT-3

Common IT Projects

Item #	Program Name	Page #
1	Budget System Enhancements	2
2	ERM - Archer Software	7
3	Learning and Inclusion Digital Learning Transformation	14
4	Mobile EHS SME	21
5	Obsolete Oracle GRC Software Replacement	26
6	Phased Replacement of Legal Technology	32
7	Rate Case Enhancements	42
8	Vertex/Sabrix Oracle Add-On	48
9	Soft Tissue Injury Prevention Project	53
10	Third Party Risk Management Program	58

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset		
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: Budget System Enhancements			
Project/Program Manager: John Durning Jr.		Project/Program Number(Level 1): 20613824	
Status: ☐ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date: 8/1/2015		Estimated Date In Service:	
A. Total Funding Request (\$000) Capital: 9,665.0 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 441.6		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
This project represents an ongoing investment in the continuation of the Company's move from the legacy Hyperion Planning (HP) suite of planning and budgeting applications to the newer Enterprise Planning and Budgeting Cloud Service (EPBCS) technology platform. EPBCS was successfully implemented in 2020 and utilized for the 2020 planning cycle for the first time. Through implementation and based on user experience we continue to implement enhancements to the tool to provide additional reporting capability, better integration of actuals and forecasting processes, data maps and data governance processes. The enhancement work is expected to continue through 2023. Starting in 2024 funding is earmarked to integrate updates and processes that result from the Oracle Human Capital Management (HCM) project and Oracle EBS cloud migration project. Data integration, inputting data once, and a single source of the true are core tenants of cloud based financial systems. In order to enable this single input and single source of the truth, all systems (financial and non-financial) must be integrated. To enable this integration, each system must have common data definitions for things like Account, Geography, Management Unit, Legal Entity, etc. For ePBCS specifically the following integrations will be critical to meet the requirement of FP&A and the business: 1. HCM to Workforce planning: Headcount, salary, title, department, user permissions and other data fields will be pulled directly from HCM rather than re-input into ePBCS. This will be used not only to support production of plans (head count and labor costs) but will also be supported for access provision and validation rules within ePBCS. As such, we need to make sure the inbound data can be integrated with or mapped into the current structures which are in ePBCS today.			

2. **Fusion Cloud to ePBCS:** Both the projects module, as well as other GL data (Revenue, other expenses, equity, other items, statistical accounts, etc.) will be integrated into ePBCS. This enables all plan to actuals analysis to occur in the planning application. It's critical that the source of actuals data (projects and the GL) be of a complementary structure to how plans and forecasts are produced in ePBCS. This will enable less effort in the production of forecasts and plans, and easier interpretations of variances between actual and plan.

The integrations of these two systems, aside from technology and data considerations, will have upstream and downstream impacts on timing and process (e.g., timing of Manual journal entries in Cloud EBS need to be considered in the consolidated plan (ePBCS) and actual (FCCS) tools. Due to these close linkages of process, data, and technology, it is critical that the current ePBCS application configuration is updated in sync with the changes in those source applications.

Justification Summary:

This program will ensure the planning and budgeting tools at the Company are maintained and enhanced to allow for efficient and effective budgeting and planning processes. The system is critical in providing accurate planning forecasts for internal budget reviews and approvals and regulatory proceedings such as rate cases.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name: Department. Finance. Quality of Forecasts & Quality of Internal Financial Reporting

Risk 1 Description: Adding headcount and other HR analysis to BI

2. Supplemental Information

Alternatives:

As data maps and underlying processes change through the implementation of the HCM project and Oracle cloud project the integrations to the budget system must be maintained. The alternative would be to maintain these changes offline and manually map data and workflows into ePBCS.

Risk of No Action:

Failure to be able to accurately forecast and budget various planning items such as O&M, Capital, net plant, and depreciation. This would significantly impact on the Company's ability to plan for future budget years and submit rate case projections.

Non-financial Benefits:

Enables an effective and efficient budget and forecasting process for the Company. Avoids the use of many offline calculations and /or manually updated spreadsheets to produce accurate and reliable financial projections.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

3. Total Cost (\$000)

All Previous Actuals (16,071.6) + Cur. Yr. Sanctioned Forecast (1,732.6) + Next 5 Years Est. (9,577.0) = Total Cost (27,381.1)

4. Basis for estimate Historical cost basis.

5. Conclusion

The budgeting system is a fundamental system for developing the Company's financial plans and submitting rate cases with accurate and timely data. As such the investments needed to ensure proper integration with other Company systems as well as to continue to enhance the tools functionality and output are critical.

Project Risks and Mitigation Plan

Risk	Mitigation Plan
New Cloud Technology	Continue to work with partners from Oracle to ensure new technology and updates are incorporated into plans appropriately.

Technical Evaluation/ Analysis

Project Relationships (if applicable)

Human Capital Management (HCM) implementation
Oracle EBS to cloud

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital	1,966.8	1,277.7	4,438.5	4,277.9		1,732.6
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):
Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	827.0	750.0	3,500.0	3,500.0	1,000.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project / program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	0.0	75.0	350.0	350.0	100.0
M&S					
A / P	827.0	637.5	2,975.0	2,975.0	850.0
Other					
Overheads	0.0	37.5	175.0	175.0	50.0
Total	827.0	750.0	3,500.0	3,500.0	1,000.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	71.4	72.8	74.3	75.8	77.3
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program / project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M	☐ Regulatory Asset
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic		
Project/Program Title: ERM - Archer Software		
Project/Program Manager: Connie Kwan-Fung		Project/Program Number(Level 1): 24646604
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :		
Estimated Start Date: 1 / 2 / 2023		Estimated Date In Service: 6 / 30 / 2024
A. Total Funding Request (\$000) Capital: 2,019.0 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 428.0		D. Investment Payback Period: (Years/Months) (If applicable)
Work Description:		
The objective of this project is to implement a software solution (i.e., Archer a Governance Risk and Compliance (GRC) Software) to automate, standardize, and centralize the Enterprise Risk Management (ERM) and Sarbanes-Oxley (SOX) framework and workflows. This will require the procurement of four ERM/ SOX related modules (i.e., Control Monitoring Program Management, Top-Down Risk Assessment, Bottom-Up Risk Assessment, and Key Indicator Management) and the hiring of a consultant to gather requirements, design, implement, test, and deploy the software solution. This project is driven by recommendations derived from the following: 1) Audit of ERM framework and management of risks, 2) an external consultants review of assurance functions for fit and alignment to Archer's use cases and capabilities, and 3) ERM key stakeholder feedback sessions.		
Justification Summary:		
ERM's framework is a manual process that uses Microsoft Office to interact with over 250 employees and manage hundreds of documents. Similarly, SOX's framework also employs Microsoft Office to interact with over 200 employees throughout the Company. ERM and SOX are looking to procure a software to electronically support their respective processes and have a direct user interface for inputting and collecting risk and control information, including a database to retain historic data with easy extraction and version control, and that has customizable reports and dashboards. The benefit realized from a SOX perspective will be a centralized repository of controls with automated workflows for approval. This will greatly reduce the burden of manual sign off by business and improve the stakeholder experience. Additionally, the tool will assist with tracking material changes within our control environment.		

This software will help address ERM's current challenge of having poor visibility into the interrelationships between risks and their associated attributes, which is an integral part of monitoring and reporting the Company's risk exposure. Additionally, these attributes are not currently tracked in real-time, are not easily accessible, and are allocated across various software (i.e., Microsoft Excel, PowerPoint and Word). The procurement and deployment of these modules are in response to the recommendations of external parties, which include:

- 1) This year the ERM program was audited, by Internal Audit, to determine the adequacy and effectiveness of the ERM framework design and management of corporate and department risks. Auditing deemed the ERM controls sufficient, however they advised on the following observations and solutions:

Recommendation: Leverage GRC Tool

- Observations
 - Documentation is shared manually through a shared network drive and emails
 - ERM requirements are not always updated in a timely manner nor systematically tracked
 - ERM activities are reliant on key people and institutional knowledge to perform responsibilities
- Proposed Solution
 - Utilize a GRC tool to centralize documentation and increase visibility across the organization
 - Allows for continuous improvement opportunities across workstreams, reduces the amount of manual labor in ERM activities, and increases visibility across internal stakeholders

Recommendation: Automate KRI Monitoring Process

- Observations
 - There is a defined foundation for monitoring and reporting while looking for improvement opportunities
 - Few automation tools are being used, leading to processes that are manual and time-consuming
 - Current KRI monitoring is more reactive than proactive in nature
- Proposed solution
 - Begin adoption of continuous monitoring processes with an automation roadmap
 - Leverage an RPA or ETL tool to support KRI monitoring and reporting
 - Adopting automaton will encourage a more proactive risk management mindset throughout the enterprise

- 2) This year, an external consultant assessed SOX, ERM, and other assurance functions fit and alignment to Archer's use case and capabilities and developed an Archer Roadmap. ERM and SOX reviewed the consultant's recommendations and has decided to action those that are appropriate and align with Audit's observations.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Business Model	Risk 1 Description: The ERM program's emerging issues and trends matrix and insights are used as a mitigation control for this risk.
Risk 2 NY Regulation	Risk 2 Description: Improve stakeholder relationships and confidence levels in the Company's management of its most material risks, particularly for regulators and investors.

2. Supplemental Information

Alternatives:

ERM and SOX researched alternative software solutions (e.g., CURA, Workiva, and Service Now, Navex) to ensure it aligned with IT's principles of Promoting One Enterprise, Excel at the Basics, Foster / Promote Innovation, and Implementation Methodology Ensures Speed, Flexibility & Simple Design. In particular, the Oracle suite was analyzed and that system does not currently house the capabilities that is needed by ERM/SOX. The Company—via Compliance Management—has already made a significant investment in utilizing RSA Archer as its enterprise compliance management and action tracking software. ERM, in collaboration with Compliance Management, has also made an initial investment of \$143,000 in 2018 procuring a pilot prototype in RSA Archer for risk management and, in 2020, made another investment of \$199,000 to hire a consultant to perform an assessment of assurance functions fit and alignment to Archer's use cases and capabilities and to perform an in-depth ERM Program Assessment. The consultants were also tasked with advising if there were better software options than Archer to perform assurance related tasks. They recommended the best option is to build out functionality to support the ERM and SOX process within the Company's existing platform. RSA Archer has the potential to be expanded in the future to support other Governance Risk and Compliance (GRC) functions across the enterprise, including operations risk management, quality management, supplier relationship management and audit functions

Risk of No Action:

The ERM program is currently excessively manual in nature, which may result in delays in collecting risk information and reporting and managing the Company's level of risk exposure to its most material risk. These risks should leverage real-time data and permit the Company to identify, mitigate, monitor and report risks in a timely manner. Without proceeding with this project, the Company would continue to utilize current manual processes using Microsoft Office. Current processes are not standardized, are manual in nature, have poor visibility into the interrelationships between risk and associated attributes, and do not support efficient information sharing across the Company thereby increasing the risk of process fatigue, human error, and not leveraging the real-time data to reduce and manage risk.

Non-financial Benefits:

Risk Reduction

- Consolidated view of parent and child risk attributes improves monitoring and reporting the Company's risk exposure and effectiveness of their mitigation activities and controls
- Real time information to inform actionable insights
- Increased access to risk related information
- Align business processes, objectives, controls and risks
- Operational efficiencies gained from utilizing a common control testing platform for evaluating the effectiveness of controls used to demonstrate compliance and mitigate risk.
- Transparency and visibility of the impact of business activities on risk and compliance objectives at departmental and corporate levels.
- Governance with managed processes that improve the baseline performance and effectiveness of risk mitigation and compliance activities.
- Reduction of manual controls sign off by business and improve the stakeholder experience for SOX.
- – Reduction in time required to query, analyze, and report on data (e.g., Corporate Risk Report)

Efficiency

- Automation of manual processes, reducing process fatigue
- Standardization of GRC functions saves resources
- Accelerated work delivery supported by greater collaboration and mobility

Accountability

- Clear roles and responsibilities
- Accountability for policies and /or controls

Collaboration

- Drive coordination across the three lines of defense
- Sharing of best practices

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

We expect to see process efficiency gains for ERM staff and its stakeholders, but do not expect and FTE reductions to result from this investment.

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (2,019.0) = Total Cost (2,019.0)

4. Basis for estimate

The estimate was prepared in partnership with IT, external consultant, and benchmarking. The major elements of work for this project include:

- Capital
 - o Procurement of four ERM/SOX related modules (i.e., Control Monitoring Program Management, Top-Down Risk Assessment, Bottom-Up Risk Assessment, and Key Indicator Management)
 - o Hiring of a consultant to gather requirements, design, implement, test, and deploy the software solution
 - o IT labor to assist the consultants to design, build, and deploy modules
 - o IT and vendor support during the stabilization period, post-deployment
- O&M
 - o Server hardware and maintenance
 - o Ongoing IT/Cognizant support and maintenance
 - o Ongoing licenses for Risk Catalog, Control Monitoring Program Management, Top-Down Risk Assessment, Bottom-Up Risk Assessment, and Key Indicator Management

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan
Technical Evaluation/ Analysis	
In 2020, ERM hired a consultant to evaluate assurance functions fit and alignment to Archer’s use cases and capabilities and to perform a detailed ERM program fit assessment. ERM and SOX decided to action their recommendations. In 2018, with the assistance of a consultant, ERM led a risk management pilot to build an Archer in prototype for ERM’s existing framework. Additionally, ERM benchmarked with many other utilities to identify best practices and lessons learned (e.g., National Grid).	
Project Relationships (if applicable)	
This project is closely related to the Compliance Management’s previous RSA Archer projects and current effort with IT to re-build Archer servers with additional capacity and improved architecture. Additionally, if Third Party Risk Management Software and Services Project receives funding and selects the Archer platform, then the ERM, SOX, and TPRM project collaboration could resulting cost savings and project dependencies.	

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital				-		
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	1,798.0	221.0	0.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/ program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor		203.0	81.0		
M&S		217.0	0.0		
A / P		1,130.0	90.0		
Other		120.0	7.0		
Overheads		128.0	43.0		
Total	0.0	1,798.0	221.0	0.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	16.0	103.0	103.0	103.0
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program / project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M	☐ Regulatory Asset
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic		
Project/Program Title: Learning and Inclusion Digital Learning Transformation		
Project/Program Manager: Zoryana Gavrilova		Project/Program Number (Level 1): 23289195
Status: ☐ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other :		
Estimated Start Date: 3/1/2022		Estimated Date In Service: 1/1/2024
A. Total Funding Request (\$000) Capital: 14,314.0 O&M:		B. ☒ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: 75.0 Capital:
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 3,700.0		D. Investment Payback Period: (Years/Months) (If applicable)
Work Description:		
This project will provide the necessary innovation and technology to transform and improve our employees learning experience and performance. To achieve this, we must: · Assess current training methodologies and curriculum inventory · Create training governance process and policies by: ☐ Benchmarking across major industries including the Utility industry ☐ Stakeholder assessments · Develop a digital learning platform consisting of : ☐ Replacement of the existing Learning Management System (LMS) ☐ Integration of multiple technology solutions to provide an efficient mix of systems, hardware, software, and process development for the enterprise. ☐ Use of corporate IT integrated solutions that cross organization needs, e.g., Cloud based Video and life cast training. · Implement new the learning strategy to: ☐ Deliver the enhanced employee learning experience to the employee, improving engagement and retention ☐ Improve employee performance in the work place ☐ Meet organizational training needs, optimize training hours, and comply with regulatory training requirements. The project team will develop a learning strategy that will transform how we prepare our employees to meet the challenges of a rapidly changing work environment as technology and innovation shape the future of the utility		

business. The objective is to create a learning platform that embraces employee development, has the ability to address new technology and training methods and provides the best training experience at the right time and place. Using design principles and a data-driven approach, we will redesign and or replace key processes and systems over multiple years. This includes the replacement of the current LMS system and integration of a Cloud based platform to support a mobile learning philosophy that will place training tools into field for the employees use. This process will enable us to manage the entire learner experience benefiting our learners, the organizations we support, our stakeholders and ultimately the company's performance.

The goal is to establish and sustain an excellent training culture through innovative learning solutions by:

- Creating dynamic learning experiences that build on our strong foundation using state of the art technology.
- Developing the scope, approach and design of each element of the project, cognizant of the interrelationships between them.
- Identifying activities, processes, and systems for improvement
 - o Establish a governance Process.
 - o Evaluating training proficiency and cost effectiveness
 - o Establishing performance measurement, control plans and reporting around training
- Delivering optimal learning strategies to meet changing business needs.
- Promoting and growing a strong learning culture.
- Expanding the learning beyond the classroom.
- Enhancing and modeling Diversity and Inclusion as an integral part of the learning experience.
- Collaborating with our Stakeholder to respond to changing or developing needs such as the current AMI project and future BCO initiatives.
- Realizing O&M costs savings implemented in phases throughout the project, e.g., reduce reproduction costs, resources and optimized training curriculum

These projects form the cornerstone of L&I's Business Cost Optimization (BCO) initiative and provide the core learning foundation successfully meet future enterprise needs.

Justification Summary:

· **Justification:**

Today's learners' expectations, the changing utility landscape, the external pressure of innovation and technology combined with an enterprise need to have a flexible work force are driving this initiative. The adoption of online and digital learning models continue to accelerate at a rapid pace, changing the way individuals learn and how training is delivered. This shift is transforming traditional learning.

Integrating new learning technologies and instructional design is an effective way of training today's workforce. The speed and flexibility of mixed learning is imperative to enhancing the learning experience and productivity of the modern workforce, as training continues beyond the classroom.

To maximize the benefits of training it is imperative the training goals of the company are in alignment with the Company's top priorities: safety, operational excellence, regulatory compliance, and the customer experience.

Starting in 2019 and continuing over the next five years, we will transform the delivery and absorption of training material from an instructor-led walled classroom to one where an SME utilizes mix of digital material and physical, mobile and virtual environments.

The goal of implementing targeted cognitive learning strategies is to:

- Increase technical proficiency, employee safety, operational excellence, a measurable impact to the business and the ability to react dynamically in a technical environment with a compressed learning curve.

- Infuse and reinforce a motivation toward continuous learning and the ability to gather and analyze situations and data to support business and customer needs.
- Prepare the workforce for a rapidly changing environment by enabling them to learn and process information from digitally available resources that are updated in real time not subject to publication dates.
- Set in place a series of evolving steps to reach the digital learning vision.

Tactics include, but are not limited to:

- Integrating a mix of learning tools and approaches utilizing technology e.g., e-Books, Mobile content, Virtual/ Augmented Reality.
- Providing various delivery channels for training content to enable greater access and improved /same proficiency e.g., Mobile devices, enhanced learning spaces. Distance learning.
- Optimizing the level of training per employee for safety, job requirements, promotions, advancement, etc.
- Ensuring the cost effectiveness of learning.
- Acting as a standard and resource for good pedagogy for the enterprise and the center of learning.
- Reviewing, updating and creating policies and procedures for training governance.
- Responding to the speed of business and ensuring agility to respond to events and changing customer needs e.g. Just in Time training.
- Benchmarking to ensure continuous improvement and effectiveness of learning e.g. Training hours per employee.
- Improving employee-learning Journey to attract, develop and retain qualified employees.
- Integrating customer initiatives to ensure holistic approach and efficient use of resources.
- Provide appropriate learning spaces and technological tools for enhanced learning.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Safety	Risk 1 Description: Inadequately trained employees increase safety risks to our employees and members of the public.
Risk 2 Safety	Risk 2 Description: Reduces risk of being out of compliance with regulatory requirements and corporate policies
Risk 3 Name: Legal Compliance	Risk 3 Description: The risk is an increased likelihood that the company would not meet regulatory requirements because system does not easily track and document and control these regulatory training requirements
Risk 4 Name: Adequacy of TLC Safety & Operational Standards	Risk 4 Description: The inability for TLC to provide adequate and relevant training to address safety and operational skill requirements
Risk 8 Name: Major Storm	Risk 8 Description: The project provides the necessary digital tools and systems that can provide critical training to the employees at any time and place and allows the company to respond in an expedited manor to insure employees are properly trained and in compliance.

2. Supplemental Information

Alternatives:

Alternatives: Maintain current training programs and processes.

Risk of No Action:

Risk of No Action:

- Dependence on manual processes to update and maintain learning materials, including content associated with regulations, procedures, and regulatory requirements.
- Outdated distribution channels (VHS, physical presence) resulting in unmet demand, increased costs and loss of learner engagement.
- Inability to leverage existing and emerging technologies to improve the learner experience.
- Being out of alignment with instantaneous, self-paced and continuous learning that everyone expects (YouTube, Coursera).
- Not achieving optimal performance and proficiency of our learners, and loss of employee potential because of the cost and constrained supply of physical classrooms.
- Increased difficulty to measure training effectiveness.
- Difficulty in achieving cost optimization targets.
- Inability to systematize governance.
- Obsolescence of existing platforms.

Non-financial Benefits:

Non-financial Benefits:

- Long-term sustainability as a state of the art learning organization.

Direct non-financial strategic value through increases in compliance, safety, and more widespread skill proficiency and development.

24/7 access to training and the agility to respond to demand with revised / new training.

On-demand content that engages the learner.

Incorporation of visual interactivities to maximize student engagement.

- Refinement of course content, which may potentially reduce seat time and return employees to the field sooner.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

Summary of Financial Benefits (if applicable) and Costs:

The long-term cost avoidance associated with this program includes instructor facilitation costs, materials, travel expenses, and reprographics costs. It should be noted that this may not be a direct dollar savings as increased training needs by the organization can be handled with current staffing and overhead costs. Within the enterprise, we anticipate reduced labor costs associated with time and travel and increased productivity.

§ Financial Summary

- o This will be a significant part of the \$1 Million dollar savings over a five-year period as noted in our BCO training charter. The remaining BCO savings will come from other O&M initiatives. This order of magnitude savings could increase subsequent to the completion of the phase Zero analysis.
- o Elements of the project will be placed in service in incremental stages resulting in partial cost savings throughout the five-year period.

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (14,314.0) = Total Cost (14,314.0)

4. Basis for estimate

· Basis for Estimate:

The estimates provided in this document are order of magnitude only, and require additional scope of work development and detail along with IT review.

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

- Technical Evaluation / Analysis:
 - o IT evaluation of solutions required

Project Relationships (if applicable)

Project Relationships (if applicable):

- New to the 2019 Capital Budget Optimization process will be an IT Optimization of the portfolio of IT projects. This review will determine the integration and necessary upgrades, enhancements, and / or replacements of system hardware and software to support this project.
- Additional IT Projects may be required because of the existing LMS replacement. Evaluation of current functionality and proposed new functionality will be provided, so that decisions to retain or sunset functionalities by user groups can be made.

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	464.0	5,000.0	4,250.0	3,100.0	1,500.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project / program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor					
M&S					
A / P					
Other	464.0	5,000.0	4,250.0	3,100.0	1,500.0
Overheads					
Total	464.0	5,000.0	4,250.0	3,100.0	1,500.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings			25.0	25.0	25.0
O&M Avoidance			25.0	25.0	25.0
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	350.0	600.0	1,600.0	2,600.0	3,100.0

Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program / project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary			
Type: ☒ Project ☐ Program		Category: ☒ Capital ☐ O&M ☐ Regulatory Asset	
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: Mobile EHS SME			
Project/Program Manager: Peter Cooney		Project/Program Number(Level 1): 23322599	
Status: ☐ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date:		Estimated Date In Service:	
A. Total Funding Request (\$000) Capital: 2,174.0 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 40.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
Develop a Mobile Environmental, Health & Safety (EHS) Subject Matter Expert (SME) system that uses technology to allow field personnel to communicate by use of a personal body camera and microphone with EHS SME personnel 24 by 7. The system would also be used to communicate with various commodity Operations SME personnel for complicated work tasks that may require additional or enhance Job Briefings			
Justification Summary:			
Typical overhead work involves working on live cable in various voltage classifications (4 kV, 13 kV, 27 kV). Company procedures govern most of these work tasks but often the choice made by the employee on the work location dictates the protective devices that are actually used. Typical gas leak repairs also are governed by			

Company procedures but field decisions are required to be made by the mechanic at the location. The ability to have an SME review the conditions in real time mitigates risk of serious injury for these types of situations.

The use of body-cams that link to a cloud type environment will allow both control room personnel, field supervisors and EHS personnel to view in real time the work that is being done on energized lines. This body-cam would also have a person down feature for emergency crews that work without a second person.

The body-cam would also allow a real time recording to be stored in the cloud environment for lessons learned and teachable moments.

Con Edison has reduced the number of injuries to employees, but the Company still experiences High Hazard Injuries. Con Edison has implemented a number of safety programs to reduce these injuries, however, the Company continues to seek further reductions in injuries. High Hazard Injuries are often life altering for the individual or individuals involved in the event. These injuries include arc flash burns, gas ignition burns, fractures and other serious life altering injuries. In many cases these individuals are not able to return to work or can no longer perform the tasks and duties that they were trained to perform.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name: Safety

Risk 1 Description:

Ability to use technology for real time discussions relating to safety, environmental, "just in time" training and technical issues.

2. Supplemental Information

Alternatives:

Physically presence of the field supervisor or EHS SME required at site of event.

Risk of No Action:

Field crew making an error involving risk to safety or environment

Non-financial Benefits:

Reduction in safety injury incidents, operating errors, "Rules We Live By" incidents, video and audio record

of a “close call”. Ability to dial up by the EHS SME to ensure 100% compliance

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

N/A

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (2,174.0) = Total Cost (2,174.0)

4. Basis for estimate

The basis of the estimate is derived from the conceptual scope of work.

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

To be accomplished during a Phase 0 process

Project Relationships (if applicable)

None

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

* * For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	1,000.0	1,000.0	174.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	0.0	200.0	200.0	24.0	
M&S	0.0	300.0	300.0	40.0	
A/P	0.0	400.0	400.0	100.0	
Other					
Overheads	0.0	100.0	100.0	10.0	
Total	0.0	1,000.0	1,000.0	174.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	10.0	10.0	10.0	10.0	
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☒ O&M
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Obsolete Oracle GRC Software Replacement	
Project/Program Manager: Tracy Lau	Project/Program Number (Level 1): 24626913
Status: ☒ Initiation ☐ Planning ☐ Execution ☐ On-going ☐ Other: _____	
Estimated Start Date: 2023	Estimated Date In Service: 2024
A. Total Funding Request (\$000) Capital: \$449 O&M: \$60	B. ☐ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: n/a Capital: a/a
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: Capital:	D. Investment Payback Period: (Years/months) (If applicable)
Work Description: Current Oracle Governance, Risk Management, Compliance (GRC) on-premises software will be unsupported by Oracle as of 5/31/23. Additionally, GRC will lose functionality when the company moves to Oracle cloud-based services as the two applications are incompatible. The expected timeline for the Oracle cloud conversion is 2024, with the project anticipated to commence in 2023. Based on the aforementioned timeline, funding for implementation is needed in 2023. The objectives of implementing the GRC software replacement include: streamlining ERP Cloud role design for security and segregation of duties, automating the internal controls and compliance processes that ensure financial reporting integrity, and continuously monitoring for insider threats and policy violations. This will require the procurement of modules to cover the existing functionality of Oracle GRC which includes Transaction Controls Governor, Configuration Controls Governor and Applications Access Controls Governor. Additionally a consultant will be required to gather requirements, design, implement, test, and deploy the software solution.	
Justification Summary:	

SOX is looking to replace Oracle GRC on-premises and procure a software to electronically support its segregation of duties analysis on the Company's General Ledger (GL) platform (Oracle) and transaction monitoring across Consolidated Edison Company of New York and Orange and Rockland Utilities in the cloud platform, to be compatible with the Oracle ERP cloud implementation . The software will ideally have the future capability of being integrated with other applications, such as the Treasury Management System, PowerPlan, ServiceNow, and our GL platform, in addition to providing access provisioning capability.

The benefit realized from a SOX perspective will be a centralized internal control monitoring tool with automated prompting for resolution of issues identified.

Recommendation: Leverage GRC Tool

- Observations
 - SOX transactional controls are not systematically monitored in a tool.
 - SOX activities are reliant on key people and institutional knowledge to perform responsibilities
 - SOX documentation is manually prepared and updated .
- Proposed Solution
 - Allow for continuous improvement opportunities across workstreams
 - Reduce the amount of manual labor in SOX activities
 - Increase visibility across internal stakeholders

Recommendation: Automate Transaction Monitoring Process

- Observations
 - There is a defined foundation for monitoring and reporting while looking for improvement opportunities
 - Few automation tools are being used, leading to processes that are manual and time-consuming
 - Current monitoring is more reactive than proactive in nature
- Proposed solution
 - Begin adoption of continuous monitoring processes with an automation roadmap
 - Adopting automaton will encourage a more proactive risk management mindset throughout the enterprise

- Benefits of GRC Tool
 - GRC Tool supports current SOX controls (segregation of duties analysis, transaction controls within Purchasing)
 - GRC Tool will drive automatic action and issue information sharing as required and designed. through the identification of access conflicts and transaction anomalies
 - Tool can be leveraged to automate additional SOX Controls in the future which are currently performed manually providing opportunity for cost savings

Strategic Driver Alignment: Reducing and managing financial misstatement risk, strengthen company processes, promote "One" enterprise, excel at the basics

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

The purpose of the SOX organization is to provide guidance for and oversight of the continuing design, documentation, review, results of testing, and updating of internal controls over financial reporting for compliance with Section 404 and Section 302 of the Sarbanes-Oxley Act of 2002 (SOX). The Company has the obligation to meet these regulatory requirements. The SOX program impacts the identification, assessment, mitigation, monitoring, and reporting of financial misstatement risks.

This software solution will improve the Company's ability to better mitigate/improve controllability for the risk of financial misstatement and adhere to regulatory requirements through continuous transaction monitoring and automated notifications of issues requiring resolution. For information regarding the benefits of the solution, please see above.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection

The Oracle Cloud product that could replace the existing on-premises Oracle GRC software is unable to integrate with other software platforms outside of Oracle, limiting desired use cases. Additionally, it does not have capability to manage user access provisioning. Functionality and use-cases would be limited compared to alternative software provided by other marketplace participant.

Risk of No Action

Risk 1

Inability to execute SOX controls including Segregation of Duties Analysis. SOX controls are required to be executed annually and no action will result in potential non-compliance.

Non-Financial Benefits

Enhance regulatory compliance as well as increased efficiency for our stakeholders in executing their SOX internal control processes

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

We expect to see process efficiency gains for SOX staff and its stakeholders, but do not expect FTE reductions to result from this investment. Ongoing maintenance O&M is expected to increase \$20K per year.

3. Total cost

4. Basis for estimate

The estimate was prepared in partnership with IT, external consultant, and benchmarking. The major elements of work for this project include:

- Capital
 - Procurement of SOX related modules (i.e., Application Access Controls Governor, Transaction Controls Governor, Configuration Controls Governor) and SOX project manager labor to support the life cycle of the project
 - Hiring of a consultant to gather requirements, design, implement, test, and deploy the software solution
 - IT labor to assist the consultants to design, build, and deploy modules
 - IT and vendor support during the stabilization period, post-deployment
- O&M
 - Ongoing IT support
 - Annual Subscription Fee

5. Conclusion

Project Risks and Mitigation Plan

Risk 1	Mitigation plan
Implementation of SOX systems is discouraged in 4 th quarter (Sept 2023 – Dec 2023)	- Plan to complete tasks and migrate codes beforehand - Secure resources and commitment level - Staff augmentation/Hire contractor - Communicate in advance and often - Close project monitoring

Technical Evaluation / Analysis

Project Relationships (if applicable)

This project is tied to the Oracle BI and EBS Cloud Migration project, as the existing Oracle GRC software cannot integrate with the new Oracle cloud environment.

3. Funding Detail

Historical Spend

	<u>Actual 2016</u>	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Forecast 2021</u>
Capital	-	-	-	-	-	-
O&M	-	-	-	-	-	-

Total Request (\$000):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	-	\$59	\$390	-	-
O&M*	-	-	\$20	\$20	\$20

* A portion of this is attributed to IT/Cognizant support and maintenance and these numbers are subject to change.

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor	-	\$25	\$168	-	-
M&S	-	-	-	-	-
Contract Services	-	\$11	\$72	-	-
Other	-	\$10	\$65	-	-
Overheads	-	\$13	\$85	-	-
Total	-	\$59	\$390	-	-

Total Gross Cost Savings / Avoidance by Year: N/A

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings	-	-	-	-	-
O&M Avoidance	-	-	-	-	-
Capital Savings	-	-	-	-	-
Capital Avoidance	-	-	-	-	-

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M	-	-	-	-	-
Capital	-	-	-	-	-

*If whitepaper is supporting a capital project/program this refers to implementation O&M

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Project Status:

- Initiation – New project, not authorized yet
- Planning – Project authorized, not started yet
- Executing – Project in-flight
- On-going – Annual program

Law Department 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M	☐ Regulatory Asset
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic		
Project/Program Title: Phased Replacement of Legal Technology		
Project/Program Manager: Teresa Barillas		Project/Program Number(Level 1): 25496794
Status: ☒ Initiation ☐ Planning ☐ Execution ☐ On-going ☒		
Estimated Start Date: 1/1/2023		Estimated Date In Service: 12/31/2025
A. Total Funding Request (\$11,500) Capital: 9,000 O&M: 2,500		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 3,200		D. Investment Payback Period: (Years/Months) (If applicable)
Work Description:		
The Law Department is seeking to take a phased approach to the replacement of old and obsolete legal technology that is critical to the running of the Department. The Department is undergoing a significant transformation project and upgrading this vital technology project will provide the support that is critical to the successful implementation of various departmental transformation initiatives Phase 1: Enterprise Legal Management Implementation: Con Edison is seeking to implement a solution that is a “system of engagement” to help the Law Department provide better service while improving operational efficiency. Matter management and e-billing, though they make up a fraction of the legal department’s responsibilities, are critical pieces of this provision of services. Phase 1 starts with the implementation of cloud-based matter management and e-billing systems, most of which now come with built-in workflow capabilities, and sophisticated reporting and analytics systems to manage and track Law matters and projects. This necessarily includes the conversion of data from the existing obsolete systems to the new systems and the creation and recreation of interfaces to other systems. These system integrations are vital to achieve the necessary efficiencies in processes between Company, Department, and third-party systems including HR, Oracle (AP and AR), e-billing, the federal government, our document management system, document scanning processes, workflow automation systems and document assembly systems, to name a few. The new system will include native data analytic tools and the ability to create and track metrics for strategic decision-making, resource management and accountability. Con Edison would issue an RFP for the products with the work beginning in 2023 and completing in 2025.		

Phase 2: Document Management Implementation:

The implementation of a cloud-based document management system will provide a secure, centralized repository for documents, images and other media related to the business of the Law Department and will include the conversion of data from the existing out of date document management system to the new system. The new system will interface with Law's enterprise legal management solutions, document scanning, and workflow automation systems and third-party applications like document assembly products. In addition, a cloud-based system offers a range of solutions for record management, email management, content searching, and SharePoint integration. Phase 2 would begin toward the end of Phase 1 with an RFP in 2025 and completing in 2026.

Justification Summary:

The Law Department is undergoing an organizational transformation to improve efficiency. Updating the basic, obsolete, and out-of-date legal technologies in use by the Department is critical to the success of several of the transformation plan initiatives that commenced in January 2021 under the leadership of the General Counsel and the senior leadership team. The transformation plan involves a multi-year restructuring of the Law Department to achieve greater organizational efficiency. There are twelve specific competency models, based on the Corporate Legal Operations Consortium (CLOC) "Core 12" functional competencies, are in the final stages of refinement before presentation to the SLT. These models outline plans for Law Department reorganization, team realignment, process improvements, and a new service delivery model. Functions include firm / vendor management, eDiscovery, business intelligence, financial management, contract management, information governance, legal operations technology, and program management. As part of the transformation initiative, a new Litigation Center of Excellence has been created to provide standardized litigation services across multiple practice groups, serving as a model of efficiency and agility.

The Law Department has formed roadmap plans and teams to implement these transformation initiatives, all of which rely heavily on legal technology. To achieve the objectives set forth in these initiative plans, it is imperative that the Law Department is enabled to embrace innovations in technology, thereby making strategic transformative changes. The exciting opportunity to use legal operations for increased operational and cost efficiencies, as well as driving value for the business, relies on an investment in technology. Most importantly, workflow automation tools and analytics / metrics are critical.

The Law Department has identified two essential phases as critical to its short-term and long-term objectives:

Phase 1: Replacement of End-of-Life Enterprise Legal Matter Management System: The matter management system is used to manage and track the work done in the various sections of the Law Department. The Law Department's existing matter management system, LawManager, does not meet current departmental and Company needs for several important reasons. LawManager lacks the capability to create and track metrics for strategic decision-making, resource management, and accountability. Most importantly, the system is **obsolete**, having been sunset by the vendor in 2017. There are functional, technical, and security risks to continued reliance on outdated, obsolete software, which is no longer supported or updated to keep up with changing business requirements. The Cloud-based matter management system includes reporting, analytics and remote capabilities, all current legal industry standards. Unlike LawManager, current matter management systems also offer workflow automation and integration with other Law Department and Company applications (from Office 365 to e-billing systems). Transition to a new matter management system will increase productivity and efficiency by enabling collaboration and streamlining tasks.

Reporting capabilities will finally provide the Law Department with tools to track metrics, analyze data, create reports, utilize dashboard, and do other types of analysis necessary for strategic planning and for measuring the value of its services. A robust matter management system would allow the Law Department to standardize matter intake, add approval workflows to its matters, and track and report on different custom attributes. Matters would be captured in detail for tracking purposes. The system would integrate with the Company's accounts payable system so that we could

track and analyze spend by practice area (log spend, enforce billing guidelines, perform spend analysis) and available opportunities to reduce costs. We could also explore alternative arrangements and discounts on outside counsel rates.

Phase 2: Replacement of End-of-Life Document Management System: The existing document management system, eDOCS OPENTEXT, has existed in some iteration within the Law Department for over 15 years. eDOCS is no longer considered a market leader in the industry. The Law Department's current software, like LawManager, is outdated, does not integrate with other Company applications such as Office 365, and lacks remote functionality. The technology is three versions out of date and no longer meets the needs of the Department or the Company. The current system has limited functionality, and there are many features lacking in comparison to newer document management applications. As with LawManager, eDOCS presents technical and security concerns. The Law Department invests time and resources, along with IT, in maintenance and troubleshooting, from overseeing end-user problems to managing operational issues. Many Law Department staff do not utilize the document management system for work products due to its unreliability and slowness.

The benefits of cloud-based systems are well known to this audience, and the Company has been moving towards cloud-based systems for a few years. Cloud-based systems are secure and cost-efficient. There are no capital expenses, data can be backed up regularly, and there is instant provisioning. We are seeking cloud computing solutions with optimized performance, security, and control for both phases of this project.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Funding this request is critical to the Department's five-year and long-range plans. Gartner notes that developing a multiyear legal technology strategy that can evolve with changes in the corporate environment and advancements in the technology market is critical to success. (Gartner Insights – Legal & Compliance, “5 Legal Technology Trends Changing In-House Legal Departments,” Feb. 9, 2021)

The Law Department's transformation plan is a forward-thinking long-range plan. The Department is reorganizing to improve service delivery and optimize process improvements. As we move through transformation and beyond, it is critical that we have functional legal technologies. These technologies allow for sophisticated insight into our work for service delivery, transparency in reporting to our internal and external stakeholders and predictive analytics that would enhance our strategic and tactical decision making. Our current technologies are years out of date and insufficient to meet our needs. New cloud-based technologies can evolve with the Department as it transforms, and these technologies are integral, critical support to the success of Law's various transformation initiatives.

Law's current applications are on-premises and require substantial time and effort from Law and various groups in IT to manage daily. Cloud applications allow complete and efficient access from any device and any location. Law's matter management system, the life blood of its day-to-day operations, has been obsolete for four years. The vendor has not sold or invested in the product since 2017. The product does not meet our needs and its utility to the Department during a business continuity event, as demonstrated throughout the pandemic by our inability to readily make workflow and process changes in the system, is reduced and increases the severity of risk of significant loss. We are seeking systems that improve our interface capabilities and include bi-directional exchange of information with, for example, the courts that enable us to more efficiently ensure that we do not miss deadlines, including deadlines for regulatory filings and court documents.

We continue to invest significant amounts of time, dollars, and internal and external resources, to fix and change out-of-date systems, just to keep up with basic functions. Implementing innovative technology solutions requires an initial investment, but the internal IT and Law Department resources currently dedicated to this work can then focus their attention where they are otherwise needed. Cloud-based solutions maximize availability and performance because maintenance and support, including regular software and security updates, are managed by the vendor with little to no IT involvement, saving the Company time and money. Moving these applications to the cloud will also save over \$20k/year of IT maintenance of these on-premises applications.

The newly created Litigation Center of Excellence, one of the products of our transformation initiatives, is now supporting litigating sections across the Department. The ability to provide internal and external stakeholders, including regulators, the courts and insurance companies, with reports and analytics (predictive and otherwise) regarding the work of the Department is essential. Providing data and information increases transparency, which increases trust and decreases the risk of eroding relationships. More robust, advanced, and reliable tools will enable transparent collaboration with the exchange of detailed information that in turn allows for better business and strategic decision-making, improving relationships among all stakeholders.

Risk 1: Records Management

Risk 1 Description: The controllability of the Records Management risk is increased as all data and documents are subject to the Company's records retention policies. Up-to-date systems allow for the appropriate classification of documents and data and thus allow for compliance with the policy. Over-retention of records beyond records management policies and legal hold requirements can result in increased exposure to the Company and higher litigation costs. This is a known issue that the Law Department is actively working to mitigate.

Risk 2: Cybersecurity

Risk 2 Description: Funding this project would decrease the Cybersecurity risk, as the risk of shutdown would be mitigated. If the Company systems are compromised, the Cloud applications would still be available, and the Law Department could continue its critical work without interruption and without fear of missing regulatory or litigation deadlines.

2. Supplemental Information

Alternatives:

An alternative would be to fund only one of two phases now. This alternative was rejected, as the systems in these phases are tightly integrated. Replacing and upgrading only one of the two obsolete systems will not provide the overall efficiency process envisioned in the transformation initiatives. This project should be implemented in a phased approach over time. As noted above, the current matter management system is obsolete – so the alternative of not replacing the systems associated with that application is rejected. The document management system uses old technology and is three versions out-of-date. It does not meet today's needs for access via remote access or offer much of the Office 365 integration and other functionality widely available in other document management systems. A legal enterprise management system would be hobbled without a new document management system behind it, and vice versa. The systems in these two phases are intricately linked. As documents are scanned into the Department, they are associated with a matter in the matter management system, routed and filed in the document management system with the other documents associated with that matter. The matter management system is updated with reference to the document that was filed. When a new document is created it is saved in the document management system in a folder structure associated with the matter to which the document belongs. One without the other decreases its respective utility. This alternative is unacceptable if the Law Department is to continue to be a leader in legal operations.

Risk of No Action:

Risk 1:

If Law is unable to move forward on its technology roadmap it will fall behind in its ability to properly defend and support the Company. The inability to utilize up-to-date technology in conducting its business directly impacts the Department's ability to effectively manage its matters, budget, and resources. The result will be a loss of productivity and efficiency in an organization that greatly values its high performance. Data allows insight into business trends and assists in our partnerships with the organizations across the Company that we advise and represent. Currently, there is no ability to effectively forecast budgets and analyze outside legal spend, though we continue to increase the use of outside counsel. There is a huge reliance on manual workflows, which can and should be replaced by automation and digitized processes. Resources are devoted to IT to maintain and troubleshoot outdated software and systems. Law will continue to require assistance from multiple IT resources to address fixes and apply patches to on-premises systems in three environments (development, test, and production). Client software deployments and updates will continue to require the IT Lab to create scripts that push the changes.

Risk 2: The lack of metrics and the inability to objectively quantify, analyze and report data on matter and resource management is detrimental to the overall functioning of the Department. Benchmarking is critical to promoting efficiency, productivity, and value. The current matter management system is rich with data about where, why, how, and when the circumstances that give rise to litigation occur. Enterprise legal management allows for matter management coupled with many other capabilities including analytics that allow mining of data for potential risk identification. Our systems contain information on organizations we serve and what legal needs they have. This data should be analyzed to provide insights and trends that Law and the Company can use for strategic decision-making. We receive requests from the PSC and other external agents for reports and data that we are not able to satisfy efficiently due to the limitations of our systems. New legal enterprise management systems would allow us to make forward-thinking strategic decisions based on data.

Non-financial Benefits:

This project will increase the productivity of the department by providing the ability to create workflows between departments and strengthen relationships by providing the ability to provide factual detailed insights about the matters we handle for the organizations of the Company. The matter management system is rich with data about where, why, how, and when circumstances occur which give rise to litigation. It can also collect data relating to the transactions reviewed and negotiated by Law, as well as regulatory and environmental information. This data should be analyzed to provide insights and trends which can be used for strategic decision-making by Law and the Company. The systems together will improve communication among departments by enabling interfaces that do not currently exist for the exchange of information about Company structures, incidents and claims which impact the health and safety of our employees and the communities we serve. It will also enhance existing interfaces and allow for increased collaboration with other departments to maximize the use of innovative Company automation tools. Transitioning to cloud-based systems will reduce the time spent searching for or re-creating information. It will also improve productivity and make content accessible to users at anytime and anywhere. New matter management and document management systems can connect with document assembly systems that further enhance efficiency by taking data from one system and routing it to a variety of templates and forms. Flexibility and mobility with better access to more complete, reliable information enables users to make critical decisions faster. Cloud-based systems will provide greater integration with Office 365 tools and the ability to share documents securely on mobile devices and with other departments and external stakeholders to increase transparency, efficiency and reduce reliance on exchanging documents via email, FTPs or portable media. This will enhance users' ability to comply with governmental regulations and internal company policies involving PII, cybersecurity and safeguarding company, customer, and employee information.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

A robust, capable enterprise legal management system includes, in part, matter management and electronic billing for outside counsel matters. Data analytics will enable Law to identify metrics and create dashboards to track compliance with billing guidelines, predict litigation budgets, reduce redundancies, share engagement data across the Department, and track the diversity of counsel assigned to our matters. Transition to a cloud-based enterprise legal management and document management system will reduce ongoing costs associated with reliance on IT resources, purchasing, and maintaining server space, power consumption, and the physical real estate footprint required to run in-house servers. With the ability to access data and metrics, we can analyze and manage outside counsel by managing cost per hour and the cost of handling and resolving claims and cases, which will then provide better insight into settlement values and the right point of settlement.

2. Major financial benefits

The financial benefits are associated with mitigating risk and financial exposure to the Company, enhancing external relationships and strengthening Company processes.

There are two areas where these benefits can be identified: reporting and business process improvements. Law's ability to provide information and metrics to its constituents is paramount. The current level of need for reports far outpaces its ability to create them. The effort necessary to create reports severely limits the number of reports we can produce. New systems, with built in reporting and dashboard capabilities can provide real-time data and will reduce the time spent creating reports by at least 50%. Law conducted an analysis and determined that it currently spends nearly 3,000 hours and \$360,000 in labor annually in these two areas due to the intense manual nature of obtaining the required data and information. For example, to create the annual reports for the Board of Directors and President, up to 20 hours of Vice President time and 20 hours of Section Manager time are utilized unnecessarily each year. In addition, many hours of attorney time are spent on bi-monthly reports for the General Counsel, plus additional versions of the report that are tailored for O&R and Construction. This level of manual effort to obtain the basic or threshold business information necessary to report on is not an efficient use of anyone's time. Reducing this effort by 50% will save the Department \$180,000 in labor cost annually that could be shifted to more productive endeavors.

Automating and improving business processes in cloud systems is another area where substantial benefits can be found. The business processes that are currently done manually in e-billing, template creation in an enterprise legal

management and document management systems and eliminating most technical problems with on-premises matter and document management solutions would reduce time spent on those activities and result in labor savings of 65% per year for those processes. Current process time for just these 3 business processes is 1,068 hours and \$136,000 labor dollars per year. New systems would cut the process time on these 3 by 690 hours, saving over \$91,000 labor dollars annually in the Law Department alone. The current on-premises systems require regular internal maintenance and support by Law Department employees, IT personnel and the vendor. The maintenance and troubleshooting require daily communication and follow-up to identify and resolve problems. There will still be a need for some level of IT support, but the time would be greatly reduced if the product were in the cloud. As noted above, transition to the cloud promises flexibility, everything from saving time, money to improving agility and scalability. As noted above there would also be savings of over \$20k / year for IT maintenance of these on-premises applications.

In the report and business process areas, we would anticipate cost reduction in the amount of \$271,000 in the first year in known savings. That reduction will allow us to turn those resources to work to expand our reporting capabilities and the number of organizations to whom we report.

3. Total Cost (\$000)

Total Project cost is \$11,500

Phase 1 Enterprise Legal Management cost is \$8,100

In 2025 and beyond, there will be ongoing subscription and labor O&M costs of \$1,000 annually to the Law Department.

Phase 2 Document Management Implementation cost is \$3,400

In 2027 and beyond, there will be ongoing subscription and labor O&M costs of \$.7 annually to the Law Department.

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast (0.0) + Next 5 Years Est. (11,500) = Total Cost (11,500)

4. Basis for estimate

Preliminary discussions with vendors and Enterprise Legal Management RFI in 2021.

5. Conclusion

As noted above, the Law Department's transformation plan is a forward-thinking long-range plan. The Department is being re-envisioned to accomplish the objectives of the multi-year transformation initiatives to right-size work and improve service delivery to the Company. To ensure the success of the transformation and beyond, it is critical that the Law Department has access to adaptable, innovative, and agile technologies that allow for sophisticated insight into our work for service delivery, transparency in reporting to our internal and external stakeholders and predictive analytics that will enhance our strategic decision making. New cloud-based technologies can elevate the Department, support sustainable best in class practices and ensure our continued leadership in legal operations.

Project Risks and Mitigation Plan

Risk	Mitigation Plan
Increase in scope	Monitor project scope, plan, and budget to avoid scope creep and going over budget.

Technical Evaluation/ Analysis

Not Applicable.

Project Relationships (if applicable)

Not Applicable.

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Actuals 2021</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2022</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):
Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital		1,822.9	1,359.4	3,033.8	2,707.7
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project / program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor		600.0	615.0	1,230.4	1,261.1
M&S			0.0		
A / P		796.5	346.5	999.8	637.5
Other					
Overheads		426.4	397.9	803.6	809.0
Total		1,822.9	1,359.4	3,033.8	2,707.7

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M		250.0	375.00.0	393.7	687.8

Capital						

4. Definitions

Total Funding Request: All funding requested for program or project over program / project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that do not occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Rate Engineering 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset	
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic		
Project/Program Title: Rate Case Enhancements		
Project/Program Manager: Ricky Joe; Lucy Villeta; Yan Flishenbaum	Project/Program Number(Level 1): 20988719	
Status: ☐ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other :		
Estimated Start Date: 1/1/2018	Estimated Date In Service: 12/31/2026	
A. Total Funding Request (\$000) Capital: 6,314.0 O&M:	B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: 0.0 Capital: 0.0	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 0.0	D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:		
The Rate Case Enhancements Project is a project to continue to streamline, enhance, and add functionality to Rate Engineering's Customer Usage System (CUS). CUS is a strategic data warehouse and analysis system that is used to centralize and summarize electric and gas data necessary for Rate Engineering to report on or develop various rate structures, and to analyze load research and develop load shapes. To be effective, CUS must be an integrated and complete snapshot sales reporting system. Over the last several years, Rate Engineering has worked to replace and integrate the data and functionality of four disparate and obsolete mainframe systems into the CUS. This integration has eliminated the need to manually query multiple systems and facilitate more thorough and timely rate case analyses. As we work on new components of the integration of the CUS, a need has surfaced for additional functional enhancements to support electric and gas demand analysis, rate design, and rate impact activities and to expand functionality to improve efficiency and decrease the need for manual processes. There is also need for enhancements, particularly to accommodate the growing population of customers with bills not calculated in CSS (manual or off-system billing). These populations of customers often have complex billing structures, or characteristics that require separate treatment outside of CSS. Expanding CUS's linkage to the Off-System Billing platforms will address billing changes for growing populations of customers with no alternative bill impact reporting design or capability and, in so doing, enhance the Company's ability to more efficiently develop bill impact analyses. Specifically, with the Rate Case Enhancements Program, the Company plans to:		

- Develop and implement system requirements associated with billing changes not included in original scope of the CUS integration (e.g., capacity tag billing, net metering or value stack options, standby billing, incentive rate designs, REV proceeding outcomes, reactive power billing, updates to reflect changes in rate structures and future rate cases)
- Implement technology and software enhancements, including developing additional fields and derivations, and data mining for additional customer usage and interval data information available from other data collection and storage software
- Obtain additional data storage capacity for customer billing and interval data
- Implement further automation related to the creation and storage of load shapes in the CUS. These load shapes include New York Independent System Operator (NYISO) and market support activities, including wholesale energy reconciliation and retail supply pricing, and enhancements to the Company's existing Load Shape library.

Justification Summary:

Rate Engineering continues to support the growing trend of evaluating and developing new rate structures that follow different models from existing rate structures. Future rate impact programming will not only need to assess the effect of a change in existing rate structure but also to evaluate the effect of completely different rate forms. Expanded functionality will be required to support other PSC-mandated activities as well. For example, Rate Engineering must update load shapes used for energy settlement and market supply-pricing for customers without interval metering.

Additionally, automated and streamlined access to current and historical billing and interval data is critical to respond to the needs and initiatives of various Company and PSC efforts including distribution analyses, energy efficiency, and electric vehicle initiatives. Cross-functional training of Company staff on the use of available data storage and analytic tools will allow each individual user to focus their inquiries in a targeted way, allowing for improved automation and efficiency.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 NY Regulation	Risk 1 Description: The systems are needed to develop new rate structures in a REV environment.
Risk 2 NY Regulation	Risk 2 Description: The outlook for rate changes is increasing and the system supports the ability to develop new rate structures
Risk 3 NY Regulation	Risk 3 Description: The outlook for rate changes is increasing and the system supports the ability to develop new rate structures

2. Supplemental Information

Alternatives:

There are no viable alternatives other than to continue with further development of the CUS system. The systems serving various aspects of the rate case process must change to accommodate new rate structures and information. While normal maintenance will address many quick fixes, it is necessary to plan for periodic upgrades to address changes requiring complex logic or other significant system changes. Some have already been identified (e.g., addition of capacity tags) and others will be identified in upcoming cases.

Risk of No Action:

If no action is taken, Rate Engineering will continue to rely on manual off-system analysis routines that are time consuming, inefficient, and prone to error.

Non-financial Benefits:

Cross-functional training will facilitate the provision of accurate and timely information from Rate Engineering to our external stakeholders; these stakeholders require access to summarized billing and interval data to aid in their own analyses. Improved relationships with these stakeholders are also anticipated, as the training can be targeted to their particular needs.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

This project is expected to cost \$9.8 million over a period of eight years beginning in 2018. It was developed based upon prior experience with Business Intelligence efforts. With respect to financial benefits, while this project will increase Rate Engineering's efficiency at performing certain tasks, we also expect that the level of required work will continue to increase.

3. Total Cost (\$000)

All Previous Actuals (1,285.2) + Cur. Yr. Sanctioned Forecast (647.7) + Next 5 Years Est. (6,314.0) = Total Cost (8,247.0)

4. Basis for estimate

The total cost is budgeted at \$9.8 million over eight years for additional consulting services, on-premise server purchases, and installation costs. This estimate is supported by prior experience in purchasing equipment/services for similar projects. The initial project appropriation assumed the on-premise server purchases would be purchased over a span of two years starting 2020. This estimate has been revised to spread the server purchases over six years taking into consideration that data storage requirements will build over time with the phased rollout of AMI and the time required to obtain a full year of customer demand and usage data necessary to conduct load research.

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Rate Engineering will continue to identify projects and make minor upgrades as necessary. Technical evaluation will occur when the scope of work has been finalized.

Project Relationships (if applicable)

The goal of Rate Engineering's strategic systems replacement plan is an integrated system with ease of reporting and inquiries. The ongoing updates and enhancements to Customer Usage System are critical to the success of this effort. The project will touch on numerous extant processes and databases, including legacy billing systems and recently-developed data analysis engines.

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital		347.3	86.4	851.5		647.7
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):
Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	1,262.0	1,263.0	1,263.0	1,263.0	1,263.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/ program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	0.0	0.0	0.0	0.0	0.0
M&S	672.0	673.0	673.0	673.0	673.0
A / P	493.0	493.0	493.0	493.0	493,000.0
Other	0.0	0.0	0.0	0.0	0.0
Overheads	97.0	97.0	97.0	97.0	97.0
Total	1,262.0	1,263.0	1,263.0	1,263.0	1,263.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings	0.0	0.0	0.0	0.0	0.0
O&M Avoidance	0.0	0.0	0.0	0.0	0.0
Capital Savings	0.0	0.0	0.0	0.0	\$0.0
Capital Avoidance	0.0	0.0	0.0	0.0	0.0

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	0.0	0.0	0.0	0.0
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program / project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: & Project & Program	Category: & Capital & O&M
Work Plan Category: & Regulatory Mandated & Operationally Required & Strategic	
Project/Program Title: Vertex/Sabrix Oracle Add-On	
Project/Program Manager: Joseph Montalbano	Project/Program Number (Level 1): 25524464
Status: & Planning & Design & Engineering & Construction & Ongoing & Other: _____	
Estimated Start Date: 1/1/2022	Estimated Date In Service: 12/31/2024
A. Total Funding Request (\$000) Capital: O&M: (Implementation expense) Retirement: Total contingency:	B. & 5-Year Gross Cost Savings (\$000) & 5-Year Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: 650 Capital: 1,200	D. Investment Return (B – C) / A Total 5-year Net Savings / Total Funding Request:
Work Description: Vertex, TaxWare and Sabrix (OneSource) are sales tax engines that make sales and use tax a seamless part of every transaction, connecting with our source system (Oracle). Vertex, TaxWare and Sabrix provides expertise, collaboration, training, and support needed throughout the sales and use tax process. The objective of this project is to add either Vertex, TaxWare or Sabrix as an add on to the Oracle ledger and purchasing system currently in place at Con Edison. With the addition of one the three sales tax software programs to the Oracle system, the process of calculating, collecting, and reporting Sales and Use Tax will improve, promoting the Company's goal of data-driven decision making, operational excellence, and customer experience. The Sales Tax Engine has the following primary objectives: · Implement a cloud-based solution that integrates with Oracle enterprise resource planning (ERP) · Connect to Oracle's financial, billing, and other systems through pre-built and custom integrations · Calculate correct sales and use tax amounts automatically · Accuracy through automation · Reduction of compliance costs, potential penalties and interest, and errors associated with over or under assessing sales and use tax. · Produce reports for high level data analytics analysis	

To meet these objectives, Tax requires software implementation support from additional software and tax consultants along with the software and support provided by the chosen vendor. This request includes staffing for the addition of 2-3 programmers and management roles to assist in the implementation of the sales and use tax engine. Tax will need assistance from various departments throughout the company's footprint including, but not limited to, Accounts Payable, Supply Chain Management, Information Technologies, Corporate Accounting and Oracle Support. To complete the project these roles will require competencies in project management, data science, business analysis, and application development and implementation.

Justification Summary:

Since the company's deployment of the Oracle enterprise resource planning (ERP) systems, over and under accruals of sales and use tax have significantly increased. The investment of a sales tax engine offers an opportunity for the company to reduce these accruals. Over and under accruals ultimately cost the company money in consultant costs as hired consultants take a percentage of the refunds received as part of the reverse audit process of the three-year audit cycle. Additionally, this prevents proper data analytics since costs of purchased items do not properly reflect the addition cost of sales tax.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection

Current Sales Tax Engine (Oracle EBS) has limitations, but labor intensive manual work arounds are possible. The start-up costs of Oracle EBS is built into the implementation of Oracle Cloud ERP, as well as the annual SAAS costs.

Alternative 2 description and reason for rejection

Alternative 3 description and reason for rejection

Risk of No Action

Risk 1 -

- Sales and Use Tax accruals continue to grow.

Risk 2

· Data Analytics are not an option since transactions do not include sales and use tax. <u>Risk 3</u> · Reliance on consultants to request refunds. <u>Risk 4</u> · Consultant fees increase as over accruals increase. <u>Risk 5</u> · Diminished data quality and inconsistent analytical results could lead to a lack of trust by users. <u>Risk 6</u> · Inconsistent practices could lead to poor solution quality.
Non-Financial Benefits
Summary of Financial Benefits and Costs (attach backup) 1. Cost-benefit analysis (if required) N / A 2. Major financial benefits N / A 3. Total cost \$1,200 4. Basis for estimate The capital request will fund the implementation of the sales and use tax engine. 5. Previous budget variances 6. Conclusion The over-accrual of Sales and Use Tax has resulted in multimillion dollar Audit refunds. To attain the audit refunds, Con Edison hires an Reverse Audit consultant to discover the over-accruals and to submit and represent CE refund claims. The consultant's contingency fee is approximately 15% of the approved refund, which has resulted in millions of dollars in contingency fees. A Tax Engine will implement various processes that will reduce Sales and Use tax over-accruals. By implementing a more efficient Tax Engine, reduced Sales and Use Tax refunds will reduce the Reverse Audit consultant's contingency fees.
Project Risks and Mitigation Plan

Risk 1	Mitigation plan
Risk 2	Mitigation plan
Risk 3	Mitigation plan
Technical Evaluation / Analysis	
Project Relationships (if applicable)	

3. Funding Detail

Total Funding Level (\$000):

Historical Spend

<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2021</u>

Historical Elements of Expense

EOE	Actual 2022	Actual 2023	Actual 2024	Actual 2025	Forecast 2019
Labor					
M&S					
Contract Services					
Other					
Total					

Total Request (\$000):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital		500	700		
O&M					
Retirement					
Contingency*					

Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor					
M&S					
Contract Services					
Other					
Overheads					
Subtotal					
Contingency*					
Total		500	700		

Total Gross Cost Savings / Avoidance by Year:

	<u>2012</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M					
Capital					

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M			420	230	
Capital					

*Please refer to the Corporate Contingency Guidelines

4. Definitions

Total Funding Request: All funding requested for program or project over program / project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology

2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M	☐ Regulatory Asset
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic		
Project/Program Title: Soft Tissue Injury Prevention Project		
Project/Program Manager: Theresa McGee		Project/Program Number(Level 1): 23322604
Status: ☐ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other :		
Estimated Start Date: 12/31/2020		Estimated Date In Service: 12/31/2023
A. Total Funding Request (\$000) Capital: 600.0 O&M:		B. ☒ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: 1,096.0 Capital:
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 0.0		D. Investment Payback Period: (Years/Months) (If applicable)
Work Description:		
Material handling-related soft tissue injuries are a significant contributor to the Company's annual injuries. These ergonomics related injuries include cumulative trauma disease (CTD), musculoskeletal disorder (MSD) or damage to nerves, ligaments, tendons or muscles causing disabling injuries or pain and discomfort of various body parts such as back, neck, thoracic spine, wrist, shoulder, ankle, knee, hip, and upper/lower extremities. The basic event mechanism is overload of one or more body parts either through handling of an overweight load, or by handling an otherwise manageable weight in an awkward body posture. The former mechanism can be avoided through assessment of the load before handling, but the latter requires self-awareness on the part of the user. During work, such self-awareness may diminish, leading to increased potential for awkward body positions or postures. Wearable sensor and interface such as Kinetic REFLEX increase self-awareness by delivering feedback in the form of vibration alert upon detection of at-risk body positions or postures. Initially, the user will wear the device for up to a month to create a baseline. Once the baseline is established, the device will detect a high-risk posture and the worker will receive real time feedback in the form of vibration to identify and correct the positioning. The Company anticipates developing capability to equip and support approximately 500 employees. This technology adds an immediate and regular oversight mechanism for at risk behavior that might otherwise produce soft tissue injuries. The Company will aggregated and analyzed the data from this program. The project schedule initiates in early 2020, anticipating continued positive outcomes from a current R&D project.		

Justification Summary:

This technology application adds an immediate and regular oversight mechanism to engage the target employees on at risk behavior that might otherwise produce soft tissue injuries.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

2. Supplemental Information

Alternatives:

Existing supervisory oversight and peer to peer coaching are alternatives to this project. However, these mechanisms provide only intermittent feedback for individual employees. Sensor application provides means for constant data analysis, oversight / coaching, increasing the potential to quickly and sustainably change at-risk behaviors through constructive feedback and individualized training.

Risk of No Action:

Taking no action leaves the Company at risk for an ongoing trend in the referenced injury type, or a trend that improves slowly over time through existing means.

Non-financial Benefits:

Primary benefit is injury prevention, with morale improvement also likely due to employee perception of technology as a direct personal benefit.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

Financial benefits driven by cost avoidance attributable to prevented injuries. The company experienced 772 total OSHA

Recordable injuries and illnesses from 2017 to 2021. Soft tissue injuries or ergonomics related injuries have resulted in 152 recordable injuries in the past five years.

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (600.0) = Total Cost (600.0)

4. Basis for estimate

Estimate is based on projected sensor /interface cost for 500 employees plus initial implementation costs

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

R&D has studied the application and viability of wearable sensors /interfaces for preventing injuries. The Company deployed 26 Kinetic REFLEX devices as a STIPP pilot program on three workgroups for approximately 3 – 6 month period during November 2016 to February 2018. Three work groups were selected (Construction Services at Van Nest Yard, Astoria Store Operations at Astoria Yard and Store Operations at East 16th Street Yard) for the pilot program based on their materials handling and other physically challenging activities. The preliminary data shows that at Van Nest Deployment (10 devices), the wearers on average performed 15 high-risk postures per day during the feedback phase, compared to 28 high-risk postures during baseline period, which is a 45% reduction in high-risk posture behavior. Similarly, 77% reduction and 31% reduction in high-risk posture behavior was observed in the pilot programs at Astoria Yard Deployment (6 devices) and East 16th Street Yard Deployment (10 devices) respectively.

Data generated to date has positively indicated potential to prevent injuries through detection of awkward body postures.

Project Relationships (if applicable)

Not applicable

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital				-		
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):
Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	300.0	300.0	0.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project / program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor					
M&S	0.0	300.0	300.0		
A / P					
Other	0.0				
Overheads					
Total	0.0	300.0	300.0	0.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance	274.0	274.0	274.0	274.0	
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0				
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program / project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M	☐ Regulatory Asset
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic		
Project/Program Title: Third Party Risk Management Program		
Project/Program Manager: Kara Kennedy	Project/Program Number (Level 1): 247345160001	
Status: ☐ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other :		
Estimated Start Date: Q4 2024	Estimated Date In Service: Q1 2026	
A. Total Funding Request (\$000) Capital: 1,500.0 O&M:	B. ☐ 5-Year (starting next year) Cost Savings (N/A) ☐ 5-Year (starting next year) Gross Cost Avoidance (N/A)	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000)	D. Investment Payback Period: (Years/Months) (If applicable) – N/A	
Work Description: Objectives: Con Edison is targeting a roll-out of a Supply Chain Third Party Risk Management (TPRM) program in the first quarter of 2023 to drive efficiencies and enhance its ability to identify, monitor, and manage the risks of doing business with third parties. Through this program, Con Edison will expand its current third-party risk assessment review to include additional risk categories including: business resiliency, fourth party management, fraud, geopolitical, human capital, physical security, compliance, reputational, and operational risks. The program will also enhance the Company's risk program by automating and aggregating all third party risk review information for ease of understanding and use. Assessments completed by third parties will be reviewed and evaluated by the Company's new TPRM employees. If the Company identifies risks, it will develop a risk treatment plan that will be tracked, managed, and approved by the appropriate internal party (e.g. the contract end-user) as part of Con Edison's third party selection management. During contract negotiations, the Company will also consider risk profile information to determine whether to negotiate special contract terms, including regarding onboarding. The enhancements that result from the TPRM program will also inform contract reassessment and monitoring cycles. In addition, the Company will establish more robust vendor performance reviews (scorecards) which will provide increased insight into third party vendor risk to the Company.		

In 2024, Supply Chain will partner with a consulting firm to assist with the expansion of the design, build, and deployment of a Third Party Risk Management (TPRM) program to all other third parties managed outside of Supply Chain managed spend including but not limited to Law and non-procured type relationships (e.g. regulators, consortiums) to continue to drive efficiencies as well as identify, monitor, and manage the risk(s) of doing business with all of the Company's third parties. Additionally, the program expansion will look to address continued enhancements of its existing program through additional automation opportunities with the procure-to-pay processes.

This proposal is to leverage its existing Oracle and RSA Archer platforms for CECONY and O&R (collectively the Company) to implement consistent and standardized processes of onboarding, assessing, monitoring, and managing the identified risk of its third parties. This implementation will involve the enhancement of four (4) TPRM Archer modules and build into the existing Issues Management solution leveraged by Compliance. Additionally, the solution will be integrated with the Vendor Portal for secure data sharing with third parties, third party risk monitoring tool(s), and linkages to payment and contract management systems. The integrations with internal tools include the Contractor Oversight System (COS), Discovery SAS, ServiceNow, Oracle's payment and contract management solutions, and the Company's big-data reporting tool(s) (e.g. Tableau, Power BI).

Justification Summary:

In February 2020, Con Edison hired a program manager to develop the business case and project manage its TPRM program. The TPRM program charter was developed to meet the Company's priority to provide a direct line of sight into risks of its third parties. The Company's TPRM Steering Committee approved the charter in Q1 2020.

In December 2020, Supply Chain onboarded KPMG LLP to partner in driving a, complex, cross-functional project with over 70 stakeholders from across the Company to design, build, and deploy a TPRM program. An investment into the Company's existing on-premises Governance, Risk, and Compliance (GRC) platform, RSA Archer, was selected as part of the Company's strategic initiative to build functionality with IT partners already used by the company, rather than increasing our portfolio of software partners.

The major elements of work for this project in 2022 include:

- (1) create a TPRM Oversight Committee and a single function within Supply Chain to oversee implementation and operation of program;
- (2) incorporate all 12 risk domains and applying TPRM processes consistently across all third parties;
- (3) adopt a risk-based methodology to assess and monitor third parties;
- (4) document a formal TPRM policy and procedure;
- (5) create training and awareness to drive change and facilitate adoption of program enhancements;
- (6) develop a single, dynamic due diligence (control-based) questionnaire that incorporates all applicable risk domains;
- (7) define a risk treatment process to track identified issues to closure;
- (8) assess third party risk at an engagement and third party level respectively to better identify and manage new potential risks;
- (9) implement technology that supports the end-to-end TPRM Framework and workflows, which includes:
 - i. onboarding of third parties, procurement process /lifecycle, risk domain subject matter experts (e.g. EH&S, Law, Information Security), and business requestors throughout the enterprise
 - ii. centralizing third party profile data to capture comprehensive risk profiles
 - iii. embedded and traceable workflows (internally and externally with third parties)
 - iv. real-time risk metrics and end user work queues for workflow management
 - v. ease of QA reviews with embedded audit trails (internally and externally)
 - vi. document repository

Outer years (2024-2026), will help the company mature its overall program maturity by extending beyond Supply Chain and making this an enterprise program (for CECONY and O&R).

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

This program will improve the Company's ability to develop risk treatment plans.

2. Supplemental Information

Alternatives:

Alternative 1 description and reason for rejection

An alternative to this project would be the development of standardized processes and instructions that could be followed by employees so that one method is used to manually record and track onboarding and templates can be developed and leveraged to consistently risk rate third parties in the existing non-electronic, decentralized, and duplicative manner currently used. This would not provide efficient or timely sharing of information, and continue the current practices disparate electronic inherent risk, due diligence assessments, and action tracking from the respective third party risk profiles.

Alternative 2 description and reason for rejection

Another alternative could be to build a home-grown solution that supports the TPRM framework instead of purchasing a system solution from a vendor. Building a system is not an efficient solution in comparison with a fully functional vendor-provided system that remains dynamic and current with the latest technology and industry frameworks as competition drives system improvements and will be supported by a maintenance contract.

Alternative 3 description and reason for rejection

Another alternative is to select a TPRM solution by an alternative vendor. From the Gartner report that rates existing platforms, RSA Archer is the preferred option due to its dynamic abilities to integrate and its ease of configuration to support this evolving landscape. Additionally, it is already being used by other areas of the company.

Risk of No Action:

Risk 1

By not proceeding with this project, the Company will not fully address internal audit findings, will continue to fall behind industry TPRM program maturity, and not be able to support the increasing Corporate Risks of Cyber and Fraud or the Organizational Risks of Third Party Risk Management, Supply Chain Disruption, or Emergency Preparedness & Response. The expanding risk landscape and an inability to identify and mitigate risks in real-time operational impacts, financial loss, regulatory exposure, public embarrassment could result in reputational damage to the Company.

Risk 2

By not proceeding with this project, the Company would continue to utilize current processes to manage third parties. Current processes are not standardized, are manual in nature, decentralized, duplicative and do not support efficient information sharing across the Company thereby increasing exposure to risks that cannot be identified or managed in a timely fashion. Thus, making it increasingly difficult for Supply Chain to address its departmental risk of Supply Chain Disruption and Third Party Risk Management.

Risk 3

By not proceeding with this project, this could lead to low employee morale and retention due to a lack of centralized technology that supports Supply Chain's ability to make faster and smarter decisions regarding third party selections from a risk evaluation perspective and its ability to support effectively managing risks as they arise.

Non-Financial Benefits

Benefit Category	Expected Benefit
Enhanced Data & System Security	Technology maintenance and management of third party information and the Company's on-premises platform of third party risk information
Improved Agility	Reduce and manage risks
Enable use of current technology	- Training - Continuous improvement and alignment with the Governance, Risk, Compliance (GRC) platform connectivity with Compliance and Enterprise Risk Management
User Experience	Continuous improvement through enhancements and other integrations to the system
Scalability	Continue expansion of the platform to other areas outside of Supply Chain and non-procurement transaction relationships
Operational Excellence	- Automation of processes - Centralized view of third-party risk profile information, open issues and risk treatment plans by risk ratings
Increase Standardization Data, Processes and Systems	- Adoption of common taxonomies for risk and reporting - Streamlined current state and enhanced processes
Reduced Compliance Reporting Risks	- Reduce compliance reporting risks due to increased accuracy and completeness of data sourced from an integrated system. - Compiling periodic compliance reports will reduce manual efforts due to greater integration, automation, standardization, and the ability to use pre-built reports and dashboards. - Faster production of key management reports due to fewer integrations and decreased reliance on multiple disparate systems.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

1. Improved vendor onboarding and qualification process, supporting the delivery of on-time and on-budget procurements
2. Improved governance, supporting the overall reduction in financial, reputational, operational, and regulatory risk to the Company
3. Improved processes, supporting the reduction of manual labor and replication of processes (e.g. manual data entry / collection and administrative tasks supporting the program)

3. Total Cost (\$000)

All Previous Actuals (885.4) + Cur. Yr. Sanctioned Forecast (1,508.4) + Next 5 Years Est. (1,500.0) = Total Cost (3,893.8)

4. Basis for estimate

The estimate outlined in the attached was prepared by the TPRM Project Manager. The estimate includes various components as follows:

- Software Implementation and steady state support including the supporting activities of installation, configuration, data migration, integrations, and deployment (based on preliminary third party consulting quotes and input from IT PMO).

The capital spend summary by the Company is highlighted in the attached spreadsheet.

Aligned with the following strategic initiatives:

1. Oracle agreement fulfillment (implementing the previously purchased Supplier Qualification Module cloud solution);
2. Archer expansion for an integrated risk management platform (currently leveraged by Compliance Management and Enterprise Risk Management);
3. Privacy project (sponsored by Cyber and Law to address expanding regulations);
4. Discovery SAS project (sponsored by FIG to address fraud monitoring)

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital				885.4		1,508.4
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	0.0	250.0	1,000.0	250.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project / program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor			250.0	1,000.0	250.0
M&S					
A / P					
Other					
Overheads					
Total	0.0	0.0	250.0	1,000.0	250.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					
Total Ongoing Maintenance Expense by Year:					
	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M					
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program / project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology Panel
Exhibit IT-4
Electric IT Projects

Item #	Program Name	Page #
1	AutoCAD (Engineering Equipment Upgrade Program)	2
2	Central Operations Battery Monitoring Systems	8
3	Central Operations Condition Monitoring and Asset Health	13
4	Central Operations Tableau to Power Bi Migration (Const)	18
5	Contingency Analysis Program (CAP)	23
6	Customer Business Intelligence and Decisioning	29
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10	Electric - ARM Replacement (Phase 0)	53
11	Electronic Feeder Sign On	58
12	Grid Mod Data Analytics Use Cases	64
13	Integration of virtual reality into Substation Operating Orders	72
14	Replace nMarket to Avoid Lapses in ISO Transactions and Accommodate Electric Storage and Other REV-DER Resources	77
15	Operation Management System at ECC	83
16	CECONY REV/DER/EEDM Forecasting Tool	88
17	TNVS WEB	93

Information Technology 2022

1. Project / Program Summary

Type:	☐ Project ☒ Program	Category:	☒ Capital ☐ O&M ☐ Regulatory Asset
Work Plan Category:	☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic		
Project/Program Title: AutoCAD (Engineering Equipment Upgrade Program)			
Project/Program Manager: Donal Fortuné		Project/Program Number(Level 1): 20355460	
Status:	☐ Initiation ☐ Planning ☐ Execution ☒ On-going ☒ Other :		
Estimated Start Date: 1/1/2014		Estimated Date In Service: 12/31/2022	
A. Total Funding Request (\$000) Capital: 3,550.0 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 0.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
Autodesk is the maker of Computer-Aided Design software. Company engineers and designers rely almost exclusively on these products for CAD work. The CAD (Computer-Aided Design) Program requires periodic upgrades of software and hardware to keep up to date with current technology. Autodesk's licensing schema follows a subscription format that entitles its clients to all future releases of their software for a determined period. The funding requested in the five-year capital plan includes the upgrade and replacement of wide format plotters, 3D scanners, CAD laptops, and various other hardware needed to fully leverage the capability of Autodesk's collection of CAD software.			
Justification Summary:			
The CENG Management Administrative and IT Support section of Central Engineering Services Department is responsible for supporting over 200 CAD laptops/workstations used by designers and engineers throughout the company for CAD work. In 2019, Central Engineering completed an initiative that consolidated all Autodesk licenses under Con Edison. We must renew the contract with Autodesk to support our customers. Upgrading the Autodesk collection of products will increase the designers' productivity, maintain Autodesk support of the software and 3D platform, and maintain file compatibility. Productivity improvements are expected to be achieved through the implementation of Autodesk's Building Information Modeling (BIM) or 3D Design. In addition, upgrades provide for links to Excel spreadsheets with dynamic updates - making data extraction more powerful. The new applications allow for smaller file sizes which conserve			

server storage space and permit simple file sharing and communication between designers. The dashboard provides enhanced 2D/3D tools for drafting and annotations.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Not being able to provide CAD support will adversely impact CECONY.

Risk 1 Name: Department.Central Engineering.Loss of Significant Production	Risk 1 Description: Failure to fund this program will result in Designers and Engineers working with obsolete and inadequate equipment. In particular, as it relates to 3D design applications, our current hardware will not support the future goals of the organization and hence will stifle the efficiency of the designers.
Risk 2 Name: Department.Central Engineering.Quality Engineering	Risk 2 Description: Failure to fund this program will result in Designers and Engineers working with obsolete and inadequate equipment. By not maintaining certain standards of hardware and software the likelihood of a reduction in quality of Engineering work product increases.
Risk 3 Name: None	Risk 3 Description:

2. Supplemental Information

Alternatives:

Taking no action would increase the cost of maintaining older equipment (plotters, scanners, and CAD workstations/laptops) and put Central Engineering at the risk of not being able to support operational needs, CERC, Continuity of Operation activities and result in loss of productivity.

Risk of No Action:

No action on these items would discontinue our receiving of updated patches and software revisions and upgrades from Autodesk. Central Engineering (CE) would not be able to support Con Edison users as it relates to CAD software and hardware and keep pace with industry standards, our contractors, and our A/E vendors. In addition, the cost of maintaining older equipment (plotters, scanners, and CAD workstations) would be enormous and harm productivity.

Non-financial Benefits:

Productivity improvements are expected to be achieved through the implementation of Autodesk's Building Information Modeling (BIM) or 3D Design. In addition, upgrades provide for links to Excel spreadsheets with dynamic updates - making data extraction more powerful. The new applications allow for smaller file sizes which conserve server storage space and permit simple file sharing and communication between designers. The dashboard provides enhanced 2D/3D tools for drafting and annotations.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

In 2019, Central Engineering completed an initiative that consolidated all Autodesk licenses under CECONY. Over 1300 single and multi-user licenses were consolidated into 231 multi-user licenses.

3. Total Cost (\$000)

All Previous Actuals (4,388.0) + Cur. Yr. Sanctioned Forecast (705.5) + Next 5 Years Est. (3,550.0) = Total Cost (8,643.5)

4. Basis for estimate

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Project Relationships (if applicable)

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital	464.3	338.2	989.2	252.4		705.5
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):
Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	350.0	800.0	800.0	800.0	800.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor					
M&S					
A/P	0.0	775.0	775.0	775.0	775.0
Other	350.0	25.0	25.0	25.0	25.0
Overheads					
Total	350.0	800.0	800.0	800.0	800.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	0.0	0.0	0.0	

Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type:	☐ Project ☒ Program	Category: ☒ Capital ☐ O&M	☐ Regulatory Asset
Work Plan Category:	☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic		
Project/Program Title: Central Operations Battery Monitoring Systems			
Project/Program Manager: Shaun Ramkishun		Project/Program Number(Level 1): 25496810	
Status:	☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :		
Estimated Start Date: 1/1/2023		Estimated Date In Service:	
A. Total Funding Request (\$000) Capital: 1,200 O&M:		B. ☒ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: 345.0 Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 0.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
Central Operations uses over 250 battery banks for emergency DC power for the control, operation, and indication of critical assets. These batteries are currently maintained in accordance with Engineering specifications and NERC requirements when applicable. The required battery maintenance is time consuming and battery health data is only collected during maintenance activities. A battery monitoring R&D project completed in 2021 demonstrated that battery monitoring systems eliminate periodic maintenance requirements and real-time battery health data can be instrumental in avoiding failures of the DC system. This project will install battery monitoring systems on selected batteries along with a centralized monitoring software system that can be utilized to access and monitor battery condition data and generate automated alerts.			
Justification Summary:			
Installation of battery monitoring systems will lower O&M costs associated with time-based battery inspections and proactively identify degrading battery conditions thereby improving reliability of these critical assets. In addition, condition monitoring systems meet all NERC requirements thereby eliminating the risk of non-compliance.			
Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)			
This project will lower O&M costs, improve reliability, and lower the risk of regulatory non-compliance			

Risk 1 Name: Department.Substation Operations.Equipment Failure	Risk 1 Description: Monitoring of DC system will identify issues in advance of failure.
Risk 2 Name: Department.Substation Operations.Regulatory Compliance	Risk 2 Description: Monitoring of DC systems is an accepted practice by NERC that eliminates the need to perform periodic inspections to ensure regulatory compliance and has been implemented at many of our peer utilities.

2. Supplemental Information

Alternatives:

Do nothing. Continue to inspect batteries and gather inspection data manually.

Risk of No Action:

Do nothing. This alternative is not recommended as battery monitoring technology is cost effective and readily available.

Non-financial Benefits:

Battery monitoring systems increase safety because they eliminate the requirement for periodic maintenance and inspection. Reliability is also improved as continuous monitoring enables much faster identification of battery degradation. Regulatory compliance is improved as monitoring systems meet all battery inspection requirements eliminating the risk of missed inspections or insufficient data collection, analysis, and retention.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (1,675.0) = Total Cost (1,675.0)

4. Basis for estimate

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Project Relationships (if applicable)

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	600.0	600.0	0	0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor		70.0	70.0	0	0
M&S					
A/P		450.0	450.0	0	0
Other		40.0	40.0	00	00
Overheads		400	40.0	0	0
Total	0.0	600	600.0	0	0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance		35.0	70.0	140.0	140.0
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	0.0	0.0	0.0	0.0
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset		
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: Central Operations Condition Monitoring and Asset Health			
Project/Program Manager: Dean Gordon		Project/Program Number(Level 1): 25496813	
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date: 1/1/2023		Estimated Date In Service: 1/1/2023	
A. Total Funding Request (\$000) Capital: 1,080.0 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 0.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
This project is to configure and create asset condition monitoring functions and asset health dashboards for Central Operation equipment utilizing the enterprise OSi PI software. Currently, condition monitoring and asset health is managed in 3rd party software products limited exclusively to a type of equipment or monitoring device and/or in Excel spreadsheets where information from multiple data sources is manually compiled. Due to these limitations, condition monitoring and asset health assessment can be improved. In addition, it is time-consuming to manage and update all the different tools being used. Condition monitoring and asset health assessments involve the compilation and analysis of data using a multitude of algorithms and calculations usually unique to the type of asset. This project will consolidate all the equipment health-related data for currently monitored assets into a centralized database (OSi PI) and then build all functionality (algorithms, calculations, alert set-points) needed to monitor equipment performance and health in the form of dashboards in OSi PI.. Once the project is complete, as new IoT devices are installed in the field, the data will be routed to this centralized platform and algorithms and displays updated accordingly.			
Justification Summary:			
Robust asset condition monitoring and health assessment is critical to safely, reliably, and cost effectively, manage our equipment. Condition-based monitoring enables minimization of more costly time-based maintenance and ensures assets receive maintenance when they need maintenance before they fail. Asset health enables better capital replacement planning and highlights potential programmatic maintenance and/or equipment performance deficiencies. This system will provide information for making asset-related decisions.			

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

This project promotes the use of an enterprise software system to achieve Company goals of reducing the risk of reliability related events, the safety of Company personnel, and environmental events. In addition, it would help lower operating and maintenance costs within Central Operations.

Risk 1 Loss of Substation

Risk 1 Description:

On-line condition monitoring of equipment helps prevent unanticipated and potentially catastrophic equipment failures that have safety, environmental, and reliability impacts.

Risk 2 Oil Spill

Risk 2 Description:

On-line condition monitoring of equipment helps prevent unanticipated and potentially catastrophic equipment failures that have safety, environmental, and reliability impacts.

2. Supplemental Information

Alternatives:

1. Utilize another software program for this purpose. This would be more costly than leveraging the enterprise software agreement for OSi PI that has been purchased.
2. Use Excel spreadsheets to manage equipment health. This is not desired as it is ineffective due to lack of automation.

Risk of No Action:

This option is not recommended due to the increased risk of reliability, safety, and environmental events. In addition, it is not sustainable to manage condition monitoring and asset health data as is currently done when we continue to add IoT devices in the field.

Non-financial Benefits:

Improved safety, reliability, and environmental performance due to automation asset performance monitoring that enables intervention prior to catastrophic equipment failure.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

It is estimated we can achieve 5-10% lower maintenance costs for equipment currently with time-based maintenance requirements that can be effectively converted to a fully condition-based approach. In addition, there will be cost avoidance due to the reduced risk of unanticipated equipment failures that can impact reliability, the environment, and safety.

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (1,080.0) = Total Cost (1,080.0)

4. Basis for estimate

The cost of the project was estimated assuming approximately 320 labor hours/asset type are needed to create an asset health dashboard. There are about 25 asset types that would require similar dashboards resulting in a total of 8,000 hours for the project.

5. Conclusion

Technology development and innovation continue to enable increased equipment condition monitoring. Analytics that gather, trend, and provide automated alerts are necessary to leverage the technology to lower overall equipment ownership costs as well as improve reliability, safety, and environmental stewardship.

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Project Relationships (if applicable)

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	540.0	540.0	0.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor		300.0	300.0		
M&S		150.0	150.0		
A/P					
Other					
Overheads		90.0	90.0		
Total	0.0	540.0	540.0	0.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	0.0	0.0	0.0	0.0
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology

2022

1. Project / Program Summary

Type: ☒ Project ☐ Program			Category: ☒ Capital ☐ O&M		☐ Regulatory Asset
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic					
Project/Program Title: Central Operations Tableau to Power Bi Migration (Const)					
Project/Program Manager: Franklin Alvarez			Project/Program Number(Level 1): 25496807		
Status: ☒ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other :					
Estimated Start Date: 1/3/2022			Estimated Date In Service:		
A. Total Funding Request (\$000) Capital: 2,225.0 O&M:			B. ☒ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: 600.0 Capital:		
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 172.5			D. Investment Payback Period: (Years/Months) (If applicable) 2		
Work Description: Microsoft Power BI is the new standard for organizational visualization. We need to begin the migration from Tableau Visualization tool to Power BI. There are current 1,400 visualizations that will need to be evaluated. We would like to have significant sample size evaluated so we can determine the cost for the creation of the visualizations on the new PowerBI platform. The goal would be to have Central Operations migrated by end of 2024.					
Justification Summary: We will need to renew perpetual licenses to Subscriptions by 2024. Currently we spend \$200k for the annual maintenance of the Tableau Software and this would increase to \$600k based on the new pricing model for the upgraded Salesforce Tableau software annually. As noted, Salesforce Tableau have updated their licensing model for using Tableau. Power BI is the recommendation from IT for an enterprise visualization tool.					
Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation) Supports One Enterprise System. Power BI in Office 365					

Risk 1 Major Storm	Risk 1 Description: Tableau Reports are used for analysis and PSC Storm Reporting The current environment is slow at times and has no built in redundancy in case of environment failure.

2. Supplemental Information

Alternatives:

Remain on Tableau and incur increased maintenance and license costs for a non-supported platform.

Continue running reports on a platform which may be non-supported by the vendor Salesforce and local Information Technology support by 2024. It is important to be on the latest supported secure versions as recommended. By Salesforce and Enterprise Architecture This will enable Con Edison to minimize potential Cyber risk and downtime in the older environment.

Non-financial Benefits:

Building expertise with the approved visualization tool (Power BI).

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

Reduction of Development costs for creation of new visualizations.

2. Major financial benefits

N/A

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (2,225.0) = Total Cost (2,225.0)

4. Basis for estimate

Cost provided by potential Microsoft certified supplier.

5. Conclusion

Migrating off Tableau will enable the Company to adopt the new enterprise architecture standard for reporting.

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Supported by ITPMO and Enterprise Architecture group.

Project Relationships (if applicable)

None

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	575.0	575.0	575.0	500.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	0.0	225.0	225.0	225.0	150.0
M&S					
A/P	0.0	350.0	350.0	350.0	350,000.0
Other					
Overheads					
Total	0.0	575.0	575.0	575.0	500.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance	200.0	200.0	200.0		
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M		57.5	57.5	57.5	
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Business Unit / Division 2022

1. Project / Program Summary

1. Project / Program Summary			
Type: ☒ Project ☐ Program		Category: ☒ Capital ☐ O&M ☐ Regulatory Asset	
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: Contingency Analysis Program (CAP)			
Project/Program Manager: Maggie Chow		Project/Program Number(Level 1): 10027265	
Status: ☐ Initiation ☐ Planning ☐ Execution ☒ On-going ☒ Other :			
Estimated Start Date: 1/11/2011		Estimated Date In Service: 12/31/2025	
A. Total Funding Request (\$000) Capital: 717.0 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 0.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
The Contingency Analysis Program (CAP) assists control center operators in making operating decisions during system contingencies. CAP consolidates data from multiple systems and implements decision algorithms which provide guidance to operators on next actions. The broad goals of this initiative are to: - Extract and combine vital information from different systems, such as General Electric's Extensible Architecture for 21st Century (XA/21) - Integrate data across separate applications and provide this critical information to operators in a way that they can interpret and act upon quickly. Decision aid tools help operators analyze data from a multitude of systems quickly enough to implement corrective actions. - Provide this critical information to operators in a single, actionable view. In the early module of CAP, we integrated key elements from different critical attributes from over 40 applications into CAP, during the last few years we were focusing on the Network system contingency and how to reduce the Control Center SME processing time to address ongoing system challenges and coming system contingency. The ongoing challenge is the non-network system, OH and 4kv, where the design is less reliable and takes longer duration to restore. To reduce this impact, CAP needs to further extend to provide this analytical design to the non-network system, which are outline in module 7-17 below. Modules 1-6 have previously been completed. Below are the high level modules of CAP to be developed between 2022 and 2025: Module Description Module 7 Integrate to 4kv load flow contingency analysis Module 8 Integrate to Auto-loop load flow contingency analysis Module 9 Include Underground loop system in CAP			

Module 10 Correlate multibank contingency with secondary status for operator awareness
Module 11 Provide Seamless capability to run test cases from the main display for "what if" scenarios in NNW (similar to Manual Cap for NW)
Module 12 Calculate and display now and next worst contingency for secondary cable overloads
Module 13 Provide interface with HTV Supervisory Control and Data Acquisition (SCADA)
Module 14 Provide capability/logic to trigger to run contingency on any combination of equipment and feeders (other than from feeder OA)
Module 15 Incorporate automatic status update of overhead utilizing OMS and overhead switching
Module 16 Incorporate Area Substation Over load
Module 17 Decision Aid Action Engine

Justification Summary:

CAP is a decision aid for control center operators to help them analyze system contingencies. System contingency analysis and response by operators in our control centers is a labor-intensive process. CAP presents operators with the most vital information on current system status and providing guidance on next actions. CAP works to address the following concerns:

- What is the current abnormal state of the distribution system?
- What is the current impact?
- What is the impact and severity of the next event?
- What are the best options for getting the system back to a normal state?

Historically, operators had to gather information that is contained in over ten applications. This is a laborious process and often each application typically requires a separate login with a user ID and password. While this provides a picture of the current status, the resulting view is not dynamic and needs to be manually constructed after an event.

We need to continue to enhance this tool with the improved capabilities to assist operators.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Network Shutdown

Risk 1 Description:
PSC Penalty and financial implication to the company

2. Supplemental Information

Alternatives:

The main alternative to consolidating data from multiple systems and providing decision tools to operators, as implemented by CAP, is to continue manually accessing multiple data sources to piece together vital information. Contingency analysis requires an integrated view of the condition of the distribution system which CAP provides. CAP's ability to push vital system information to operators in the form of current conditions and subsequent scenarios is a beneficial feature for control center operations.

Risk of No Action:

Operator efficiency will be impacted without the further enhancements offered through the CAP initiatives. Control operators will have to rely on the current disparate group of applications to collect relevant information. For example, to determine which customers are impacted in either high tension, multi-bank, or non-network systems, operators must combine SCADA information from numerous 4 kV auto loop systems by sorting through many pages of reports.

Non-financial Benefits:

The Company has developed and implemented a display for operating personnel that provides an integrated view of network and/or load area system conditions. The application allows the operators to navigate between the various applications as though they are all part of a single tailored application. The application facilitates the processing of primary distribution feeders from outage to restoration, and analyzes the network or load area contingency for the "now" case and the "next worst" cases.

The importance of having a complete and integrated knowledge of system conditions during contingencies is essential to successfully bringing the system back to normal status in a timely manner. The current process involves pulling out a feeder map, manually identifying the automatic transfer switches and high tension customers. Targeting the auto loop and 4KV primary grid will complete the loop by providing operators with the ability to quickly analyze system contingencies and assess next

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

A five minute reduction per outage corresponds to a 0.08 reduction in Customer Average Interruption Duration Index (CAIDI), equivalent to an average reduction of eight customer outage hours per 100 customers interrupted.

Regarding customer cost savings, a study conducted by Berkley National Laboratory and sponsored by the US Department of Energy entitled *Framework and Review of Customer Outage Costs*, computes potential costs of power interruptions to U.S. electricity customers. The report estimates outage costs at \$8,200 per hour for large commercial customers, \$1,200 per hour for small commercial customers and \$3.00 per hour for residential customers. Adjusted for inflation and locality, these costs are \$13,722 per hour for large commercial customers, \$2,008 per hour for small commercial customers and \$5 per hour for residential customers.

A reduction of five minutes per interruption due to CAP has the potential to save impacted electric customers approximately \$10.6 million.

The basis for the estimate is based on a study conducted by Berkley National Laboratory and sponsored by the US Department of Energy entitled *Framework and Review of Customer Outage Costs* as described in the Major financial benefits section of this document.

3. Total Cost (\$000)

All Previous Actuals (8.6) + Cur. Yr. Sanctioned Forecast (20.2) + Next 5 Years Est. (717.0) = Total Cost (745.8)

4. Basis for estimate

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Project Relationships (if applicable)

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital				8.6		20.2
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):
Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	239.0	239.0	239.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor					
M&S					
A/P					
Other	0.0	239.0	239.0	239.0	
Overheads					
Total	0.0	239.0	239.0	239.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	0.0	0.0	0.0	
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Customer Business Intelligence and Decisioning	
Project/Program Manager: Martinos, Dany	Project/Program Number (Level 1): 25524257
Status: ☐ Planning ☐ Design ☐ Engineering ☐ Construction ☒ Ongoing ☐ Other: _____	
Estimated Start Date: 01/01/2023	Estimated Date In Service: 12/31/2025
A. Total Funding Request (\$000) Capital: \$12M O&M: Retirement:	B. ☐ 5-Year Gross Cost Savings (\$19M) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: \$ Capital:	D. Investment Payback Period: (3Years/6months)
Work Description: The three year program described in this roadmap applies emerging technologies to enhance the customer experience, encourage self-service, increase Energy Services Representative productivity, reduce costly errors, and shorten case lifecycles. These benefits would be achieved by predicting and delivering contextual and enabling information during appropriate stages of the case in the preferred communications channel to ESD customer and contractors. In addition, critical information would be added to ESD cases to help ESD reps streamline case progression . This goal will require restructuring, capturing and delivering the data associated with our business processes (Unified Data Structure). New data models would be created to deliver customer and business intelligence to ESD and all other departments involved in the ESD case progression workflow. Once these new data models are created and ESD is able to capture and access this data, the project team would improve workflows across the various Con Edison systems to leverage the new data in order to optimize business processes . The technology group plans to create a road map and phase these initiatives in over the next four years beginning in 2023, with various releases throughout that time. This business intelligence is not available to ESD and associated departments today due to inconsistent and insufficient data across multiple systems. The current data structure prevents a shared understanding of customers, contractors, employees and cases – as well as external factors such as geographical location, etc. – to allow service teams across Con Edison to become better equipped to add value throughout the case lifecycle, especially with a projected growth in demand. The Unified Data Structure would consist of the following models:	

- **Contractor Unified Model** – Global model for collection, distribution, and management of contractor data along with data quality guidelines and stewardship responsibilities for handling contractor data. Data on case history and past experience will provide information on contractors with repeated issues in the case life cycle. Examples:
 - Inspection failures
 - Missed appointments
 - Frequent case inquiries
 - Late document uploads/changes
- **End- Customer Unified Model** – Global model for collection, distribution, and management of customer data along with data quality guidelines and stewardship responsibilities for handling customer and contractor data. Data includes case history, case types, experience, and risks to gain insight into customer behaviors and Con Edison's relationship with end-customers. For example, this functionality will track and identify when in the case life cycle customers are having issues/ submitting inquiries. This information will provide the opportunity to be proactive in the case life cycle by providing guidance and information before it is requested by the customer.
- **Case Unified Model** – Global model for collection, distribution, and management of Energy Services case data to allow comprehensive case visibility between Con Edison groups such as ESD, Engineering, Meter and Test, Construction Planning, Field Services, etc. and external customers. This functionality would provide transparency between the internal groups displaying case information which is not currently visible across internal applications. Adding this functionality will create greater visibility for our reps to better communicate relevant case information directly to customers. This functionality would assist the various groups Energy Services collaborates with listed above by eliminating the current need and use of manually prepared and tracked spreadsheets. Therefore this initiative would derive benefits for these various departments other than ESD as well. These benefits are not calculated in our cost justification below.
- **Location (Place) Unified Model** – Global model for collection, distribution, and management of location data to make accessible all useful information about a geographical area, as context for providing service in specific locations. This will allow ESD to anticipate, avoid, and/or better respond to case-related decisions, customer inquiries, and location-oriented problems, and to predict and prepare for zone- and city-level conditions that could affect schedules and service. This functionality would also allow ESD to inform customers about situations that may impact or interfere with case progression, including design and construction. Examples:
 - Embargoes
 - Paving
 - Festivals
- **Failed Inspection Model** – This model would enhance the data surrounding customer inspections. Data captured in this model would identify the root causes of failed inspections. Together with the case unified model, ESD would gain visibility to determine, for example, whether an inspection failed by field services was due to a customer or ESD error. The model could further reveal if the failure was unique or repetitive. This enhancement would allow ESD to identify and assist our customers, contractors and representatives who have repeated failures. This would also allow ESD to employ a more proactive and targeted approach towards training our representatives.

This new data platform would achieve the ability to “look backwards” to identify process breakdowns and to anticipate them in the future. Once structured, the project team would establish “baseline scores” to identify and measure case lifecycle risks, errors, and pain points using the captured historic data. The project team would apply this business intelligence to streamline future cases; for example,

to identify high risk cases and potentially route them to more experience reps, and/or alert the rep that the case contains elements that have historically caused delays or additional, avoidable work.

The technology enhancements include:

- **Enterprise Taxonomies (Controlled Vocabularies/Data Tagging/Metadata)** to standardize data collection across platforms and applications.
- **AI and Machine Learning** to better and more quickly recognize key events, behaviors, anomalies, and risks in case management. From this we can refine processes to more accurately respond to case conditions and customer inquiries, and to provide continuous-improvement opportunities for day-to-day case management and customer communications. This would allow the ability to take a proactive approach with our customers.
- **Intelligent Notifications** – Identifying when and how much information to push to customers to reduce customer inquiries, questions, and confusion. By leverage predictive analytics, ESD could proactively communicate critical information to customers at the right moment based on historic risk analysis.
- **Task Automation and Self Service** to improve day-to-day case management operations, by leveraging chat, Virtual Assistants, RPA (Robotic Process Automation), data input validation in both the customer portal (Project Center) and internal systems (e.g., CPMS), etc. Examples:
 1. Reading data from documents: identify and confirm that information supplied by the Customer/Contractor in the Application for Service meets ESD requirements, eliminating manual review.
 2. Integrating with NYC regulatory websites: e.g., confirm validity of Electric or Gas Certificates supplied by the Customer/Contractor.
 3. Customer appointment /Field Services Technology: Self Scheduling, Auto notifications, Mapping functionality, Arrival time notification. Rep identification/authentication.
 3. Validating customer-submitted work description in the initial service request filing to identify missing or inaccurate information leading to case cancellation and resubmittal.

Enabling Technologies

- Process AI(Artificial Intelligence)/NLP(Natural Language Processing)/ML (Machine Learning) :
- Case Management/Live Data
- Data Analytics – to measure & monitor business performance & cost management
- Predictive & Behavioral Analytics
- User Experience / Digital Experience (human factors/user-centric design)
- Robotic Process Automation/Chatbots
- CDH: Decisioning comes with predictive and adaptive analytical models
- Workforce Management and Field Automation (Enhanced Mobile Capabilities)
- Customer Self Service – Web/Portal/Mobile

Justification Summary:

The goal of this initiative is to decrease the overall case lifecycle, reduce case errors, increase customer satisfaction, and reduce ESD representative time required to progress the majority of ESD cases. These benefits would be derived from data collection and analytics that would allow case management to be more proactive vs reactive and improving resource management.

Examples of tangible business benefits include:

Reduction in failed Inspections: Identifying recurring/predictable causes for failed inspections and identifying contractors that typically fail inspection.

Through predictive analytics, the system would generate discreet, targeted information assets to communicate ways to avoid recurring failure points and suggest ways to ensure successful inspections.

Intelligent Appointments: Identifying recurring causes for inspection 'no-shows' and 'reschedules' to .

The goal is to reduce 'no-shows' and 'reschedules' by identifying communication gaps that cause the 'no-show'/'reschedule' and reuse the slots caused by last minute changes for another inspection (for example, offering an earlier inspection time to customers in the same area when there is a cancellation).

Case Progression Exception Handling: Identifying average timeframes between critical case milestones.

When the timeframe exceeds a specific threshold, the system notifies users to investigate possible bottleneck or process delay (e.g., pending engineering approval, construction scheduling, customer payment, document submission, etc.). An example includes Gas Booster cases which typically have delays due to the large amount of required documentation not being completed properly. At the macro level, a spike in exceptions can be analyzed for system or process improvement.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

This project is aligned with the Corporate Digital Customer Experience (DCX) initiative to improve the external customer's experience by streamlining and leveraging web technologies.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection

The goal of the program would be to leverage technology to streamline the end-to-end process for resolving electric and gas new business requests by using captured business intelligence, predictive analytics and decisioning capabilities to make corrective actions proactively and avoid pain points. The same goal can be achieved by hiring database experts and paring them with ESD reps to perform frequent case reviews in order to manually identify case risk points. The team would document common and chronic failure points and communicate case attributes leading to those failure points to ESD case owners. The case owners would then monitor their cases to identify high risk cases and act appropriately to avoid case problems.

With approximately 60,000 cases filed annually, this alternative would be costly, difficult to manage, and would produce lower quality output.

Alternative 2 description and reason for rejection

Some of these goals could conceivably be achieved through alternative methods including manual spreadsheet analysis and visual analytics technologies available today within ESD. This method

would require an investment in database and reporting human resources to manually obtain the business intelligence describe above and perform the analysis to identify corrective actions. Given the large number of cases received annually, this would be an expensive and inefficient activity. Energy Services would require an investment in data analysis in order to achieve a limited result.

Risk of No Action

Risk 1

Potential for errors with increased case volume and manual entries.

Risk 2

Declining customer satisfaction due to increasing expectations as customers get used to new customer services with other companies, especially as regards increased case transparency, increased customer self service functions, quicker problem resolution, and decreased case lifecycle.

Risk 3

Increasing Representative and Clerical Staff headcount to maintain existing levels of service.

Risk 4

Energy Services would continue to rely on manual efforts from other departments that supply the limited information we currently get on customers cases.

Non-Financial Benefits

Implementation of the program described above is expected to provide substantial increases in customer satisfaction by avoiding case errors and decreasing case lifecycle time.

Customers will have more transparency and self-service into case status, and control over case progression (Customer Empowerment).

All technologies will be designed within the guidelines of IT and the DCX initiative. This initiative would leverage and reuse any existing technologies already implemented in Con Edison.

The design will allow scalability. Any new implemented technology would scale from a department to an enterprise solution.

Summary of Financial Benefits and Costs (attach backup)

ESD is able to calculate a reasonable estimate of the financial benefits of this initiative in a few discreet areas. For a more detailed description of these benefits, please see the accompanying ROI document.

Annual benefits once implemented:

- Reduction in Failed Inspections: \$860,000
- Optimizing Inspection Scheduling: \$990,000
- Case Exception Handling by reducing:
 - o Reschedules due to Street Paving: \$525,000
 - o Reschedules due to Street Embargoes: \$37,000
 - o Revised Service Determinations due to incomplete/inaccurate/late load data: \$1,147,938

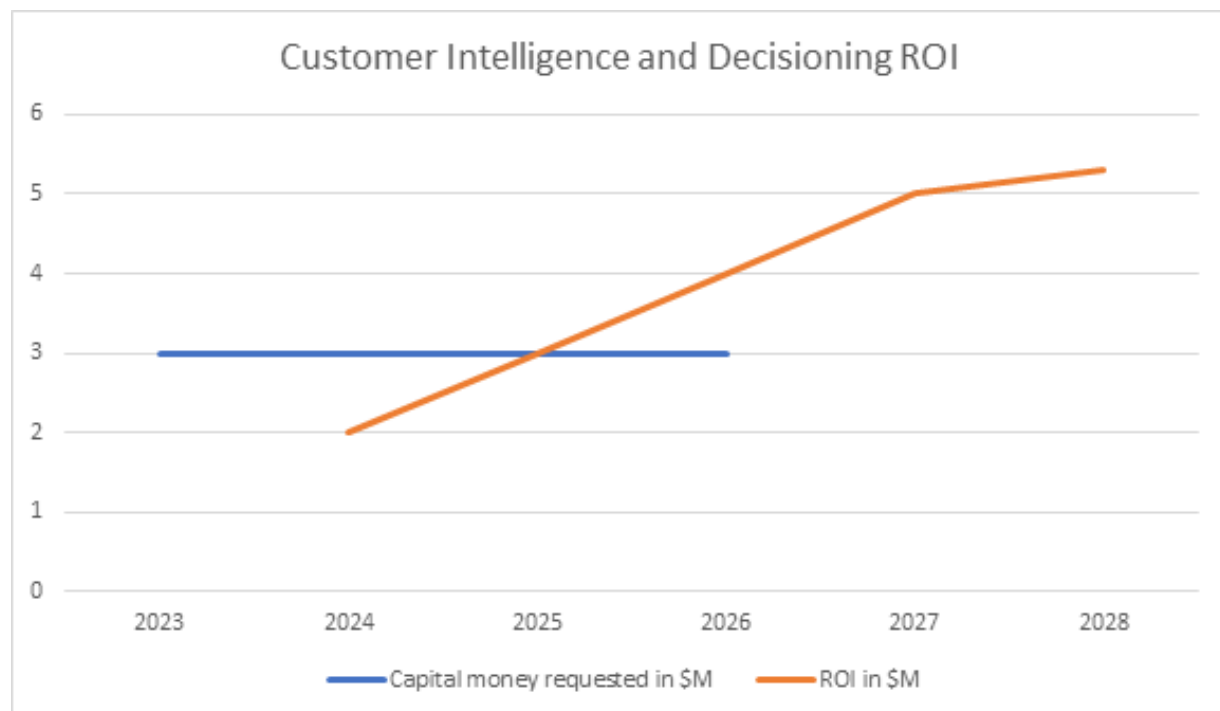
- o Case Triage due to initial service request data validation: \$843,750
- Automation:
 - o Application for Service approval: \$584,123
 - o Case Status Inquiry: \$354,375

Total Estimated Annual Financial Benefits (After Year 5): \$5,341,685

Benefits Phase-in:

Year 1: \$2,000,000
 Year 2: \$3,000,000
 Year 3: \$4,000,000
 Year 4: \$5,000,000
 Year 5+: \$5,340,000

This initiative would result in a 5-year financial benefit of \$19M dollars with an ROI of 3.5 years.



Project Risks and Mitigation Plan

Risk 1:

Current platform does not have best-in-class technologies to implement solution.

Mitigation plan:

Identify alternate vendors and assess additional cost of integration with ESDs case management system (CPMS).

Risk 2:

A desired technology lacks appropriate interfaces to existing ESD software and databases.

Mitigation plan: Create custom application interfaces. Risk 3: Data “cleansing” (standardization) requires a request to make a change in a system not within the control of ESD. Mitigation plan: Negotiate with the data/system owners as required.
Technical Evaluation / Analysis
Project Relationships (if applicable)

3. Funding Detail

Historical Spend

	<u>Actual 2016</u>	<u>Actual 2017</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2021</u>
Capital			<u>1,700</u>	<u>1,900</u>		<u>2,250</u>
O&M						
Retirement						

Total Request (\$000):

Total Request by Year:

	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>	<u>Request 2027</u>
Capital	<u>4,000</u>	<u>4,000</u>	<u>4,000</u>	<u>4,000</u>	
O&M*					
Retirement					

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>	<u>2027</u>
Labor	<u>1,400</u>	<u>1,400</u>	<u>1,500</u>	<u>1,500</u>	
M&S	<u>100</u>	<u>200</u>	<u>500</u>	<u>500</u>	
Contract Services	<u>2,500</u>	<u>2,400</u>	<u>2,000</u>	<u>2,000</u>	
Other					
Subtotal					
Contingency**					
Total					

Total Gross Cost Savings / Avoidance by Year:

	<u>2024</u>	<u>2025</u>	<u>2026</u>	<u>2027</u>	<u>2028</u>
O&M Savings	<u>\$2,000,000</u>	<u>\$3,000,000</u>	<u>\$4,000,000</u>	<u>\$5,000,000</u>	<u>\$5,500,000</u>
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>	<u>2027</u>
O&M	<u>400K</u>	<u>400K</u>	<u>400K</u>		
Capital					

*If whitepaper is supporting a capital project/program this refers to implementation O&M

**Please refer to the Corporate Contingency Guidelines

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset		
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic			
Project/Program Title: DEMS Replacement Project			
Project/Program Manager: Michele Concepcion		Project/Program Number(Level 1): 25496792	
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☐ Other :			
Estimated Start Date: 1/1/2022		Estimated Date In Service: 12/31/2024	
A. Total Funding Request (\$000) Capital: 5,140.0 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 200.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
The Distribution Equipment Management System (DEMS) is an IMS Transactional System written in an unsupported legacy code allowing for no improvements. This system is in a mainframe environment that is scheduled to be retired by 2024. Both the code and database have reached obsolescence. This obsolescence results in an increase in maintenance and leads to redundant manual data entry. Manual data entry in multiple systems contributes to human error and inaccurate inventory. This inaccuracy and obsolescence increase operational risk. DEMS has rigid functionality that can no longer be maintained with current IT resources. The broad user base struggles with navigation requiring command prompts and free-form character entry. Continual training and support requirements are extensive. The DEMS database was implemented in 1985 to provide a central database to track the cradle-to-grave life of the transformer. This includes receiving equipment in Oracle, manual data entry into DEMS, storeroom-to-storeroom transfers, issuance to field for installation, and removal from the field for consideration for retirement. The information managed in DEMS is vital to Distribution Engineering (DE), Regional Engineering, Electric Operations, Stores, EHS, Finance, and other groups for reporting, regulatory agencies, legal entities, taxing agencies, planning and financial forecasting. This solution is to enhance functionalities of Oracle EBS and the Maximo work management system, which will require some level of integration and process improvements. These enhancements would replace the legacy DEMS system and allow for better automation and data accuracy. A high-level schedule of the project is as follows: Design: 2021 Development/Test: 2022 Q1 – 2022 Q3 Implementation: 2022 Q4 – 2023 Q3			

Justification Summary:

The DEMS system's functions are managing inventory and usage of distribution equipment. The core justifications are enumerated below for the functionality described in the above table.

1. The mainframe environment is scheduled to be retired by 2024. The functionality in the current DEMS system needs to be transferred or rebuilt prior to 2024 to continue to support business requirements.
2. Integrations between systems will create synergies, streamline processes, eliminate duplicate data entry efforts and potential subsequent errors. For example, storerooms are heavily space-constrained, yet equipment must be on-hand for field installation and remain prepared for emergency events.
3. The integration between systems would improve accuracy and enable common reporting.
4. Transfer of functionality from DEMS into Maximo WMS will eliminate the duplicate data between those two systems and the need for a reconciliation process. This will substitute the reliance on various manual transactions including paper forms and spreadsheets between operations and Stores personnel.
5. Using newer technologies enables the potential to add automation to the data collection process.

This project will also improve inventory representation and tracking, both of which are is essential

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

2. Supplemental Information

Alternatives:

Replacement of DEMS with a new, standalone application with intuitive process and Inventory Management System solution that will potentially include automation to eliminate the redundancies and misalignment between physical inventory and what is entered into the database. There should be an intuitive user interface to minimize input errors and provide real-time, and accurate inventory.

This is a more extensive solution which would require more resources and funding.

Risk of No Action:

Risk 1

DEMS is an IMS Transactional System written in an unsupported legacy code allowing for no improvements. Both the code and database have reached obsolescence. If data restore procedures fail, this could lead to catastrophic operational failure.

Risk 2

Existing process and systems require duplicate data entry which leads to human error.

Non-financial Benefits:

Non-financial benefits include Consolidated Enterprise Platform support and maintenance, streamlined business

processes, enterprise product license leveraged.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

The below table outlines the capital components for the project design, development/ test, and implementation. The O&M component is a sunk cost to the existing systems.

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (5,100.0) = Total Cost (5,100.0)

4. Basis for estimate

Basis for Estimate

To accomplish this first step of improving DEMS our team has met with CFS storekeepers, OST, IT and work management resources in order to gather various perspectives and thoughts on how to precisely go about this new interface approach.

The team has recommended an enhancement of existing systems with a rough duration estimate of about 18-24 months for one developer. This can be cut down if additional developers are added. To estimate labor, we used \$220K per FTE annually (this does not include contingency). In terms of hardware costs, there are no servers required to host these enhancements to existing systems. We used estimates per location and field-user to determine the automation costs. We used a bottom-up approach based on the configuration, integration, conversion, and reporting.

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Project Relationships (if applicable)

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):
Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	840.0	2800.0	1500.0	0.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	0.0	0.0	0.0		
M&S	0.0	0.0	0.0		
A/P	0.0	0.0	0.0		
Other	840.0	2800.0	1500.0		
Overheads					
Total	840.0	2800.0	1500.0	0.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	0.0	0.0	100.0	0.0
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Business Unit / Division 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset		
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic			
Project/Program Title: Distribution Ops Training Simulator			
Project/Program Manager: Maggie Chow		Project/Program Number(Level 1): 21546535	
Status: ☐ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date: 6/1/2018		Estimated Date In Service: 12/31/2023	
A. Total Funding Request (\$000) Capital: 143.0 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 0.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
The objective is to create a module that will allow Distribution Control Center Operators to learn remotely and practice in a simulated and controlled environment. The virtual environment will reconcile information from various sources including Reactance to Fault, substation relays, FMS Fault Correlation, and reports of manhole fires, and Contingency Analysis. The testing simulator needs to be continuously expanded to include lessons learned, projected spending for 2020 was \$60k, the process and procedure changes as well as new technology required to deploy remotely will cost \$115k and expanding the training material, reporting and scoring capabilities will cost \$125k in 2022 and \$145k in 2023. The simulator results will be used to analyze an operator's performance, and for qualification and requalification of new and experienced users. This tool has been ruled as a capital tool that will require new features not maintenance. The training material has been vetted with a Vendor, gamified and is available on the learning management system in the TLC without voice over. Voice over and sequencing will be completed in 2020. Scoring and evaluation will be implemented in 2021.			
Justification Summary:			
System Simulation significantly enhances operator understanding of system complexity. It provides a powerful addition augmenting the integrated the use of new and existing tools in processing events occurring on the system. This increases efficiency through the development of greater expertise using Human Performance Improvement (HPI) Program. skills. Through the development of scoring criteria this application provides an objective mechanism that can determine skill levels before operators can be considered qualified. With the increasing shortage of expertise through			

retirement and the increasing complexity of our distribution design, it is critical that we have a new technological tool to stimulate learning and assess readiness for our operators. This application will be available in the Control Center on a designated computer for the purpose of making remote learning, moderating and scoring possible.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Operator Errors

Risk 1 Description:

We decided to test the technical skills of feeder processing and ability to observe HPI traps rather than focus on the current applications used to conduct the process. The training model has a built-in mitigation plan, we will not encounter the need to revise the training model based on applications that have been retired.

2. Supplemental Information

Alternatives:

Hands on training - Desk-readiness is dependent on staff available to train, materials covered and individual training style. Errors made by trainees will be made in real-time with a real-world impact. Hands on training does not provide the equivalent conditioning of operators and an objective qualification process based on dynamic operator response. Through the development of objective scoring criteria and training content, this application provides a training mechanism that can determine skill levels before operators can be considered qualified.

Risk of No Action:

Maintaining operator expertise becomes increasingly challenging given changes in the technological landscape in each Control Center and the training requirements required to sustain the current business process. Control Centers require a singular enterprise application that can be used to reduce human error and is consistent with Electric Operations Human Performance Improvement (HPI) Program. If the risk of committing operating errors as a result of human error are not mitigated the consequences will be equipment damage, and injury to employees and the possibly the public.

Non-financial Benefits:

- Targeting the auto loop and 4KV primary grid will provide operators with the ability to quickly analyze system contingencies respond more efficiently.
- Increased reliability of service by quickly restoring a feeder back in service, ensuring customer satisfaction.

- Ensuring regulatory compliance, Summer restoration time is monitored by the Public Service Commission.
- Internal performance monitoring, we have a KPI to improve and reduce feeder processing time.
- A stronger relationship with field operators, Control room operators will have a more accurate representation of the customer outages related to the system contingency and the next worse event providing a safer working environment for field employees and the public.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

3. Total Cost (\$000)

All Previous Actuals (67.8) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (143.0) = Total Cost (210.8)

4. Basis for estimate

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Complete enhancements, new features and to improve the user experience of the existing Distribution Simulator including designing and developing content in an interactive, self-paced course for each scenario, add gamified elements to keep users interest, incorporate multiple choice questions and interactive feeder maps and create additional scenarios including MTA coordination during contingency planning. Some of the project benefits include: a safe, contained learning environment where the inevitable mistakes of a learner can be made without serious side-effects consistency of learning across personnel, since all operators will be exposed to the same set of experiences exposure to a wide range of situations, not limited to the situations that happen to arise during any particular shift comprehensive and retrievable documentation of operator performance.

Project Relationships (if applicable)

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital	-	35.1	32.7	-		
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	0.0	143.0	0.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor					
M&S					
A/P					
Other	0.0	0.0	143.0	0.0	
Overheads					
Total	0.0	0.0	143.0	0.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	0.0	0.0	0.0	
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type:	☐ Project ☒ Program	Category:	☒ Capital ☐ O&M ☐ Regulatory Asset
Work Plan Category:	☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic		
Project/Program Title: District Operator Task Managing System			
Project/Program Manager: Richard Scholz		Project/Program Number(Level 1): 21925935	
Status:	☐ Initiation ☐ Planning ☐ Execution ☒ On-going ☒ Other :		
Estimated Start Date: 1/1/2016		Estimated Date In Service: 12/31/2026	
A. Total Funding Request (\$000) Capital: 1,600.0 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 0.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
The new software functionality includes computerized warnings and other indications that will contribute to timely processing and error free environment. New operator consoles will be added to support these new applications. The new 3G Feeder Networks will be modeled and integrated into the electronic order flow. The interfaces with Rapid Restore, FeederBoard and Visual Electronic Distribution Information System (VDIS) will be updated to reflect the changes in 3G field conditions and connections.			
Justification Summary:			
The District Operators coordinate and direct all switching operations on Con Edison's distribution and transmission systems using multiple computer systems including the energy management system (EMS), Feeder Management System (FMS), Transmission Operation Management System (TOMS), Telephone Line System (TLS), and other corporate systems such as Rapid Restore, DO (District Operators) Direct, Outage Scheduling System (OSS). Each of these systems has different user interface and operates on different vendor platforms and operating systems.			
Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)			

Risk 1 Operating Errors	Risk 1 Description: This project manages the department risk "Operating Error" by affecting the likelihood of such an event. The likelihood is affected by streamlining the process and improving the organization for a DO issuing operating orders.

2. Supplemental Information

Alternatives:

None. Maintaining the current interfaces will not model new additions to the electric network nor allow for the integration of the multiple systems .

Risk of No Action:

Without continuous system improvement and the addition of new functionality, the OMS systems would not allow the District Operators to safely direct the outage maintenance of the electric grid. Keeping current with physical changes to the distribution system and procedural processes in the field, is critical in maintaining the reliability of the power grid.

Non-financial Benefits:

Work processing efficiency. Improved safety and reliability.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

Not Applicable

2. Major financial benefits

3. Total Cost (\$000)

All Previous Actuals (1,009.4) + Cur. Yr. Sanctioned Forecast (601.4) + Next 5 Years Est. (1,600.0) = Total Cost (3,210.9)

4. Basis for estimate

Project scope, schedule, and vendor proposals.

5. Conclusion

This project will enhance the operators' environment by allowing them to perform their important tasks from a common graphical interface and manage the varied and multiple systems more efficiently.

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Not Applicable

Project Relationships (if applicable)

None

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year** (O&M only)</u>	<u>Forecast 2021</u>
Capital	-			346.4		601.4
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	400.0	800.0	400.0	0.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor					
M&S					
A/P					
Other	400.0	800.0	400.0		
Overheads					
Total	400.0	800.0	400.0	0.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	0.0	0.0	0.0	
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset		
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: Electric - ARM Replacement (Phase 0)			
Project/Program Manager: Jason Foehrenbach	Project/Program Number(Level 1): 25524272		
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date:	Estimated Date In Service: 12/31/2023		
A. Total Funding Request (\$000) Capital: 2,200.0 O&M:	B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:		
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M:	D. Investment Payback Period: (Years/Months) (If applicable)		
Work Description:			
This effort seeks to conduct a phase 0 assessment to determine the feasibility, scope, and estimate to migrate the Electric WMS (Work and Asset Management) system to the enterprise Maximo WMS platform. This is in keeping with IT's strategy of moving to a "One Enterprise" Work and Asset Management solution for all of Con Edison's business areas, to realize the full benefits of a true enterprise solution across all business areas. Electric WMS is now on the CGI ARMS platform and is experiencing severe limitations in the product line to meet the current and growing needs of the business. Significant investments have to be made to enhance the current functionalities of the Con Ed CGI ARMS implementation which can be met with Maximo out of the box capability. Maximo has been successfully implemented and has been in use in several business areas at Con Ed for many years: Central Operations, Steam, and Transmission Ops. In 2021 the platform was upgraded and the Controlled Enterprise license, which had some limitations in terms of the number of Maximo products licensed and the business areas covered, was re-negotiated to a true enterprise model which gives Con Edison and its affiliates use of any/all modules within the Maximo work and asset management suite of products on a subscription basis. A roadmap has been established to migrate over 45 disparate legacy WMS systems over the next decade. The Steam Job Tracking System migration to Maximo is now underway and Construction WMS will be migrated starting the fourth quarter of 2021. With this unrestricted use of the product line and total user base coverage, Electric Operation can now access and use all of Maximo's Work and Asset Mgt modules under the current enterprise license. The current Electric WMS system manages and tracks all work done by Electric Operations including: • Emergency repairs • Maintenance and inspection • New construction and customer connections			

- System performance/reliability programs

This phase 0 assessment will encompass all major categories of work and asset management currently tracked in CGI ARMs, understand the limitations of the existing solution to meet the current and future needs of the business, and fill in the gaps. It will look at a cross section of, but not limited to:

- Work Initiation – initiate work from various sources
- Design and Estimating - The use of Compatible Units (CU) to define the labor, material and associated accounting
- Prerequisite and Materials Management – Prerequisites, such as parking data, is asset part of an embargo area, is a permit required to work on the asset or any special equipment needed, are set up for the work prior to the clerical effort required for dispatch. The materials are defined in the compatible units (CU's) of work to be performed
- Scheduling - The scheduling process starts with planning and forecasting the work, then scheduling.
- Dispatching and Resource Management – Dispatching is an extension of the scheduling process where the work is dispatched to field forces and resources around this are managed. Mobile, Work Closure and Time Reporting

Justification Summary:

In keeping with IT's strategy of establishing a true "one enterprise" WMS platform for all operating areas, all legacy WMS systems are roadmapped to be migrated to the Maximo Platform including Electric WMS. In addition, potential risks associated with limitations in CGI's capabilities to continue meeting Electric Operations' changing needs with their ARM suite will be mitigated.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name: None

Risk 1 Description:

2. Supplemental Information

Alternatives:

Do not migrate to Maximo but keep the limited WMS Logica implementation. This is not in keeping IT's strategy for establishing a state of the art enterprise Work and Asset Mgt solution for all of Con Edison which fully meets/exceeds the current and growing needs of the business.

Risk of No Action:

Electric WMS has work management capability limitations. The product line cannot support the growing needs of the business.

Non-financial Benefits:

- Increased efficiency and customer satisfaction
- Improved workflows and streamlined business processes
- Enhanced business capabilities in areas of asset life-cycle management and asset performance management.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

This is an analysis phase of the project N/A

2. Major financial benefits

This is an analysis phase of the project N/A

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (2,200.0) = Total Cost (2,200.0)

4. Basis for estimate

Based on previous WMS analyses

5. Conclusion

The current system's platform vendor, CGI, is not investing in their technology roadmap and do not have a vision for future capabilities needed for work management. As such, their technology will likely be obsolete within 3 to 5 years (e.g., Powerbuilder)

In addition, ARM WMS for Electric is functionally limited and may not meet the current and growing needs of the business. Migrating to a "One Enterprise" WMS system will bring new and greater efficiencies, consolidated platform and system support, and the ability for the business to leverage new and innovative functionalities to meet its current and future needs.

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

This analysis phase of the project will technically evaluate the feasibility/benefits of migrating to "One Enterprise" Maximo WMS.

Project Relationships (if applicable)

EGIS, CORE, Gas and Electric WMS

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	2,200.0	0.0	0.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor		1,100.0			
M&S					
A/P		500.0			
Other					
Overheads		600.0			
Total	0.0	2,200.0	0.0	0.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M					
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program		Category: ☒ Capital ☐ O&M ☐ Regulatory Asset	
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: Electronic Feeder Sign On			
Project/Program Manager: Maggie Chow		Project/Program Number(Level 1): 24453499	
Status: ☐ Initiation ☐ Planning ☐ Execution ☒ On-going ☒ Other :			
Estimated Start Date: 3/1/2020		Estimated Date In Service: 12/31/2023	
A. Total Funding Request (\$000) Capital: 1,625.7 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 50.0 (annually)		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
The Electronic Feeder Sign On (FSO) system has been developed by IT using the business case, scope and detailed user requirements developed by the Edison Project with all operating regions to interface with Rapid Restore to allow qualified employees to sign on to feeders effectively and safely, this will reduce the phone call traffic to the Control Centers and accelerate the current "call in" sign on process. The FSO application interfaces with the existing Rapid Restore application. Initial development work done by our corporate IT were three Sign On modules incorporated into this application: Crews signing on to perform spearing/clantech & cutting, pulling, and splicing of cable. The application requires continued operational improvements. Therefore, the project calls for the implementation of other modules. We are requesting additional funding to cover the following work: • Addition of Transformer Replacement scope of work • Addition of Local Grounds scope of work to move this type of work from paper tracking to digital These additional modules will provide the operational benefit and add value to the existing product and platform in which Electric Operations and IT have already invested.			

Justification Summary:

The FSO system allows crews to electronically sign-on to feeders and to reduce the sign-on/sign off traffic at the Feeder Control Desk in the regional control centers. This technology builds in a sequence of safety checks and balances to electronically verify the critical element of signing on to work locations via a more efficient process than the current manual system. Supervisors, Cable Mechanics, Distribution Splicers and Feeder Control Representatives (FCRs) significantly benefit when signing on to a feeder electronically. In addition to the efficiency, the electronic process has built in electronic hard matches for safety precautions through the use of standardized templates with a variety of confirmation and verification functionalities. By allowing our field personnel to sign on more basic work through the use of FSO, it will allow the FCRs to focus on more complex jobs. FSO will streamline the process by improving our schedule attainment by eliminating delays and improve on safety as a result of the checks and balances built into the system through hard matches.

Technological obsolescence is another driver for this project. This upgrade will include new servers, database servers, and changes needed to run with the latest browser. From a business perspective, if the current system stops functioning, all field crew work would have to use pen and paper to keep logs. This will lead to increased paperwork and make it more difficult for managers to keep track of the history of daily tasks going on at each work location. In addition, there is a greater likelihood that paper instructions could be misinterpreted which will put our employees and equipment at risk.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

The high level schedule includes:

1. Expand FSO to include I&A (Instruments and Apparatus) group transformer work which is considered to have higher volume of scheduled work~2022-2023

---Include local ground work

---Install new transformers
2. Develop scope of work change module to allow for edits in the spear/cut, cable and splice modules. Allow the FCR or field crew to update the current location details if a crew wants to issue a verbal scope of work change after electronically signing on. ~2022-2023
3. Attach the layout for a job to the location in the Crew Management module in FSO. The layout provides additional technical details and verification to eliminate operating incidents and enforce operating practice. ~2023
4. Further integration with other Company application such as GIS, WMS (Work Management System) for work assignment and System Operations FMS application. The goal is to have the application integrate or be tied to our other Company applications. This will serve as additional check and balance since this is a safety and Human Performance Tool. ~2025

2. Supplemental Information

Alternatives:

There are additional features that have to be added to the application. The vulnerability still remains if we don't complete the application to add the additional planned work and make it a mandate for the departments that work on live feeders.

Risk of No Action:

Operations will continue using the current manual sign-on process relying on operating orders to be exchanged via phone voice calls and direct operator interaction. However, a high volume of calls in to the control center limits efficiency of the process. Inability to adapt to evolving technology - The risk of increasing HPI traps and operating errors by not using technology to improve inefficiencies in the feeder process causes interference with Electric Operations objectives.

Non-financial Benefits:

The Electronic Feeder Sign On (FSO) system allow crews to electronically sign-on to feeders and to reduce the sign-on/sign off traffic at the Feeder Control Desk in the regional control centers.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

3. Total Cost (\$000)

All Previous Actuals (1,498.6) + Cur. Yr. Sanctioned Forecast (241.5) + Next 5 Years Est. (1,625.7) = Total Cost (3,365.9)

4. Basis for estimate

5. Conclusion

FSO application allow Distribution Splicers to spear/cut, remove and install, and splice cable. The current goal is to consolidate and standardize the electronic sign on for all regions and create new functionality to sign on to other types of electric distribution work. In addition, the Control Center personnel will use this as a tracking tool to review the electronic records and work that has been selected for the purpose of electronic sign on.

Project Risks and Mitigation Plan

Risk	Mitigation Plan
User Training	

Technical Evaluation/ Analysis

Project Relationships (if applicable)

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital	457.0	404.5	348.5	288.7		241.5
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	290.6	333.9	333.8	333.7	333.7
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	0.0	285.0	285.0	285.0	285.0
M&S					
A/P					
Other	290.6				
Overheads	0.0	48.9	48.8	48.7	48.7
Total	290.6	333.9	333.8	333.7	333.7

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	50.0	50.0	50.0	
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset		
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: Grid Mod Data Analytics Use Cases			
Project/Program Manager: Dan Smilowitz		Project/Program Number(Level 1): 23317468	
Status: ☐ Initiation ☐ Planning ☐ Execution ☒ On-going ☒ Other :			
Estimated Start Date: 3/1/2020		Estimated Date In Service: 12/31/2026	
A. Total Funding Request (\$000) Capital: 19,590.1 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 1,050		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
The objective of this program is to develop and deploy a series of Grid Modernization Analytics (GMA) use cases to convert operational data into actionable operations intelligence using advanced analytics and best in class technology. GMA uses Con Edison's Enterprise Data Analytics Platform (EDAP), which is managed and maintained by the Company's Analytics Center of Excellence (ACE). ACE oversees the prioritization and governance standards needed for successful implementation of Grid Modernization Analytics use cases. The Grid Modernization Analytics program began with discovery and the initial prioritization of use cases in May 2020 and is scheduled to be in service by the end of 2025. The project utilizes the Agile project management methodology, with developers, data engineers, and data scientists from ACE working with product owners from Electric Operations (i.e., Distribution Engineering) to align on priorities and deliver value. To date, the Grid Modernization Analytics team has implemented several use cases to improve processes and create efficiencies for the business. These efforts have included the development and implementation of use cases to identify efficiencies in open main design and work prioritization process, machine-learning-driven identification of potential open neutral conditions, and automation of data validation aiding in SAIFI/CAIDI reporting. The program will deliver more advanced analytics use cases, leveraging the data integrated from previous phases. Work will continue to develop a comprehensive data layer to build a holistic view of distribution assets and related use cases to improve visibility, as well as work on higher-value, higher-effort use cases to enable asset health analytics. Use cases for the program have been scoped across a variety of business domains, including, but not limited to, safety, work prioritization, transformer health, outage management, power quality, and cable systems.			

For each use case, the Company will procure the additional storage or computer capacity necessary to store the additional data that is integrated and run the algorithms to perform the analysis.

The Company will use a standardized prioritization framework to evaluate use cases and guide decisions on how to apply the program budget. The prioritization framework accounts for key value and complexity attributes of the use case, such as financial value, impacts to reliability and safety, customer experience impact, as well as analytic and data complexity (i.e., availability and quality), use case maturity, process change requirements, and organizational impacts, among others.

Justification Summary:

Advanced data analytics is an essential tool to leverage data from additional sensors and communications technology delivered through other Grid Innovation and Distributed System Platform (“DSP”) investments. Machine learning and artificial intelligence offer the ability to process the increasing volume of data being produced at the grid edge. These advanced capabilities are existing functionalities of EDAP that Con Edison has already implemented as part of the AMI rollout and in earlier phases of the Grid Modernization Analytics program. EDAP, as a cloud-based big data platform, is well-suited to scale and add data as required for additional, more-advanced GMA use cases.

As additional data sources are modeled and integrated into EDAP, the Company realizes economies of scale and synergies through reduced incremental costs for each future use case that can leverage the same data sources. For instance, many of the use cases under the GMA program leverage customer or usage data that is already modeled on EDAP with no additional data integration work required. The same will be true of future use cases that will leverage the additional data that will be integrated as part of this program.

As demonstrated throughout this whitepaper, the Grid Modernization Analytics program also has various financial and non-financial benefits. Financial benefits of the program include improved capital asset planning and operational savings. In addition to these financial benefits, the execution of GMA use cases will increase public and employee safety, mitigate operational risks, improve grid reliability, increase customer satisfaction, enable a unified view of distribution electric assets, and enhance regulatory compliance.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

The Grid Modernization Analytics program will help the Company improve grid reliability by converting operational data into actionable intelligence through advanced analytics. The insights derived from such analytics will help the Company improve capital asset planning and achieve operational savings. Furthermore, the program will increase regulatory compliance, reduce risks, and improve employee and public safety through programs driven by analytic insights.

As an example of the benefits described above, an early use case executed as part of the GMA program uses machine learning to identify open neutral conditions, which present safety risks to the public and have associated costs to the Company. The earlier identification of such conditions, enabled through this program, reduces such safety risks as well as the risk of incurring increased costs.

2. Supplemental Information

Alternatives:

Alternative 1 description and reason for rejection

An alternative to leveraging the enterprise analytics platform to model data and analyze business problems is to develop analytic applications in individual business areas. Failure to use an enterprise analytics platform could result in non-IT supported application development by individual departments that provide very limited scope and may not use the appropriate resources, data, and technology. These departmental projects consume capital funds, create new "silos" of data, may have redundant data and functionality, and ultimately require additional support personnel for administrative and maintenance activities. Furthermore, if the data is not integrated to the enterprise analytics platform, it cannot enable future use cases for and correlation of that data, forgoing the network benefits of the platform.

Risk of No Action:

Risk 1

Not building advanced analytics capabilities to support Grid Modernization would prevent the Company from optimizing rules to run the business more efficiently and expand the visibility of engineers and operators. This would restrict the Company to using the existing toolset which will not keep pace with the rapid expansion of grid edge data. The Company would continue to manage by business rules and programmatic replacements and would not fully utilize the other advanced sensing and communications assets it is deploying.

Risk 2

If the Company does not continue to pursue Grid Modernization analytics use cases it will forgo the benefits associated with their execution. Without the implementation of these analytics use cases, the Company risks missing out on benefits associated with their implementation, including, but not limited to, increased public and employee safety and improved reliability.

Non-financial Benefits:

The implementation of Grid Modernization Analytics use cases on EDAP offers additional non-financial benefits, including:

- Increased safety – Grid Modernization Analytics use cases increase public and employee safety by analyzing grid and operational data to develop analytic insights and identify potential safety conditions that can be more quickly addressed.
- Risk reduction – By making use of additional grid edge data, the Company anticipates that it will be able to reduce public safety events and better maintain its equipment, resulting in improved safety and enhanced reliability for its customers.
- Improved customer experience – The reduction of public safety events and improved reliability will lead to increased customer satisfaction.
- Regulatory compliance – The work management and asset maintenance enhancements will provide efficiencies

in maintaining regulatory PSC compliance.

- Improved workflows/communication among departments – Rather than implementing siloed solutions and programmatic replacements, the implementation of grid and operational data analytics on an enterprise platform allows for synergies and information/insight sharing across departments.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

The Grid Modernization Analytics program has demonstrated financial and non-financial benefits. GMA provides financial benefits through improved capital asset planning and operational savings generated by automation and increased efficiencies. Each use case under the umbrella program has unique financial and non-financial benefits. For example:

- Identifying Protected Streets use case – Automatically flags work being done on streets with protected status, which allows for the delay of low priority work to create operational savings from reduced paving costs.
- Automating the Identification of Open Neutrals – Automatically the identifies of open neutral conditions. This led to the optimization of personnel resources through process automation; mitigated fire and shock risks, which decreases the likelihood of associated legal expenditure and oversight costs; and improved power quality.

Furthermore, the network effects present from using an enterprise solution lessens the costs associated with development work for the program as this work will also enable future analytics initiatives at lower costs.

2. Major financial benefits

As illustrated above, major financial benefits associated with the GMA program include improved capital asset planning and operational savings associated with back-office labor optimization, automation of processes, and increased efficiencies. Such operational efficiencies (e.g., back-office labor optimization, process automation, etc.), enabled by analytic insights derived from Grid Modernization use cases, will generate costs savings and avoidances.

3. Total Cost (\$000)

The total cost of the Grid Modernization Analytics program for 2022-2025 is approximately \$20.64 million. Of this total, approximately \$19.59 million accounts for capital expenditure, while the remaining approximately \$1.05M represents ongoing O&M maintenance.

Consistent with the detailed funding breakdown below, planned capital expenditure, without contingency, is approximately \$1.65M 2022, followed by roughly \$4.48M each in the rate years 2023, 2024, and 2025. In addition to this capital funding, additional O&M maintenance (\$150,000 in 2022 and \$225,000 in 2023-2025) is required for the program annually.

4. Basis for estimate

As of May 2021, the Grid Modernization Analytics program has identified a total of 44 use cases, eight of which have minimum viable products (MVPs) delivered, leaving 37 remaining use cases in the backlog. Use cases are classified based on complexity into a "Low," "Medium," or "High" complexity group per the table below. Based on executed GMA use cases, we can estimate the average time required to deliver an MVP for each complexity group:

Complexity Group	Number of Use Cases from Group in Remaining Backlog	Average Weeks to MVP
Low	11	12.3
Medium	13	14.0
High	13	16.5

Based on its size and complexity, it would be infeasible to execute the backlog at current workforce capacity. To deliver these use cases during the rate years 2023-2025, the labor and contract resources available will be increased in order to handle the volume of work anticipated for the GMA project.

The estimate provided in this whitepaper increases the available developer, data engineer, and data scientist resources by 150%. The majority of the increase falls in Labor and the associated Capital Overheads, with the remaining increase in Contract Services. Transitioning the work from largely Contract Services to largely Labor will establish a more sustainable model – using Company employees vs. external contractors will both provide increased value in terms of hourly rate and ensure more consistent resourcing across the duration of the project and different use cases.

This resourcing strategy will increase the benefits retained by the Company through increased knowledge retention and allow for the completion of the GMA program within the specified timeline.

5. Conclusion

There are significant financial and non-financial benefits to be gained through the continued implementation of the Grid Modernization Analytics program. Early use cases have demonstrated the potential for success of the program. GMA increases public and employee safety, increases grid reliability, enhances regulatory compliance, improves capital asset planning, and provides operational savings for the business groups leveraging the tool. These benefits justify the continued implementation of Grid Modernization Analytics use cases.

Project Risks and Mitigation Plan

Risk	Mitigation Plan
The possibility of resources assuming contingency assignments outside of their normal role presents a risk to the project schedule	Identify alternate resources who will be retained by their organization to assume responsibility of the work of those who are called to contingency assignments.
Emerging or otherwise unplanned use cases that must be accommodated present a risk to project timeline and cost.	Use ACE's prioritization framework and coordinate with program leadership to determine priorities for execution within timeline and available funding.
Delays or unforeseen issues with source system integrations present a risk to project schedule.	Build contingency into project timeline to allow for managing such delays or unforeseen issues with source system integrations should they arise.

Technical Evaluation/ Analysis

Previous experience with the Enterprise Data Analytics Platform and use cases executed earlier in the Grid Modernization Analytics program informs capabilities to execute future GMA use cases.

Project Relationships (if applicable)

The Grid Modernization data analytics use cases are dependent on several other investments to source, transfer, store, model, and analyze data. Smart sensors and transformers with PTO sensors collect additional operational data from the field to analyze. Communications infrastructure is required to transmit the data back to receive systems for processing.

Distribution Engineering is currently undergoing a related effort with the "Emerging IT Projects Initiative for Enhanced Distribution System Analysis." This program is meant to improve Distribution Engineering systems and applications; data from several of these systems will ultimately be used for analytics under the GMA program. Under the Emerging IT Projects Initiative, Distribution Engineering is looking to enhance the Outage Management System and the PVL application. These are just two examples of systems from which Grid Modernization Analytics is currently or plans to leverage data for analytics.

In addition, several use cases in the Grid Modernization Analytics backlog are dependent upon the replacement of the Distribution Equipment Management System (DEMS). This is an IMS Transaction System in a mainframe environment that provides information on electric assets. Use cases in which historical asset data is required, such as the development of asset health scores, will require data from the new system that will replace DEMS.

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital				1,737.5		2,651.1
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	1,656.1	4,483.5	4,483.5	4,483.5	4,483.5
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	426.0	1,700.0	1,700.0	1,700.0	1,700.0
M&S					
A/P	920.0	1,760.0	1,760.0	1,760.0	1,760.0
Other	14.0	10.5	10.5	10.5	10.5
Overheads	296.1	1,013.0	1,013.0	1,013.0	1,013.0
Total	1,656.1	4,483.5	4,483.5	4,483.5	4,483.5

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	150	225	225	225	225
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset	
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic		
Project/Program Title: Integration of virtual reality into Substation Operating Orders		
Project/Program Manager: Sam Vero	Project/Program Number(Level 1): 25496814	
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :		
Estimated Start Date: 1/1/2023	Estimated Date In Service: 12/31/2024	
A. Total Funding Request (\$000) Capital: 1,100.0 O&M:	B. ☒ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: 800.0 Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 50.0	D. Investment Payback Period: (Years/Months) (If applicable) 5 years	
Work Description: Substation Operations is planning to enhance the Rapid Restore system for operating orders and work permits issued on the electrical system by System Operations personnel to interface with Augmented Reality tablet application. The significant improvements that could be realized by building a new communication interfaces that will allow the District Operator to utilize the current Rapid Restore system to create the Work Order and to the Augmented Reality tablet application. The Rapid Restore application, with a new data interface supporting XML or similar will send and receive data from the Augmented Reality tablet application. This will allow the District Operator to add indirectly any items via the Content Management system to the Work Order and send the Work Order to the Station Operators and also receive any orders manually entered by the Substation Operator or supporting staff.		
Justification Summary: The opportunity exists to significantly reduce the likelihood of equipment switching errors by leveraging commercially available technology integrated with our operating orders and rapid restore systems. The proposed project will help ensure with validation that Operators are at the right equipment when performing switching moves. Operating errors result in unplanned disturbances on the transmission system as well as pose a safety threat to personnel.		
Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation) This project leverages commercially available technology and integrates with existing Con Edison software platforms resulting a significant reduction in the likelihood of equipment switching errors. This reduces the risk of personnel		

injury, system disturbance, and costly equipment damage.	
Risk 1 Equipment Failure	Risk 1 Description: Preventing operating errors that can result in equipment failure
Risk 2 Operating Errors	Risk 2 Description: Technology will directly reduce the likelihood of an operating error
Risk 3 Safety	Risk 3 Description: Reduction of operating errors reduces the likelihood of an injury as a result of that error.

2. Supplemental Information

Alternatives:

There are a few alternatives that are currently being evaluated for effectiveness that will determine the exact technology used for this project. This includes virtual reality, mixed reality and/or barcoding.

Risk of No Action:

The risk of no action is a continued reliance on human performance practices to prevent switching errors. Operating experience has shown that a continued emphasis solely on HPI tools does not fully eliminate the risk of human error.

Non-financial Benefits:

Improved personnel safety, reliability, and the avoided costs of responding to switching errors and at times the resultant equipment damage.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

The financial benefits are improved efficiency in executing operating orders which lowers the time needed to perform and document switching activities. This also results in on-time issuance of work permits being issued to crews which improves their productivity.

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (1,100.0) = Total Cost (1,100.0)

4. Basis for estimate

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Project Relationships (if applicable)

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):
Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0.0	800.0	300.0	0.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor					
M&S		740.0	275.0		
A/P					
Other					
Overheads		60.0	25.0		
Total	0.0	800.0	300.0	0.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance		200.0	200.0	200.0	200.0
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	0.0	0.0	50.0	0.0
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program		Category: ☒ Capital ☐ O&M	
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic			
Project/Program Title: Replace nMarket to Avoid Lapses in ISO Transactions and Accommodate Electric Storage and Other REV-DER Resources			
Project/Program Manager: Frank Imburgio / Anthony Castellano / Heidi Cinquegrana		Project/Program Number(Level 1): 21526152	
Status: ☒ Initiation ☐ Planning ☐ Execution ☐ On-going ☐ Other :			
Estimated Start Date: 2/1/2022		Estimated Date In Service: 12/1/2023	
A. Total Funding Request (\$000) Capital: \$1,920 O&M: See below		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year Ongoing Maintenance Expense (\$000) Capital: O&M: \$300 (2024 – 2026)		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
Presently, Energy Management uses nMarket, which is an electricity nomination and scheduling system. It provides functionality to manage a participant's transactions, public settlements, and invoices with the Independent Market Operator, Independent System Operator or Regional Transmission Organization. These functions typically represent in excess of billion dollars in transactions annually, but can be much higher depending on the market price of energy. Originally a Ventyx product, nMarket was once the industry leading software for ISO communications. However, after multiple acquisitions and corporate restructuring the product is no longer the focus of the parent company and is failing to keep in step with the needs of a rapidly changing energy marketplace. At the same time, Energy Managements needs are growing, and a product which can support the bidding of grid scale batteries and other distributed energy resources is needed in the near term for proper implementation of regulatory mandated programs, which the current system is not capable to address. These developments will add complexity to Electricity Supply's Physical Wholesale business requirements, creating the need to replace the existing nMarket System. The CEBs have already transitioned away from nMarket due to similar concerns with the product's inability to keep up with up with changing market rules and the transition to renewable energy. They have implemented Adapt 2 in its place. Adapt 2 is the premier ISO bid-to-bill platform for all North American ISO markets enabled with AI and Big Data technologies. The core components of Adapt 2 include Market Link, Front Office, Back Office and Plant Portal with over 2,500 market participants. This project is looking to replace the nMarket System and utilize an alternative software solution (i.e., Adapt 2) to support Electricity Supply's Physical Wholesale business requirements, which consists of the following: - Electricity purchasing, scheduling and invoicing - Using and monetize electric storage assets in ISO energy, capacity and ancillary markets. - Regulatory and SOX compliance			

- Interfacing with other internal systems
- Implementing the NYS PSC Reforming the Energy Vision (REV) Initiative

Justification Summary:

The implementation of REV expands the participation of DERs (especially electric storage) in the wholesale energy markets as well as extend the electricity markets down to the network and distribution levels. This will add complexity to Electricity Supply's Physical Wholesale business requirements, creating the need to upgrade or replace the existing nMarket System. The NYISO requirements for the operating parameters for a storage asset differ than that of a generator (i.e., new parameters, such as state of charge). nMarket is not configured for these new parameters. Without a replacement for nMarket, manual entry of operating parameters will be required.

This project will help Con Edison:

- Improve Energy Management processing of over \$1 billion in wholesale electricity supply transactions, which requires state-of-the-art software to assist in managing the energy portfolio.
- Interact with NYISO with more complex granularity than currently available.
- Keep up with any regulatory changes which could impact how we do business.
- Increase efficiencies by making data and results available in a standardized format that can be used to generate reports automatically for internal use, settlements, and regulatory reporting
- Decrease the possibility for errors by automating processes as appropriate and interfacing with other internal systems on a corporate and organizational level
- Maintain strict SOX controls and audit capabilities
- This current system interfaces with an in-house system, ePortfolio, NYISO - MIS, Con Edison's Pricing Database System (PDS), and once implemented, Energy Management's Data Analytics Tool, and the Enterprise Data Analytics Platform .

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Cybersecurity	Risk 1 Description: The application controls access to scheduling of electricity at the NYISO. Strict protocols are enforced to ensure only approved schedulers are given access
Risk 2 Fraud	Risk 2 Description: The application schedules over \$2 billion of electricity used by the company's customers. The application maintains security over users and reduces the risk that fraudulent activities occur.
Risk 3 Inaccurate record keeping and counterparty data	Risk 3 Description: This application records our scheduling of electricity. It provides the basis of reconciliation and verification of the electricity we purchase.
Risk 4 Full recovery of all fuel costs	Risk 4 Description: As the scheduling program for electricity, any inaccuracies in recording or reconciling of our purchases will limit our ability to fully recover fuel costs.

Risk 5 Transactions are improperly executed	Risk 5 Description: The nMarket system provides a record of who enters transactions on behalf of the company. A series of checks and balances ensure that the transactions are properly executed

2. Supplemental Information

Alternatives:

If the existing system is not replaced to accommodate changes in our business requirements, manual processes will need to be developed which is more labor intensive and vulnerable to human error.

Risk of No Action:

The risk of no action would jeopardize Con Edison's ability to function as a market participant in the wholesale energy market place (i.e., limited ability for ISO communications, REV impact, underutilization of storage assets), and potentially impact SOX and regulatory compliance requirements. Without an appropriate replacement, manual data entry will be required to accommodate changes in ISO market rules, including offering energy storage resources into ISO markets, which will cost unnecessary hours of labor and increase the risk of error. As additional resources enter the market, manual participation will no longer be a viable option.

Non-financial Benefits:

Non-financial benefits of adopting Adapt 2 includes:

- Efficient management of the energy portfolio
- Regulatory compliance
- Successfully support and implementation of REV initiative

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

The annual wholesale electricity supply cost to all electric customers in the Con Edison service area is about \$3 billion. The benefits of REV enhancements to all electric customers are expected to be greater than the carrying cost of this project.

3. Total Cost (\$000)

See table below.

4. Basis for estimate

Cost estimates were put together with the assistance of subject matter experts and costs associated with similar internal projects. Estimates include costs associated with internal labor, contractor laborers, software licensing, etc. over the course of a two year period.

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

N/A

Project Relationships (if applicable)

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	Historic Year** (O&M only)	Forecast 2021
Capital					
Implementation O&M*					
Regulatory Asset					

* * For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	929	991	0.0	0.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	125	200			
M&S					
A/P					
Other	741	691			
Overheads	63	100			
Total	929	991	0.0	0.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M			100	100	100
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/ project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology Central Operations 2022

1. Project / Program Summary

Type: Project ☒ Program			Category: ☒ Capital ☐ O&M		☐ Regulatory Asset
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic					
Project/Program Title: Operation Management System at ECC					
Project/Program Manager: Richard Scholz			Project/Program Number(Level 1): 22249004		
Status: ☐ Initiation ☐ Planning ☐ Execution ☒ On-going ☒ Other :					
Estimated Start Date:			Estimated Date In Service: 12/31/2026		
A. Total Funding Request (\$000) Capital: 1,831.0 O&M:			B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:		
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 0.0			D. Investment Payback Period: (Years/Months) (If applicable)		
Work Description:					
This project will address upgrades to the Operations Management Systems (OMS) computer systems and provides for expansion of these systems to better support the needs of the operators and field services. This work will also support infrastructure needed for replication of systems at the Alternate Energy Control Center (AECC) for disaster recoverability. This project will include the replacement of the current replication system used by the Feeder Management System (FMS) with Virtual Machine platforms in order to improve the reliability and disaster recoverability of FMS. The new Virtual environment will upgrade the OMS computer systems with new servers, storage units and virtual infrastructure software to facilitate the operation of multiple virtual machines on fewer physical servers. Complete duplication of the production database functionality will be built in parallel with the current production database, allowing a cutover with a minimal system outage. The new architecture will build local and remote duplication into every aspect of the OMS, thus creating fault tolerant dual redundant systems.					
Justification Summary:					
This project is needed to maintain OMS computer system hardware and operating systems current with industry levels in order to maintain high system performance, better reliable systems and databases, strong cybersecurity posture and dual redundant, fully independent backup systems at the AECC.					

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Operating Errors

Risk 1 Description:

This project manages the departmental risk "Operating Errors". This project will reduce the likelihood of such an event by improving the process by which district operators issue orders.

2. Supplemental Information

Alternatives:

Keep using the current hardware.

Risk of No Action:

No action will lead to unsafe and hazardous conditions in all field work and the system will become vulnerable and unreliable.

Risk of greater hardware breakdown, less redundancy, less reliability, and less secure systems.

Non-financial Benefits:

Fewer interruptions, more reliable systems, highly available functionalities and disaster recoverability.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

Not Applicable

2. Major financial benefits

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (1,831.0) = Total Cost (1,831.0)

4. Basis for estimate

Historical cycle

5. Conclusion

This project is needed to maintain OMS computer system hardware and operating systems current with industry levels in order to maintain high system performance, better reliable systems and databases, strong cybersecurity posture and dual redundant, fully independent backup systems at the Alternate Energy Control Center.

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Not Applicable

Project Relationships (if applicable)

None

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital	-		-	-		
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	331.0	766.7	366.7	366.7	400.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor					
M&S					
A/P					
Other	331.0	766.7	366.7	366.7	400.0
Overheads					
Total	331.0	766.7	366.7	366.7	400.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	0.0	0.0	0.0	
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: CECONY REV/DER/EEDM Forecasting Tool	
Project/Program Manager: Berna Falay Ok	Project/Program Number (Level 1): 25546223
Status: ☒ Initiation ☐ Planning ☐ Execution ☐ On-going ☐ Other: _____	
Estimated Start Date: 2023	Estimated Date In Service: 2023
A. Total Funding Request (\$000) Capital: \$2,730 O&M: \$100	B. ☐ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: \$100 Capital:	D. Investment Payback Period: (Years/months) (If applicable)
Work Description: In 2020, McKinsey designed, built, and deployed the Con Edison Distributed Energy Resource (DER) forecasting application, containing forecasting modules for storage and for electrification of heat. They also developed the theoretical approach to the electric vehicle forecasting module. The application was used live in the Con Edison winter peak forecast this fall. With this project, the Company is looking to continue its engagement with McKinsey to enhance the analytics and tools used to forecast four more electric load modifiers that are undergoing significant changes in the coming years. The modules covered in this proposal are: - Electric Vehicles ("EV"); - Combined Heat and Power Distributed Generation installations ("DG/CHP"); - Solar photovoltaic installations ("PV"). The application will cover the 20-year electric forecasts for EV, DG/CHP, and PV; and will be performed for Con Edison's electric service territory, specifying the DER effects on: - Electric System Annual Delivered Volume; - Electric System Annual Billable Demand; - Peak load at Electric System Summer and Winter Peak Hours; - Peak load at Electric System Summer and Winter Network and Radial Feeder Independent Peak Hours.	
Justification Summary: The uncertainty of the energy landscape has increased with its evolving complexity. This application software will reduce this uncertainty and provide a higher level of confidence in the summer peak demand, winter peak demand, and annual delivered volume forecasts for Con Edison electric. Such	

forecasts are essential for reliability planning, capital planning, budget management and bill impact modeling, and rate design.

McKinsey has developed versions of this application software for two of the DERs in Con Edison. The Company currently is using this application software to develop Electric System Peak, Network/Load Area Peak, and Delivered Volume Forecasts.

This application software provides a higher-level of confidence due to its stock and flow approach through gaging the potential/universe of several load modifiers and maintaining the best available data while the framework and mechanics of achieving a future carbon neutral economy evolves.

This application software will allow for the management of the aforementioned load modifiers, in order to avoid overlap through balancing of their potential, and so that there is reasonability in the stock and flow of each load modifier.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

This project is in response to the ever-evolving energy market, dynamic policy, innovative configurations, renewables, and advancing the Company's commitment to a clean energy future. This tool looks to effectively reduce demand and manage energy and predict where loads will go under policy measures such as PV, EE, and Electrification, which are policy driven to mitigate climate change and promote decarbonization.

The Company's Long Range Plans, from Strategic Planning, will rely heavily on the outputs of this tool and will apply them to the sensitivities assigned. This tool predicts how electric peak demand and volume will evolve in an already uncertain and risky energy landscape.

Supporting the project is in alignment with the Company's goals to provide safe and reliable services to the local community and to support NYS CLCPA and NYC LL97 goals.

Lastly, this tool will be used to reduce Energy Management's organizational risk called Inaccurate Demand Forecast Related to Electric, Gas, or Steam.

2. Supplemental Information

Alternatives

Alternative description and reason for rejection

The alternative would be to continue to perform manual and independent forecasts for DG/CHP, PV, and EV. Such forecasts are not balanced against one another to the level that the new software application performs, and the forecasts are not organized and fed from updated data sources and stock and flow.

Risk of No Action

The primary risk associated with not completing this project is that the uncertainty in Energy Management's forecasts will increase under evolving policy and electric load modifiers that are undergoing significant changes in the coming years. Forecast error can lead to diminished reliability,

higher supply costs, and increased O&M. Lastly, not developing this tool could increase the likelihood and severity of Energy Management's organizational risk called Inaccurate Demand Forecast Related to Electric, Gas, or Steam.

Non-Financial Benefits

This project will improve the Company's ability to predict electric peak demand and volume, comply with regulatory requirements, improve supply plans, improve energy scheduling, and improve the efficiency of the overall forecasting process. Additionally, this project further demonstrates the Company's commitment to improve its predicting and planning capabilities to support a clean energy future for its customers, regulators, and stakeholders.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

N/A

2. Major financial benefits

This project will indirectly result in financial benefits for the customer. This tool is likely to improve forecast accuracy by an estimated 10% (2% for organization, 2% for balancing across load modifiers, 3% for improved algorithm, and 3% for improved data streams). Such improvements could lead to:

- For reduction in an over-forecast - Avoid supply costs, having to purchase the next incremental MW, as well as avoid load relief at certain substations.
- For reduction in an under-forecast - Avoid last-minute, surprise day-ahead supply costs, which are higher than planning in advance, unforeseen outages/load shedding, and enhanced ability to comply with electric performance metrics.

3. Total cost

The estimate for this capital project is \$2.7 million.

4. Basis for estimate

This estimate was prepared in partnership with an external consultant and using historic corporate estimates.

The estimated work required includes the following:

- 60% user interface, middleware, and back-end model integration (including testing);
- 30% core algorithm development (including some due diligence on existing forecasting methods and processes through interviews and documentation assessment for PV and DG/CHP, plus user testing);
- 5% methodology and process development, mainly focused on PV module; and
- 5% user training.

5. Conclusion

The Con Edison REV/DER Forecasting Tool must be developed in order to continue to increase the accuracy and granularity of load modifier forecasts, to facilitate more prudent planning and support the achievement of NYC LL97 and NYS CLCPA goals.

Project Risks and Mitigation Plan
Risk of cost overruns, project delays, and scope creep – Energy Management will appoint a project manager and will partner with McKinsey to oversee the successful initiation, planning, design, execution, monitoring, controlling and closure of the project, which includes monitoring and addressing budget vs. actual variances and project delays. The project manager will have an escalation plan to address project risks and challenges.
Technical Evaluation / Analysis
McKinsey & Company developed such an EEDM Tool in 2017 and the first two forecasting modules for the REV/DER Tool in 2020 for Con Edison. This project looks to build on these tested and proven models, which are currently being used by Con Edison with McKinsey & Company.
Project Relationships (if applicable)
EEDM Tool and REV/DER Tool.

3. Funding Detail

Historical Spend

	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2021</u>
Capital						
O&M						
Regulatory Asset						

Total Request (\$000):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0	2,730	0	0	0
O&M*	0	0	50	50	0
Regulatory Asset	0	0	0	0	0

Capital/Regulatory Asset Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor	0	200	0	0	0
M&S	0	170	0	0	0
Contract Services	0	2,240	0	0	0
Other	0	15	0	0	0
Overheads	0	105	0	0	0
Total	0	2,730	0	0	0

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M			50	50	
Capital					

*If whitepaper is supporting a capital project/program this refers to implementation O&M

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Project Status:

- Initiation – New project, not authorized yet
- Planning – Project authorized, not started yet
- Executing – Project in-flight
- On-going – Annual program

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset		
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: TNVS WEB			
Project/Program Manager: Matthew Koenig		Project/Program Number(Level 1): 24616815	
Status: ☐ Initiation ☐ Planning ☐ Execution ☒ On-going ☒ Other :			
Estimated Start Date: 6/1/2020		Estimated Date In Service: 12/31/2020	
A. Total Funding Request (\$000) Capital: 2,490.0 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M:		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
Migration of TNVS Desktop Client Application to a web-based solution. This will allow reach to multiple device platforms with reduced long-term deployment and maintenance costs. This updates the TNVS Server to the latest AVS/OpenViz codebase and contains a full UX update.			
Justification Summary:			
The current version of TNVS exists on a hardware server that has become obsolete and must be replaced. This project seeks to upgrade the application to a VM server environment along with all appropriate updates in operating system, software, data and browser capabilities. In addition, the application will be enhanced to create a greater scope of observability and number of users.			
Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)			
The program is designed to support operators and engineers in the field with enhanced situational awareness of the state of the transmission system. By implementing in a browser-based environment, the application provides a significant improvement in resiliency.			
Future expansion of this application will provide additional resiliency in the form of increased awareness during			

emergencies and impacting events such as loss of the ECC mimic board, or other equipment outages due to natural events or other causes.

The new application mitigates security risks through implementation of the new platform and environment.

Risk 1 Loss of a Major or Sole Supplier

Risk 1 Description:

Reduce impact from loss of bulk power mimic board

2. Supplemental Information

Alternatives:

Establish Stand-Alone Hardware Server to replace obsolete server without updating or expanding software.

Rejection Reason: No alternative for expanding accessibility and expanded functionality.

Risk of No Action:

Current server is already obsolete and will be discontinued in a year. Functionality will be lost. All previous development work will be lost. Internal customers will lose the observational capability provided by the tool.

Non-financial Benefits:

Critical transmission information available to operators, engineers, executives while offsite.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

N/A

3. Total Cost (\$000)

All Previous Actuals (378.3) + Cur. Yr. Sanctioned Forecast (135.0) + Next 5 Years Est. (2,490.0) = Total Cost (3,003.3)

4. Basis for estimate

Vendor estimates for time and effort

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Project Relationships (if applicable)

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital				378.3		135.0
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):
Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	490.0	500.0	500.0	500.0	500.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor					
M&S					
A/P	0.0	500.0	500.0	500.0	500.0
Other	490.0				
Overheads					
Total	490.0	500.0	500.0	500.0	500.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	0.0	0.0	0.0	0.0
Capital	0.0	0.0	0.0	0.0	0.0

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology Panel
Exhibit IT-5
CES IT Projects

Item #	Program Name	Page #
1	Advanced Metering Infrastructure: 2023-2025 AMI /IT – Software enhancements, and hardware refresh	2
2	AMI Business Analytics	7
3	Customer Recommendations and Analysis Tools	15
4	DER Integration and Management Program	22
5	REV-Grid Modernization (DSP)	34

Information Technology 2022

1. Project / Program Summary

Type: ☐ Project ☒ Program	Category: ☒ Capital ☐ O&M
Work Plan Category: ☒ Regulatory Mandated ☒ Operationally Required ☒ Strategic	
Project/Program Title: <i>Advanced Metering Infrastructure: 2023-2025 AMI/IT - Software enhancements, and hardware refresh</i>	
Project/Program Manager: Madhu Reddy	Project/Program Number (Level 1): P# - 25508506
Status: ☒ Planning ☐ Design ☐ Engineering ☐ Construction ☒ Ongoing ☐ Other: _____	
Estimated Start Date: 1/1/2024	Estimated Date in Service: 12/31/2026
A. Total Funding Request (\$000) Capital: 28,219 O&M: Retirement:	B. ☐ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: Capital:	D. Investment Payback Period: (Years/months)
Work Description: Con Edison is currently working on the Advanced Metering Infrastructure (AMI) project from 2016-2022 as per the current business case, which involves the implementing the IT platform, building communication network, and installing over 5 million electric and gas Smart Meters. This initiative comes at a time when New York State is seeking to rethink and improve its energy future. The Con Edison AMI smart meter initiative is integral to this very effort, and it is the most influential and transformational project in the company's history. The Advanced Metering Infrastructure (AMI) environment supports critical corporate applications, hosting smart meter data and asset information for customer billing, outage management, and other purposes. This includes the Meter Data Management system (MDMs), Meter Asset Management system (MAMs), Profield (our Smart Meter installation and support software) and the server and hardware consisting of over 120 servers and storage located at various Con Edison and vendor hosted data centers. Included in the AMI environment and this supported infrastructure are the development, test, parallel, and user production environments, supporting the AMI platform and serving the various business units whose primary work assignments is to ensure accurate bills are delivered to our customers. The AMI computer environment also functions as a platform for and will be redesigned to support CORE (Oracle's CC&B), customer information system replacement project, Gas Central gas work management system project, and the replacement of the existing CECONY and O&R mainframe systems. Vital billing determinants gathered in the AMI computer environment will be used to ensure the new CORE system continues to provide customers accurate billing information.	

The hardware supporting the AMI platform is designed with redundancy and resiliency in mind. This in order that our commitment of 15-minute interval meter reads across all 5.3 million meters are obtained on time without impacting billing processes which in turn produce customer bills.

After the completion of the major AMI Business case in 2022, the plan is to improve existing business processes and eliminate manual processing. As part of this capital request (2024-2026) it is to support software enhancements to the Meter Data Management (MDMs), Meter Asset Management system (MAMs) and Profield systems. The focus for this request will be centered around the need for continuously improvement and stabilization in the area of billing, asset management and meter, network devices and sensor events processing. The enhancements above will also ensure we continue to support of ongoing corporate initiatives around meter data, sensor data and outage data dependent on AMI business strategy. This includes the Outage Management System, which is dependent on AMI for smart meter status during storm events processing, in turn limiting restoration time and reducing truck rollouts.

Secondly, in order to ensure we are current with software version for vendor support as well as latest cyber security requirements. Hence the MDM system need to be upgraded to the latest version during this capital request (2024 - 2026).

Finally, there is a need to replace all existing AMI hardware supporting Con Edison hosted AMI systems (this includes 300 file servers and the supporting disk storage required to maintain customer meter information) in year 2024 - 2026 as the current life span of the hardware and support expires in 2024.

Our production systems located at our 30 Worth Street production data center provide the computer hardware to support the consumption of 5.3 million meter reads , collecting the data in 15 minute intervals. As part of our commitment to our customers this information is also required for data presentment to all Con Edison customers. In addition, and as part of our commitment to improve in the area of accurate customer billing, our goal is to reduce and potentially eliminate the need to estimate customer bills.

In order to accomplish this the replacement hardware will need to be designed and implemented with high availability infrastructure for the Meter Data Management (MDMs) system, this both at our production data center at 30 Worth Street and also the disaster recovery site in Secaucus. Once implemented we anticipate a significant improvement on the overall billing process and a reduction of manual work which allows for human error.

Justification Summary:

As part of the deployment of 5 million electric and gas Smart Meters and enhancements to the AMI network, the elimination of manual work will improve safety for our customers and enhance the user operational experience. The planned system enhancements include introducing new software which will allow for real time alerts to be sent to first responders in the event of a menthane sensor failure or an actual gas leak.

Additionally, the AMI project will be seeking to implement new operational improvements throughout 2023-2026. For example, the AMI/Information Technology (IT) department will seek to further optimize interfaces between MAMS, MDMS, CC&B, and Gas Central. Furthermore, it is advantageous for Con Edison to consolidate interfaces feeding meter exchanges to CORE and AMI is preparing to retire or expand the Profiled Encore application to meet that projected need. Lastly, the MDMS will be perform another upgrade (9.0) in late 2025 for the MDMS to stay in compliance with security patches.

The AMI/Information Technology (IT) department recommends the above mentioned (work description) software enhancements and hardware refresh at the total cost of \$28,218,750.

To satisfy the demand on the AMI systems to support business requirements these software enhancements will continue to be required in the upcoming years. In addition, and as part of the recommended five-year hardware refresh, all server and storage hardware will need to be replaced to support these enhancements and updates to operating system and application software. Specifically, production support will cover internal and vendor labor for tasks such as large data reconciliation efforts to keep CORE and the AMI infrastructure in sync which supports accurate and timely billing objectives. Additionally, vendor support is needed for troubleshooting external defects related to third party errors.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Refer to original business plan.

2. Supplemental Information

Alternatives

Currently the only alternative would be to rebuild most the work projected for AMI to be absorbed by CORE (Oracle CC&B) and other projects. This would not only undue all the work previously scoped between AMI and CORE between 2021-2022, but also require additional adjustments for the Gas Central, WMS, etc.

Risk of No Action

The future investments in AMI are critical to Con Edison realizing the full value of its AMI project and completing the CORE (Oracle CC&B) project. If the company took no action, there would be potential billing issues for our company and customers because these enhancements will be required to support CORE billing determinants and the refresh of the AMI server and storage environment this to avoid performance issues. The existing hardware cannot be upgraded since it will be out of support and not current with the operating system and application software requirements.

Non-Financial Benefits

Refer to original business plan.

Summary of Financial Benefits and Costs (attach backup)

Refer to original business plan

Project Relationships (if applicable)

CIMS, CSS, OMS, WMS, GC, CORE

3. Funding Detail

Historical Spend -Total business case budget

	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Forecast 2021 (O&M only)</u>	<u>Forecast 2022</u>	<u>Forecast 2023</u>
Capital							
O&M							
Retirement							

Total Request (\$000):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital			<u>7,000</u>	<u>15,219</u>	<u>6,000</u>
O&M*					
Retirement					

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor			<u>2,000</u>	<u>2,000</u>	<u>1,500</u>
M&S			<u>2,675</u>	<u>10,069</u>	<u>2,500</u>
Contract Services			<u>2,325</u>	<u>2,775</u>	<u>2,000</u>
Other				<u>375</u>	
Overheads					
Subtotal					
Contingency**					
Total			<u>7,000</u>	<u>15,219</u>	<u>6,000</u>

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings					
O&M Avoidance			<u>300</u>	<u>450</u>	
Capital Savings					
Capital Avoidance					

*FTE savings from hardware refresh – patching, maintenance, etc.

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M					
Capital					

*If whitepaper is supporting a capital project/program this refers to implementation O&M

**Please refer to the Corporate Contingency Guidelines

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M ☐ Regulatory Asset
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: AMI Business Analytics	
Project/Program Manager: Berna Falay Ok	Project/Program Number (Level 1): 23322950
Status: ☒ Initiation ☐ Planning ☐ Execution ☐ On-going ☐ Other:	
Estimated Start Date: March 2022	Estimated Date In Service: December 2025
A. Total Funding Request (\$000) Capital: \$7,179 O&M: \$300	B. ☐ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: \$300 Capital:	D. Investment Payback Period: (Years/months) (If applicable)
Work Description: The goal of this project is to design and deploy a suite of data analytics use cases to assess customer load profiles and patterns while leveraging the Company's Advanced Metering Infrastructure (AMI) data, as well as other internal and external data sources. This integrated application (AMI Business Analytics) will allow Con Edison to gain predictive insight into specific customer trends, reconciliation of weather adjusted peaks of the gas and electric systems, and uptake of load modifiers. It will also help the system planning process, which is designed to identify current and future operating requirements, risks, and potential solutions to provide safe, reliable, and resilient systems. This effort will leverage the Company's Enterprise Data Analytics Platform (EDAP), which will provide information about these systems that dictate the use cases of the model. The program will identify additional analytics to be performed on the data already existing in EDAP, as well as the opportunity to integrate new data sources to unlock additional insights and deliver new analytics use cases. The project will focus on data integration for customers employing emerging technologies like electric vehicles (EVs), heat pumps, distributed energy resources (DG/CHP), and other systems incentivized by policies like New York States' Climate Leadership and Community Protection Act (CLCPA) and New York City's Local Law 97 (LL97). Initial use case scenarios listed below are mostly concentrated around emerging technologies and new business/growth, but as the project matures, Energy Management/Commodity Forecasting will continue to build upon these use cases to address emerging policy and innovation and to reflect continuous improvement. The effort will establish a framework for identifying new use cases. It will also assess value delivered relative to complexity and reprioritize the portfolio of use cases as appropriate. The effort will begin by examining the following use cases:	

Use Case 1: Electric Vehicle and Chargers Load Profiles:

As EVs gain traction in the marketplace, they will require the installation of charging infrastructure. The chargers, which have varying charging speeds based on wattage requirements, are a large investment in and of themselves. Depending on where the demand to charge vehicles manifests, they may have a large effect on network and system peak and volume. Increases in electric demand could require Con Edison to coordinate heavily with EV charger installers prior to adding a charger to the grid and might even lead to eventual upgrades to the distribution system. Planning for the mass adoption of EVs is therefore necessary.

The project will examine details on how EVs impact the load peak and load curves in Con Edison's networks. The Company will analyze the AMI data to create a typical load curve for the following breakout categories:

- Light, medium, and heavy-duty vehicles,
- Publicly accessible charging stations (e.g., those in parking garages) and privately held stations (e.g., those in private residences,
- Level 1 chargers (L1), Level 2 chargers (L2), and direct current fast chargers (DCFC).

Analyzing these load curves alongside adoption estimates will help to forecast the effect EV chargers will have on both networks and the distribution system.

Use Case 2: Heat Pumps:

Like EVs, heat pumps are being promoted as alternatives to gas fired boilers and furnaces. Con Edison anticipates that in coming years, new business customers will likely install electric space heating systems and that existing buildings will retrofit their heating systems to comply with emissions limits. Heat pumps, which can be used in space- or water-heating systems, will play a key role in the electrification of heating because of their potential to make electric heating more efficient. However, as with EVs, the impact heat pumps have on peak and volume for both gas and electricity are difficult to determine without knowing how heat pumps operate within the Con Edison territory. Because the heat pump coefficient of performance is dependent on ambient temperature and because existing studies on heat pump performance have tended to take place in climates that are much warmer than that in the Northeast, there is a dearth of relevant, useful data regarding heat pump performance. The Company must therefore attempt to discover their load behavior using customer AMI information so that it can improve its forecasting accuracy. Energy Management plans to use AMI data of customers who have installed heat pumps to gain a better understanding of how they function on the Company's distribution system. It will examine load performance in the following different categories:

- Air source heat pumps for new and existing buildings
- Ground source heat pumps for new and existing buildings
- Hot water system heat pumps for new construction and retrofits.

Use Case 3: Battery Storage:

Con Edison is partnering with companies to ensure that battery storage is being installed in the territory. In some cases, these batteries have not yet seen significant use, but they are the forerunners in what will be a movement toward storage interconnection. The owner of the battery technology and the purpose it is meant to serve will determine its actual behavior. Energy Management/Commodity Forecasting plans to use AMI Business Analytics application to develop a nuanced understanding of the load behavior of batteries with respect to their operational objectives.

Use Case 4: New Business Ramp Up

AMI could also provide insight on new business ramp-up electric usage. New construction can sometimes take several years from beginning to completion, incurring a slowly increasing electric demand. Eventually the electric demand from a building will achieve a demand in line with design expectations communicated to Con Edison. Prior to that point, however, it is important to know the percentage of its projected load that new construction is incurring. AMI hourly data from prior projects' ramp up can provide estimates as to when new business reaches its peak demand after completion. Using AMI history from ongoing projects, Energy Management/Commodity Forecasting intends to link usage data to different types of construction documented in customer accounts. This will allow for a territory-specific ramp-up electric load curve. Energy Management/Commodity Forecasting plans to develop typical load curves based on the location and building type of new construction to assist in the development of electric peak forecasts at the network level. This is critical for our load relief planning.

Use Case 5: New Business Load Density

AMI data could provide Energy Management/Commodity Forecasting with the opportunity to analyze the electric load of new buildings that have been connected to the distribution system and use their ramped-up demand to get an estimate of average load density for buildings. Energy Management/Commodity Forecasting intends to calculate a load density in kVA per square foot for different customer types and different building types. This will give it a critical load value that it will employ in long-term forecasting.

Use Case 6: Gas Load Distribution of Interruptible Customers

Energy Management/Commodity Forecasting will use AMI data from interruptible gas customers to understand what the customers' typical hourly loads are and how much gas those customers use each day. This will assist Gas Forecasting in developing a more accurate forecast for interruptible gas usage. Analyzing AMI data in conjunction with account information for interruptible customers will also allow Energy Management/Commodity Forecasting to study the results of peak events during which interruptible customers are required to use an alternate source of fuel. Studying these events would give Energy Management/Commodity Forecasting a better understanding of when and how interruptible customers contribute to peak gas demand. It could allow them to predict how many of the customers will reliably comply with their alternate-fuel agreement. This will reduce the uncertainty of the weather adjusted peak and add value to its annual reconciliation to the forecast.

In addition to these high-priority case uses, Energy Management/Commodity Forecasting will be able to use EDAP to assess the impact that Energy Efficiency and Demand Response programs have on demand. The group will also integrate AMI data from distributed generation customers, such as, for example, distributed solar output.

Justification Summary:

Recent policies such as the CLCPA and LL97 have significantly increased the importance of the utility planning process and therefore have put upward pressure on the accuracy of the short, medium, and long-term forecasting of the electric, gas, and steam systems. In support of the CLCPA goals, the Company must be prepared to leverage the capabilities of clean energy technologies including EVs, heat pumps, Battery Storage, and Solar Panels (PV), to enable a dynamic and reliable grid. This project will help enhance the variety of reporting, analytics and forecasting that the Energy Management Organization provides to both internal and external customers. Energy Management, which is responsible for wholesale energy transactions, billing and reporting to different markets and

regulatory bodies, also provides short, medium, and long-term electric, gas and steam forecasts. These forecasts include peak, volume, and revenue forecasting.

The Company's existing data sources and platforms can be leveraged to create business value to address these challenges. These include but are not limited to: EDAP, Customer Project Management System (CPMS), Demand Management Tracking System (DMTS), Customer Information System (CIS), Power Clerk, EnergyIP/MDMS, MV90, and TCIS.

This project will help Energy Management perform the following functions:

- Integrate AMI data into the existing forecasting process flow to allow for more accurate representation of load growth, better visibilities into impacts and participation in energy efficiency programs and customer energy usage behaviors at more granular levels.
- Consolidate data sources used by Energy Management into a single platform.
- Utilize state-of-the-art software to improve Energy Management in managing approximately \$3.5 billion in wholesale energy transactions.
- Plan for future needs that arise from the CLCPA, LL97, and Reforming the Energy Vision (REV) using a fully integrated solution for AMI data analytics.
- Use advanced software, automation tools and advanced analytics to move away from time-consuming manual processes.

Improving the Company's knowledge of the future helps it to optimize capital and O&M expenses by making existing processes more efficient and reproducible. It also contributes towards the Company's Clean Energy Commitment; these use cases give the Company the opportunity to plan for a green future and provide a positive impact to the customer. Other potential impacts could include managing or preventing an increase in customer rates and improving system performance with targeted programs implemented in response to data analytics.

A lack of understanding of customer behavior and load modifier adoption could result in inaccurate forecasts, increase the risk exposure of system reliability and supply cost, and lead to misalignment with environmental and energy policies.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

The Company's five- and ten-year plans include preparing for a green energy future as outlined in LL97 and in the CLCPA. This project addresses CLCPA investment activity by implementing an AMI Business Analytics tool that addresses use cases aligned with CLCPA goals. For example, the CLCPA includes goals to install 3,000 MW of battery storage by 2030. Con Edison is seeking to approve interconnection requests for at least 300 MW of storage in its service territory by 2025. AMI Analytics that examine the performance of batteries currently installed on the system provide Con Edison with an understanding of where batteries can be deployed based on their performance and where they might be most useful.

Similarly, use cases addressing the additional load incurred by heat pumps will provide a fundamental understanding of technology that will help to decarbonize New York State. AMI Analytics will help to develop forecasts, which predict what Company revenue will be. Knowledge of revenue helps to build a budget that looks five years into the future and includes plans to implement these technologies. Understanding them now is therefore critical to Company function and climate mitigation.

Improving energy usage analytics also helps the Company to mitigate risk. Insufficient information regarding emerging technologies leads to inaccurate commodity forecasts. Because forecasts are used to plan energy purchases and operational projects, they can negatively impact the Company's strategic plans. Inefficient scheduling or operational work could result in increased customer bills, decrease in Company reliability, and negatively impact stakeholder relations. The inverse is also true; better forecasting can help to manage customer costs, improve visibility of problem areas that the Company must address, and improve the stakeholder experience. AMI analytics can act as a powerful tool for forecasting improvement that the Company has identified as a key risk mitigation initiative.

2. Supplemental Information

Alternatives

Alternative 1

One alternative would be to continue existing processes without incorporating AMI data into the workflows. This alternative would fail to leverage critical customer data from one of the Company's largest investments. It also has the potential to lead to inaccurate forecasting. Lastly, running manual one-off queries is time-consuming, complicated and is not an ideal, efficient or effective option.

Alternative 2

Another alternative is to reduce the scope of the AMI Business Analytics undertaking so that it does not address as many use cases as laid out in the Work Description. The inability to leverage AMI's valuable data could result in the Company not adequately addressing high priority forecast modifiers, whose effects are not yet holistically quantified. Energy Management / Commodity Forecasting has deemed the use cases listed above as vital to producing an accurate long-term forecast that complies with CLCPA demands.

Risk of No Action

Risk 1

Various parts of the Company are already beginning to use AMI data to support their operations and decision-making process. If Energy Management does not take advantage of this opportunity, the department will lag in utilizing data to drive decisions and not reap the benefits of one of the biggest investments the Company has taken.

Risk 2

As the Company's gains more data from AMI and as more customers elect to install new electric technologies, the traditional methods of forecasting load become increasingly insufficient. The more time spent without a way to incorporate AMI data into predictions, the less accurate those predictions are likely to be. This runs the risk of inaccurate revenue predictions, inaccurate O&M and capital forecasts, decrease in system performance, poor customer experience, and potentially increased cost to the customer.

Non-Financial Benefits

This tool allows for the development of advanced analytics, which will provide new insights for the Company and its customers. The insights provided by advanced analytics will have indirect benefits to

improving the customer experience, providing valuable information to the Company to make informed strategic decisions as it relates to its capital strategy, where to deploy operations and maintenance resources, and where to prioritize upgrades to improve system performance. This project will also help the state meet its clean energy goals to ensure the state has a green future.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

This project will indirectly result in financial benefits, as mentioned above. Accurate forecasts lead to improved dispatch and procurement of gas and electric supply and meeting load with the appropriate amounts. An under-forecast could lead to purchasing electric and gas in the real time market at a premium and an over-forecast could lead to purchasing too much gas or electric.

2. Major financial benefits

In addition to the financial benefits previously mentioned, this new application will lead to improved daily, peak, and volume forecasts, which can help optimize costs and planning.

3. Total cost

The total capital cost of this project is \$7.2 million, which includes procurement / development of software, algorithmic coding, and labor associated with gathering requirements, designing, implementing, testing, and deploying the suite of data analytics use cases.

4. Basis for estimate

The capital costs are based on an estimation model for analytics work derived from prior analytics efforts. The model takes into account the number of new data sources to be integrated into EDAP; the transformations required of these data sources in order to be used for analytics; and the unique number of metrics, reports, user interfaces, and predictive models that need to be built out, as well as their complexity. The specific use cases outlined above were used to generate estimates for the first two years of this request, with the third and fourth year assuming an equal volume and velocity of use cases as the second year. O&M costs are estimated from existing EDAP O&M costs for prior analytics work.

5. Conclusion

Con Edison, New York State, and New York City are committed to the most aggressive clean energy and climate agenda in the country. As Con Edison works to achieve the ambitious goals set forth by various stakeholders, efficient and effective planning becomes indispensable. This is an investment to leverage data analytics to support ongoing forecasting and planning efforts as the Company embraces a clean energy future.

Project Risks and Mitigation Plan

Risk 1

Data source integration challenges (data quality issues, lack of documentation)

Mitigation Plan

Detailed discovery sessions at the project's initiation will uncover specific risks and allow

for building a roadmap that begins integration of more challenging data sources before they are needed for specific use cases.	
<u>Risk 2</u> Lack of business user familiarity with or understanding of EDAP & analytics	<u>Mitigation Plan</u> The Company has developed training specific to EDAP and maintains an Analytics Center of Excellence (COE) that supports the platform, best practices, and training.
<u>Risk 3</u> Emerging or otherwise unplanned use cases that must be accommodated	<u>Mitigation Plan</u> The project will utilize an existing analytics prioritization framework and coordinate with program leadership to determine priorities for execution within timeline and available funding.
Technical Evaluation / Analysis	
Project Relationships (if applicable)	

3. Funding Detail

Historical Spend

	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2021</u>
Capital						
O&M						
Regulatory Asset						

Total Request (\$000):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	\$1,173	\$2,002	\$2,002	\$2,002	
O&M*				\$100	\$200
Regulatory Asset					

Capital/Regulatory Asset Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor	\$300	\$600	\$600	\$600	

M&S	\$1	\$1	\$1	\$1	
Contract Services	\$672	\$1001	\$1001	\$1001	
Other					
Overheads	\$201	\$400	\$400	\$400	
Total	\$1,173	\$2,002	\$2,002	\$2,002	

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M				\$100	\$200
Capital					

*If whitepaper is supporting a capital project/program this refers to implementation O&M

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Project Status:

- Initiation – New project, not authorized yet
- Planning – Project authorized, not started yet
- Executing – Project in-flight
- On-going – Annual program

Customer Energy Solutions 2022

1. Project / Program Summary

Type: ☐ Project ☒ Program	Category: ☒ Capital ☒ O&M
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic	
Project/Program Title: Customer Recommendation & Analysis Tools	
Project/Program Manager: Millene Hahm	Project/Program Number (Level 1): 25508504
Status: ☒ Initiation ☐ Planning ☐ Execution ☐ On-going ☐ Other: _____	
Estimated Start Date: 2023	Estimated Date In Service: 2025
A. Total Funding Request (\$000) Capital: \$41,500 O&M: \$17,500	B. ☐ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: Capital:	D. Investment Payback Period: (Years/months) (If applicable)
Work Description: The Customer Recommendation and Analysis Tools program is part of the Company's Strategic Customer Experience ("Strategic CX") Portfolio of projects which seeks to deliver a dynamic customer experience that will both meet evolving customer and stakeholder expectations and enable the Company to lead the transition to a clean energy future. Additional information about the Company's Strategic CX Portfolio of projects is outlined in the Customer Operations Panel Testimony. To meet State and local clean energy goals, the Company must expand and enhance its existing clean energy webpages and tools to provide customers with a more personalized and interactive experience to help customers better engage in the clean energy transition. The Company also needs tools to support the contractors and professional networks that directly participate in the Company's clean energy programs and play a key role in facilitating customer adoption of clean energy technologies. The Customer Recommendation & Analysis Tools Program ("Program") will deliver an improved online experience by offering a suite of tools, refined by customer sector, to facilitate decision-making and adoption of clean energy programs. CES will use a customer-centric design approach. Through surveys, interviews, and journey mapping, customers and contractors will play a key role in the Company's development of these tools. This program will be an ongoing project that will continue to refine the recommendation and analysis tools based on customer and stakeholder feedback, clean energy program changes, regulatory changes, and technological advances. The scope of tools provided through the Customer Recommendation and Analysis Tools Program will vary to reflect the differing needs and experiences of customers. Consistent with a "customer first" philosophy, each planning phase or "program increment" starts with an examination of feedback from customers regarding what they want. The key focus areas include:	

- **The Clean Energy Experience:** The Company will provide customers with individualized energy savings and clean energy solution recommendations, cost estimates, a list of eligible incentives, rate options, and comparisons for mass market customers. Customers will follow a customized digital journey that will allow them to input existing home/facility characteristics and technologies through a decision tree pathway. They will then receive recommendations of technologies as well as clean energy and electrification programs suitable for their home/facility, with an understanding of potential bill impacts, the return on investment of these decisions, and expected non-energy benefits. As the Company expands the portfolio of rates available to mass market customers, additional tools will be needed to help customers understand and compare the available rate options. The Company will explore expanding the customer-facing tools to include a targeted list of eligible contractors who implement the clean energy solution.

Work completed in the rate period would support future development of such as providing customers with a summary view of all the Company's clean energy programs that the customer was or is participating in, transparency into the customer's clean energy project status and timeline for payment of program incentives, and status updates on any electrification-related upgrades required for Con Edison service.

- **Electrification Experience Hub:** The Company will make significant new investments in heating and transport electrification, building envelope upgrades, while also addressing electrical constraints to support the State's clean energy vision. To enable customer adoption, CES will develop digital tools that guide customers through the electrification process, while also educating customers on the various technologies and potential benefits. The customer's electrification experience will include service and system adequacy estimators for electrification. To help mitigate potential upgrades, the Company will engage with customers on potential options to expedite and/or reduce upgrades (e.g., building envelope upgrades that reduce heat pump system capacity needs).
- **Clean Energy Contractor Hub:** Contractors and professionals working with customers are critical to meeting State and local clean energy goals. To support the Company's contractor network, CES plans to develop digital tools that provide information about the Company's clean energy programs, associated rules, project application requirements, and incentive amounts. Through this hub, eligible contractors will access Company-approved customer-facing marketing materials, sales enablement tools, and updates on their project status and program incentives.

CES will also explore expanding the Contractor Hub to connect contractors with the trade professionals and networks necessary to complete clean energy projects, such as licensed plumbers and electricians and weatherization contractors.

- **Clean Energy Customer Service Tools:** To advise customers and recommend tailored clean energy solutions, Con Edison employees will need additional tools. This includes exploring additional Customer Service Representative ("CSR") tools, business development management tools, and tools for the external vendors who manage the Company's clean energy programs. For example, CSRs and business development

managers will need tools to access the customer inputs and analyses to respond to any customer inquiries regarding customer-specific recommendations.

To implement the Customer Recommendation & Analysis Tools Program, CES must design a roadmap detailing the plan for development and roll out. While the Program has ambitious goals, these recommendation and analysis tools will need to be developed in phases for each of the customer and contractor segments, as well as through an iterative process to incorporate feedback and adjust to changing technologies. To support this endeavor, CES will conduct and complete a Phase 0 analysis in 2022 with the following detailed assessments:

- Input from key stakeholders including Department of Public Service Staff, customer advocacy groups, contractors, and other third parties;
- A benchmarking study assessing customer recommendation and analysis tools available across other utilities, energy providers, and industries that provide such customer tools
- Identify improvement opportunities in the Company's customer-facing clean energy webpages and tools
- Existing and planned clean energy program management and Company systems (e.g., DMTS, DRMS) for integration, along with integration requirements
- External vendor products and/or analytic tools available for this project
- Interactive tools needed to gather customer information for the customized recommendations
- Web analytics needed to monitor traffic, collect feedback, and assess the effectiveness of the customer tools
- A recommended operating model, including governance and organizational design for management of the Program

The proposed capital and O&M budgets are based on the following activity assumptions. These costs will be refined after the Phase 0 assessment.

- System integrations
- Vendor tools to provide customized customer recommendations and estimates
- Interactive decision tools that guide customers during their digital experience
- IT infrastructure, as well as labor expenses for the Digital Customer Experience ("DCX"), IT, CES, and project management resources needed to advance the Program
- Ancillary support functions filled by contractors to conduct ongoing maintenance and support of these tools
- Full-time resources to provide day-to-day project management, manage the customer experience, and create and introduce new content

Justification Summary:

The Customer Recommendation & Analysis Tools program is a part of the Company's Strategic CX Portfolio of projects, as outlined in the Customer Operations Panel Testimony. The SCX Portfolio projects work together to achieve the following value propositions:

- **Increase customer satisfaction** even as expectations continue to rise
- **Drive cost efficiencies through** improved service and resolution
- **Support statewide clean energy goals** by generating customer demand for and streamlining adoption of programs
- **Facilitating understanding and adoption of optional rates** which help customers save and support grid efficiency

- **Enable safe, reliable and resilient delivery of energy** through improved communication during an outage
- **Provide education and access to payment assistance** when a customer experiences financial difficulties that impact their ability to pay for service

The Customer Recommendation & Analysis Tools program specifically contributes to these value areas because it:

- Supports statewide clean energy goals: To achieve the State's ambitious clean energy goals, the Company must not only provide customers with a simple and seamless experience that offers customized assessment tools with recommendations, but also improve contractor engagement by facilitating their participation in the Company's programs with easily accessible program information and sales enablement tools. While the current clean energy information and tools have expanded gradually over the years, there is need for greater integration and expansion of the capabilities.
- Improves Customer Satisfaction: Customers and regulators have clearly communicated the need for an assortment of analysis and recommendation tools to facilitate the adoption of clean energy options.
- Facilitates understanding and adoption of optional rates: The Customer Recommendation and Analysis Tools will provide customers with individualized energy savings and clean energy solution recommendations, and rate options/comparisons for mass market customers. As the Company expands the portfolio of rates available to mass market customers, additional tools will be needed to help customers understand and compare the available rate options in conjunction with their clean energy technology choices.

The Customer Recommendation and Analysis Tools program will help customers overcome the complexity of decision-making around clean energy investments and encourage contractor participation in the Company's clean energy programs. Barriers to customer adoption of clean energy solutions will be reduced by providing timing estimates for service and system upgrade needs, along with identifying eligible contractors and upgrade mitigation solutions (e.g., energy efficiency building envelope). The Clean Energy Contractor Hub will improve the way the Company offers contractors the program information and tools necessary to more effectively market and engage customers. Finally, to advise customers and recommend tailored clean energy solutions, Con Edison employees will need additional tools. This includes exploring additional Customer Service Representative ("CSR") tools, business development management tools, and tools for the external vendors who manage the Company's clean energy programs. For example, CSRs and business development managers will need tools to access the customer inputs and analyses to respond to any customer inquiries regarding customer-specific recommendations._

Industry and societal trends, including technology advances and clean energy policy commitments, have and will continue to transform how customers use energy and interact with the Company. Supporting customers during the transition to a clean energy economy is at the core of the Company's business and this requires a dynamic customer and contractor experience that will meet evolving and enhanced regulatory expectations. The Customer Recommendation and Analysis Tools program is a critical step in leading this transition.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

The Customer Recommendation and Analysis Tools program is a strategic project that will improve the customer and contractor experience and will help enable participation in Company programs that support the clean energy future.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection

Developing small, one-off, home-grown tools to address the identified customer and company needs. This approach is inefficient, as it will result in a lack of cohesiveness and cross-functional coordination in the use of Company tools for both customers and contractors. This approach will impede progress toward a clean energy future. Though some individual tools might have a lower cost, collectively they would be more costly and less efficient at meeting identified customer / contractor needs.

Alternative 2 description and reason for rejection

Not proceeding with the project. This approach is rejected due to the many identified customer and Company needs that must be addressed.

Alternative 3 description and reason for rejection

Risk of No Action

Risk 1

Customer risk. The current lack of these sophisticated, digital tools may lead to customer dissatisfaction and frustration. This problem would only be exacerbated as customer expectations continue to rise based on digital tool offerings across other industries and as programs and technologies become more sophisticated. Customer dissatisfaction, and potential for regulatory complaints, will arise if customer needs and expectations are not met.

Risk 2

Clean energy goal achievement. Many of the solutions needed for a successful clean energy transition are unfamiliar to contractors and / or customers. Without the support of these tools driving customer and contractor awareness and consideration, adoption of these solutions may suffer.

Non-Financial Benefits

Enhances the customer clean energy experience while enabling achievement of the state's clean energy goals. This solution also enables cross-departmental coordination by developing a set of tools that can be used for multiple purposes and programs by those both directly and indirectly supporting the Company's clean energy efforts

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

3. Total cost

The total cost estimated costs for the Customer Recommendation & Analysis Tools Programs during the 2023-2025 period are \$35M in capital and \$14.5M in O&M, the details of which are provided below.

4. Basis for estimate

Cost estimates are based on historical Company costs for similar digital tools and enhancements such as DCX and rate pilots.

5. Conclusion

The Customer Recommendation and Analysis Tools Program is critical to meeting the Company's rapidly increasing energy savings goals by providing customers with the customized recommendations and tools needed to adopt appropriate clean energy solutions.

Project Risks and Mitigation Plan

Risk 1: This Program does not have a detailed implementation plan.

Mitigation plan: The Phase 0 assessment will include review of project dependencies and development of a comprehensive roadmap, along with identifying potential alternative solutions to address any potential delays.

Technical Evaluation / Analysis

Project Relationships (if applicable)

The development of the Customer Recommendation & Analysis Tools Program will impact the new Customer Relationship Management system and DCX.

3. Funding Detail

Historical Spend

	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historical Year</u> (O&M only)	<u>Forecast 2021</u>
Capital	0	0	0	0	0	0
O&M	0	0	0	0	0	0

Total Request (\$000):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	0	12,000	12,000	11,000	6,500
O&M*	0	5,500	5,000	4,000	3,000

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor	0	500	500	500	500
M&S	0	0	0	0	0
Contract Services	0	10,000	10,000	9,300	5,100
Other	0	1,300	1,300	1,000	700
Overheads	0	200	200	200	200
Total	0	12,000	12,000	11,000	6,500

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings	0	0	0	0	0
O&M Avoidance	0	0	0	0	0
Capital Savings	0	0	0	0	0
Capital Avoidance	0	0	0	0	0

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M	0	5,500	5,000	4,000	3,000
Capital	0	0	0	0	0

*If whitepaper is supporting a capital project/program this refers to implementation O&M

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Project Status:

- Initiation – New project, not authorized yet
- Planning – Project authorized, not started yet
- Executing – Project in-flight
- On-going – Annual program

Customer Energy Solutions

2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☒ O&M ☒ Regulatory Asset
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: DER Integration and Management Program	
Project/Program Manager: Shaun Smith	Project/Program Number (Level 1): L1-23322926 (IT/OT Software and Infrastructure) L1 -25508535 (Grid Edge Technology Environment)
Status: ☐ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other: _____	
Estimated Start Date: TBD	Estimated Date In Service: TBD
A. Total Funding Request (\$000) Capital: 52,937 O&M: 14,426 Regulatory Asset: 33,330	B. ☐ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: Regulatory Asset:	D. Investment Payback Period: (Years/months) (If applicable)

Work Description:
Con Ed's service territory currently has 480 MW (40k units with 365 MW of solar) of distributed generation & storage The adoption of DER is critical in meeting New York's carbon reduction goals while providing direct benefits to the public including greater customer choices for energy supply, reductions in losses, , decreased reliance on local gas generation, reductions in congestion, and local economic development. The data generated by these assets could enable consumers to participate more proactively in the energy market. However, scaling DER adoption to support The Climate Act's goals is challenging:

- Technology: Several of Con Ed's systems have finite capacity & capability for the devices they support (e.g., SCADA system used for monitoring and control and deeper penetration of DER will increase the data (e.g., live telemetry reads from more devices) that will be needed to manage the grid reliably.
- Processes: Many processes for managing, connecting, and registering DER today are manual (e.g., review of interconnection screens, data transfer/entry between systems). Manual processes will not be able to timely meet future customer demands as DER penetration grows and will be viewed as barriers preventing achievement of the Climate Act's requirements.
- Grid Planning & Operation: Today, several circuits are at hosting capacity limits (DER penetration has been high) where adding new DER would be cost prohibitive (e.g., in Staten Island and Westchester). Better tools for planning and operating DER can unlock some of this capacity, allowing more DER to interconnect in these areas. An increase in DER penetration may also make the power supply profile increasingly variable, thus adding complexity to safety, grid stability, asset condition, reliability, and resilience.

The DER Integration and Management program will address these challenges and improve hosting capacity, resiliency, market access, long term grid capital cost, and DER customer experience for both individual users and 3rd party aggregators (see the Justification section). To achieve this, Con Ed must build new capabilities. In the near-term, Con Ed will accelerate the deployment of new capabilities where there is a high confidence of immediate value while capabilities requiring further review and analysis will be pursued via a smaller scale minimum viable product (MVP) development to assess the use case

We will solve for 11 use cases:

- (1) Improvements in the hosting capacity process, analysis, and maps;
- (2) Increases in the automation of the CESIR study process;
- (3) Increases in the ability to validate DER data between the registration and interconnection databases;
- (4) Automation of monthly updates to the hosting capacity map;
- (5) Increases in the ability to assess long-term load forecasting/ grid hosting constraints on a time-series level;
- (6) Enhances real-time power flow and distribution-level demand response modelling, incorporating DER and weather;
- (7) Enhances communication with DER owners / aggregators and other demand side resources;
- (8) Incentivizing customers to select the "best" locations with 'search and find' capabilities;
- (9) Automation of the connection of DER status, controllability, and characteristics to load flow planning;
- (10) Acquiring the ability to implement push DER / inverter settings to align with seasonal operating regime; and
- (11) Acquiring control of grid edge assets in case of localized disruptions & maintenance/external adverse events.

To meet these challenges, additional investments are required over the next three years. These investments center on three areas related to IT/OT software and infrastructure, grid edge technology, and a smart inverter customer program.

Information Systems & Operational Software

The IT / OT software and infrastructure investments center on seven discrete initiatives:

- (1) The development of an online grid-edge DER nameplate database;
- (2) The development of a middleware translation platform;
- (3) A custom-built solution for network flow modeling integrating PVL (Poly-voltage load flow) that considers DER and weather;
- (4) Linking historical database of DER behavior to PVL tool;
- (5) Development of a unified control dashboard used for system switching (coordinated with NYISO) and system planning (load flow analysis, outage scheduling, work prioritization); and
- (6) Various improvements to Cybersecurity systems.

Grid Edge Technology Environment:

This area involves adding capabilities to The Learning Center (“TLC”) for testing & deployment of the four MVP level use cases in a simulated environment without impacting operations. The TLC would feature both sample grid-edge devices (e.g., EV chargers, smart inverters) and a simulated control center (including representative Con Ed IT/OT stack). In the short term, it will allow Con Ed to better understand the value of the MVP capabilities Con Ed is building out and provide the ability to train employees in a simulated environment. In the longer term, this asset will be leveraged to develop the next horizon of capabilities such as advances in sensors, high-speed/volume communications, edge computing, predictive analytics, and artificial intelligence (AI) bringing incremental value to customers. In addition, the findings of the Grid Edge Tech Environment will allow Con Ed to collaborate with community and vendor stakeholders, to ensure an equitable renewable transition.

Smart inverter customer program:

Con Ed is requesting regulatory asset funding to cover inverter upgrade costs for customers.. This will enable customer participation in MVP development that will bring wide reaching benefits The Smart inverter program should help unlock hosting capacity, improve the customer experience, and lower long-term T&D costs.

The expected cost of these investments is as follows (more detail to follow in the cost section of this document):

	2022	2023	2024	2025	2026
DER-IM					
Information Systems and Operational Software*	\$ 807,000	\$ 15,484,700	\$ 13,000,000	\$ 13,000,000	-
Grid Edge Environment*	-	\$ 1,000,000	\$ 2,250,000	\$ 2,250,000	\$ 5,144,880
Smart Inverter Rebates [#]	-	\$ 3,000,000	\$ 10,000,000	\$ 12,000,000	\$ 8,300,000

*Capital Investment #Regulatory Asset Request

Justification Summary:

The justification for Con Ed's investment in comprehensive distributed energy resource integration and management is based on enablement of five key short- and long-term benefits: (1) scaling the hosting capacity of the distribution grid, (2) preparing the system for new markets, (3) improving the DER ownership experience, (4) lowering the long-term cost of the energy transition, and (5) maintaining system reliability & resiliency. In this rate case, Con Ed will make investments focusing on enabling benefits and solving challenges in the next 3 -5 years. This timeframe primarily addresses the first three areas of benefit while the benefits related to the latter two items will be unlocked in the future through deployment of abilities being developed at the MVP level in this rate case:

1. Scale system hosting capacity to meet New York city and state climate targets

.. Absent investments supporting the capabilities described above, there will be significant challenges over the next 3 – 5 years in areas where hosting capacity is already exceeded (e.g., parts of Staten Island and Westchester) as well as other areas that will face similar situations as DER adoption grows.

Several of the capabilities noted in the Work Description will mitigate the recent increases in interconnection costs. The need for feeder extensions and service upgrades can be reduced with more accurate hosting capacity abilities and increasing automation of the hosting capacity analysis process. This would provide customers more accurate circuit visibility for project planning through improve the hosting capacity analyses that take place more frequently, with fewer assumptions, and at a more granular circuit level. The ability to assess load forecasting/grid hosting constraints at a time-series level would also limit the need for network protector improvements.

In the longer term, the ability to monitor and remotely control smart inverter settings will increase circuit hosting capacity by decreasing the need for SCADA hardware and voltage regulation at DER sites. Additionally, the ability to automatically adjust smart inverter settings based on circuit conditions (e.g., voltage control, fault response settings) may further Con Ed's ability to unlock hosting capacity without materially impacting DER revenues.

Finally, as DER proliferates, a monitoring system is needed to provide cheaper scaling while maintaining the highest levels of cybersecurity. The SCADA Distributed Network Protocol (DNP3) system is primarily used for communication between a master station and remote terminal units/intelligent electronic devices, allocates points to monitor large grid-edge assets' live statuses and characteristics and as such is not suited for the challenges of the future.. This new system will enable use of a scalable 'middleman' distributed intelligent intermediary system preventing direct communication between customer DER equipment and Con Ed central systems, to avoid potential cybersecurity challenges.

2. System preparation for new market architectures

A value driver of DER ownership is the ability of the DER owner to sell energy and other grid services. FERC 2222 permits DER owners to participate in the wholesale market. While this benefits DER owners, it increases the complexity of communication between utilities, DER customers / aggregators, and the NYISO. To ensure safe and reliable grid operations, the NYISO envisions distribution system operators having the ability to notify aggregators when an individual asset must be derated / forced out of service based on current grid conditions (e.g., load profile). While today, most DER can discharge without posing issues, increasing amounts of DER responding concurrently to a NYISO dispatch signal, may create capacity and voltage issues, resulting in voltage levels outside ANSI limitations. Building out the ability to model real time power flow and distribution-level demand response with DER will enable more agile decisions about when output must be restricted while maximizing DER utilization.

In the longer term, there is potential to host the distribution-level market platform with auctions for localized “distribution” services from aggregated DER. This forward-looking capability would create additional value streams for DER participants while building grid resiliency and flexibility through holding and producing dispatchable energy.

3. Improve the DER ownership experience

To drive deep DER adoption in its service territory, Con Ed is focused on providing the best possible customer experience for planning, interconnecting, registering, and operating a DER. Historically, utilities in other states with advanced DER adoption rates (e.g., Hawaii, California) have faced challenges scaling their interconnection processes to meet demand, such that interconnection has become a bottleneck to rapid DER adoption¹. Con Ed seeks to proactively address existing and growing challenges in the customer journey through by making investments that mitigate current challenges. To achieve these goals, Con Ed must invest in key capabilities related to hosting capacity analysis/mapping, process automation, and data validation/streamlining. .

During DER developers’ initial project planning process, there are gaps in visibility into circuit hosting capacity including: (1) the lack of a hosting capacity analysis for 1 or 2-phase circuits which comprise the majority of DER applications; (2) the hosting capacity analysis assumption of an even load distribution across non-meshed loops; (3) the use of a generic shoulder month minimum load without circuit-specific DER information; and (4) the manual monthly update of customer-facing hosting capacity maps. Data import automation and increasing granularity of hosting capacity analyses through technology that enhances data availability and modeling capabilities can address these matters.

While Con Ed is compliant with current statewide interconnection requirements, there are opportunities to shorten the process (currently up to 80 days are allowed), increase transparency to applicants, and better align customer expectations with final interconnection costs. Interconnection application times and costing accuracy can be improved by working to automate and increase capacity of the CESIR studies, automate manual data entry in the ‘applicant options’ phase, and the aforementioned improvements to hosting capacity maps.

¹ Source: Hawaii PUC—“Opening a Proceeding to Review Hawaiian Electric’s Interconnection Process and Transition Plans for Retirement of Fossil Fuel Power Plants” (2021)

Con Ed can also improve the DER ownership experience by investing in tools to validate customer asset information between the interconnection and market registration steps to flag inconsistencies early, reduce the probability of customers needing to troubleshoot later issues with billing or curtailment, and ensure that DER registrations actually can provide the registered generation / storage capacity.

Finally, in the longer-term Con Ed's requested funding for MVP development will incentivize DER build out in areas where they are valuable to the grid. In addition the development of the MVP smart inverter program settings for testing, eventually rolling out at scale longer-term to allow for voltage management (e.g., Volt-Var control, fixed power factor), bulk system support (e.g., voltage ride-through, frequency ride through), and communication & interactivity (e.g., configuration, R/T feedback).

4. Lower long-term cost of the energy transition

In the long term, the transition to renewable energy sources will increase costs due to the required grid upgrades. Customer energy costs can potentially be lowered by empowering customers to make more informed decisions related to their power consumption and timing. Although these benefits are further in the future, as part of the DER Integration and Management program, Con Ed will begin building out MVP functionality in the Grid-Edge Technology Environment (e.g., smart inverter setting control) to lay the groundwork for delivering them.

Con Ed must maintain system reliability and resiliency as the DER buildout continues. Con Ed's systems must ensure adequate energy supply and load flow, considering both variability in DER supply and potentially price-elastic DER demand. To minimize customer disruptions to power flow on the grid caused by DER, distribution planning processes must incorporate DER capacity and monitor DER asset statuses in relation to projected load flow.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

This program supports dynamic distribution system management and optimization to enable the smart grid of the future and the company's role as a DSP.

Risk 1 Name: Department. Customer Energy Services.
Business Model

Risk 1 Description:

Failure to identify, plan, and execute strategies to address changes in external environment (Climate Act) that have a materially adverse impact on the Company's business model.

Risk 2 Name: Department. Customer Operations. Relationship
with Stakeholders

Risk 2 Description:

	The DER Integration and Management Program supports the ability for customers and various stakeholders to participate in new energy markets.

2. Supplemental Information	
Alternatives:	
An alternative is continued use of point-to-point system connections between discrete systems. Maintaining and enhancing this alternative is costly as every new functionality can require multiple system integrations and will not enable the future capabilities required operationally for customers. A point-to-point connection architecture also imposes a ceiling constraint for automation and real-time capabilities based on the latency of collecting data in various systems, verifying it, and presenting it to operators. This limitation will be exacerbated as DER penetration grows.	
Risk of No Action:	
Without near-term investment by Con Ed in a DER integration & management program, DER adoption will experience delays in service territories, potentially limiting progress toward CLCPA goals. • <u>Reduced hosting capacity</u>: There are already some hosting capacity restrictions in the highest growth areas (e.g., Staten Island) which are expected to expand as DER adoption increases. Without the sophisticated modeling capabilities for which funding is requested in this rate case, limitations may exist in terms of the solutions provided to customers as an alternative to costly infrastructure buildout. • <u>Longer interconnection times & limited transparency</u> AS DER going through the interconnection process increase, bottlenecks in the interconnection process will become more acute and costly without the proposed investments. • <u>Limited ability to enable new market participation</u>: Alongside capabilities developed by the NYISO and REV/DPS staff, Con Ed has been building out MVP capabilities to enable market participation as laid out by FERC 2222 but will need to build out enterprise level capabilities to support broad market participation as envisioned by the NYISO.	
Non-financial Benefits:	
In the near term, the Work Description capabilities will improve customer experience, increase hosting capacity, and enabling participation in the wholesale markets; all non-financial benefits	
Summary of Financial Benefits and Costs (attach backup)	
1. Cost-benefit analysis (if required)	

2. Major financial benefits	
Immediate CAPEX or OPEX savings are not expected during this rate period.	
3. Total Cost (\$000)	
IT/OT software & infrastructure: \$41,300 Grid Edge technology environment: \$5.6,000 Smart inverter customer program: \$25,000 Total cost: \$40,100	
4. Basis for estimate	
The landscape of DERMS technology offerings is rapidly evolving and changing, with regard to how DERMS modules and systems fit into legacy platforms and future ADMS systems. Furthermore, Con Ed’s systems differ from those of other utilities (e.g., custom-built PVL tool used for mesh network modeling). Given these uncertainties, several sources were drawn from to generate the investment cost estimate: • Vendor quotes for specific DERMS components (e.g., from Oracle) • e.g., Gartner, Forrester) • Previous similar efforts undertaken by Con Ed (e.g., DERMS MVP deployment) The potential for future cloud-based systems was also included in estimates, as well as required data governance initiatives. In 2022, Con Ed will embark on a process of receiving detailed competitive bids to further refine these numbers.	
5. Conclusion	
Additional dollars will be justified for the DER integration & management program. These investments will allow Con Ed to improve its ability to anticipate changes, particularly regarding the timing, nature and magnitude of customer technology adoption and grid impacts. These investments are also expected to address several near-term challenges while bringing additional benefits to customers. Specifically: 1. <u>The project will bring significant near- and long-term benefits to New Yorkers:</u> As detailed in the Justification, this program will unlock five key benefits: (1) scaling the hosting capacity of the distribution grid, (2) preparing the system for new markets, (3) improving the DER ownership experience, (4) lowering the long-term cost of the energy transition, and (5) maintaining system reliability & resiliency. In the short term, increased hosting capacity, access to new markets, and improved customer experience will be felt the most acutely, however, in the longer-term Con Ed expects to see benefits across all five of these categories.	

2. The risk of no action is high: Without these investments, New York City and Westchester county’s abilities to drive increased DER adoption toward the goals laid out in the Climate Act and elsewhere will be limited.
3. The phased approach being taken by Con Ed prioritizes addressing near term needs while laying a long-term foundation: Making foundational investments today allows acceleration of the deployment of critical grid future technologies and integrate new tools and grid planning processes to lower deployment time, harmonize current grid operations with future needs and make more adaptive decisions.

Project Risks and Mitigation Plan

Risk	Mitigation Plan
Project execution could be delayed resulting in cost overruns	A Project Management Office (PMO) role will oversee the progression of the project and identify, communicate, and mitigate potential negative impacts in a proactive and timely manner.

Technical Evaluation/ Analysis

Con Ed expects to continue tracking existing KPIs (e.g., DER capacity on the system, # of DER assets on the system) to measure the effects of DER buildout on existing systems, as well as measure the ability of new investments to address various levels of DER buildout. To explore ways of improving the DER participant experience, Con Ed will continue to track the average customer time spent in the interconnection process , the accuracy of the interconnection cost estimate, and the average final customer interconnection cost-per-kW of project capacity. Finally, as FERC 2222 is rolled out, Con Ed will internally track the percent of DER enrolled and participating in the wholesale market.

As part of this program, Con Ed will develop four MVP level use cases to inform the progression of these systems, capabilities, and future rate requests. To support this effort, Con Ed will track and collect data to allow intelligent assessment of the value of wider deployment of these capabilities. The outcome measurement for each of those use cases is as follows:

- *For the ability to incentivize customers to select value-add project geography and capacity, improvements to the customer project planning process will be tracked, as well as any changes to project cancellation rates*
- *For developing capabilities to automate the connection of DER live-status and characteristics to the load flow planning process, the cost to monitor necessary asset data from each DER will be tracked and compared to traditional (e.g., SCADA) asset monitoring costs*
- *For the ability to dynamically adjust smart inverter settings, benefits pertaining to either customer energy costs or improvements to customer experience will be tracked and compared against a control use case*
- *For the ability to control assets at the grid edge in order to remedy local disruptions, ability to decrease outage time based on locally deployed dispatchable capacity will be tracked*

Project Relationships (if applicable)

The DER Integration and Management program is a foundational part of Con Ed’s broader DSIP and Electric Long-Range Plan. This program is directly enabled by several investments made in the previous rate case and the upcoming rate case, including the DSP, eGIS, and Grid Edge Comms programs. The customer-centric capabilities Con Ed is building out will

complement other DER customer programs it is investing in, for example 'Make Ready for DER'. Finally, these investments will complement other IT investments being made in DER / DR monitoring, for example the sensor database investments, the Grid Modernization analytics program, and the IEDR program.

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3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						845
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	807	16,484	15,250	15,250	5,145
Implementation O&M*		\$3,500	\$3,570	\$3,641	\$3,714
Regulatory Asset		\$3,000	\$10,000	\$12,000	\$8,300

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	100	1,031	648	768	648
M&S		3	6	6	6
A/P	620	1,834	264	264	264
Other		12,222	12,396	11,680	3,790
Overheads	87	1,393	1,935	2,531	436
Total	807	16,484	15,250	15,250	5,145.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					
Total Ongoing Maintenance Expense by Year:					
	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	3,500	3,570	3,640	3,714
Capital	0.0	0.0	0.0	0.0	0.0

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Customer Energy Solutions 2022

1. Project / Program Summary

1. Project / Program Summary			
Type:	☒ Project ☐ Program	Category:	☒ Capital ☐ O&M
Work Plan Category:	☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic		
Project/Program Title:	REV-Grid Modernization (DSP)		
Project/Program Manager:	Nickesha Carol	Project/Program Number(Level 1): 21151526	
Status:	☐ Initiation ☐ Planning ☒ Execution ☐ On-going ☐ Other :		
Estimated Start Date:	2017	Estimated Date In Service:	2026+
A. Total Funding Request (\$000) Capital: 296,320.0'22-'26 Program with annual spend O&M: 12,240.0		B. ☒ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000)(2022-2026) Capital: 296,320 O&M: 12,240		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
Con Edison ("the Company") is investing in the design and operation of the Distributed System Platform ("DSP"). Our DSP enables functionality in key areas of Electric System ("Grid") functions, like Integrated Planning, Distributed Energy Resources ("DER") Integration and Grid Operations as well as Grid Services such as Market Services and Relationship Management for customers. The DSP is the foundation for the people, process, technology, and infrastructure evolution to meet the goals set forth in the New York State Climate Leadership and Consumer Protection Act ("CLCPA"). In addition, the DSP is a foundational driver for longer term electrification and de-carbonization goals that will require a modern, optimized grid that not only enables bi-directional energy flow and manages the intermittency of load and supply but unlocks renewable technologies. Additionally, a core			

tenet of the DSP evolution will continue to increase resiliency in step with the Company's recent Climate Change Vulnerability Study while maintaining the safety and reliability standards expected by our customers.

The 2016, 2018 and 2020 DSIPs captured DSP functionality in three key areas: DER Integration, Information Sharing and Market Services. Across all these grid functions and services, Con Edison remains focused on the desired outcomes of the present and future DSP: Addressing interconnection issues, increasing hosting capacity and reducing curtailments, optimizing Grid edge operations and creating value for both DER and customers at the grid edge.

Con Edison currently operates and maintains an Interconnection Online Application Portal ("IOAP"), Hosting Capacity Maps, and Green Button Connect ("GBC") for data sharing. The Company also manages a Demand Response Management System ("DRMS") to manage aggregators, aggregations, and Demand Response ("DR") programs that provide system relief during reliability events. These investments provide the foundation for the DSP to incorporate DERs into the existing electric grid and establish long term planning processes for grid modernization and DER deployment. However, incremental investment in these areas is needed to fully integrate DER value in the existing grid while creating the operational flexibility and resilience necessary to realize the CLCPA vision. Additional investments will drive outcomes in the following categories: integrated planning, DER integration, grid modernization, market services, and managing customer relationships.

1) DER Integration

Interconnection Online Application Portal

One core component required for timely interconnection is the IOAP. Con Edison maintains an IOAP to facilitate timely DER interconnection processes (www.coned.com/dg), which now uses the PowerClerk tool as well as enhancements to its case management tool, the Customer Project Management System ("CPMS"). The IOAP design includes elements of the Electric Power Research Institute ("EPRI") IOAP evaluation and phased approach, of which, Con Edison completed Phase 1 in October 2017. These changes offered more granularity and transparency to the customer during the Standardized Interconnection Requirements ("SIR") process and automated many of the screens, data exchanges and processing steps that increased transparency in application processing. Additional investments in the IOAP will allow the company to continue building automations to support and maintain compliance with the evolving SIR process. Enhancements are focused on; administrative updates associated with the SIR, shortening timelines associated with document review, screening processes, engineering studies and program support. The Company will also continue to link and refine data sets across systems. These activities are a core input to the Hosting Capacity and grid analysis that both helps the utility understand the current system dynamics as well as better forecast and plan grid enhancements that may be needed in areas of increasing penetration. An example of this can be seen below in the way that Network Protector Relay programs are structured and optimized.

2) Grid Modernization

Modernize Network Protector (“NWP”) Relays

Most NWPs are equipped with a non-communicating microprocessor relay (“MPR”). Non-communicating MPRs are designed to identify when a reverse power flow condition exists, such as when DG provides power to the grid. Such instances cause the associated NWP to automatically trip. When an NWP does not trip the feeder remains alive-on-backfeed (“ABF”). Depending on system conditions, a feeder can remain ABF anywhere from a few cycles to hours. Troubleshooting ABF conditions delays feeder processing. In addition, ABF conditions that follow a single line-to-ground fault can cause the voltage on the unfaulted phases to increase by as much as 73 percent. The Company’s internal analysis has shown that there is a correlation between this rise in voltage and faults on the unfaulted phases, known as second faults. As DER penetration increases, there will be more persistent challenges, which create unnecessary and avoidable costs to the system and therefore to customers.

The Company will continue to modernize protective relays. This grid modernization effort, begun in 2017, provides Network Protectors (“NWP”) the intelligence to distinguish DG back feed from fault current. This capability increases the Company ability to accommodate cleaner solar and helps eliminate one of the more common interconnection costs in areas where this functionality is present. In addition to the relaying upgrades, the Company has prioritized certain locations for SCADA enabled communications to allow remote operation and control to eliminate conditions referred to as alive on backfeed (“ABF”) where a NWP can fail to open for several hours, thereby effecting the efficiency of the local network. To date, the Company has replaced 3,829 relays with 1,336 of these equipped with SCADA capability out of approximately 27,000 NWP in the secondary grid. The Company plans to continue this program in an effort to address each location that is or becomes Distributed Generation constrained as well as all locations with persistent ABF issues.

Smart Grid Optimization

Con Edison is continuing the Conservation Voltage Optimization (“CVO”) efforts as part of the Smart Grid Optimization efforts in 2022. The primary purpose of CVO is to reduce energy costs and environmental impacts while continuing to maintain acceptable voltage at all points along the distribution feeder under all loading conditions.

Based on the Company’s efforts implementing CVO technologies to date, the Company is on track to achieve its CVO energy savings goals. Operating the system at optimal voltages reduces total energy consumption and associated power generation emissions, resulting in significant energy savings for our customers and a reduced carbon footprint.

In 2023-2025, the objective of this request is to accelerate and exceed the CVO schedule to increase the energy savings to 1.75 percent by the end of 2025 and, as a result, realize an additional \$75.8 million Net Present Value

("NPV") in net energy savings through 2042 that will reduce the supply side costs of the customer bill while further reducing GHG emissions.

3) Investments in this area will allow the requisite equipment and system upgrades needed to perform these optimized voltage operations. **Market Services**

Demand Management Tracking System ("DMTS"): DMTS provides the Company with the necessary technology infrastructure to track and manage the performance of the Company's Energy Efficiency and Demand management ("EEDM") portfolio goals, and streamline the payment of incentives to customers participating in the Department's energy efficiency and building electrification programs. Since 2020, the EEDM Department has completed implementation of a number of new programs into DMTS (e.g., Clean Heat, MF Low and Moderate Income), integrated DRMS into its approval and payment process (see below), provide energy savings calculations, and created tools for participating contractors to estimate the financial support they can receive for energy efficiency upgrades prior to submitting project applications. Additional investments will be required in the DMTS to support program expansion functionality and market development as the Company launches new programs, offers new energy efficiency or building electrification measures, and provides new kinds of program incentive structures to promote greater market engagement and customer participation.

Investments will expand customer participation and improve opportunities for energy savings and demand reduction across existing and future programs. This includes enhancing incentive estimation tools and decreasing the time from application submission to project payment.

DRMS: DRMS supports the management of enrollment, event initiation, performance monitoring, and settlement of the Company's DR programs. This system enables Con Edison to efficiently interact with customers enrolled in DR programs and manage peak demand. DR resources, an integral subset of DER portfolios, are used to lower network peaks on peak summer days as well as to alleviate operational contingencies. The DR programs are designed to help defer other traditional capital investments.

The DRMS is a key operating tool used to support a portfolio of DR programs, which have substantially grown over 300% in customer enrollment from 2020 to 2021 within the CSRP, DLRP, Term-DLM, Auto-DLM, and Non-Wires programs the DRMS supports. As these programs grow in number and complexity, they will require enhancements as well as the flexibility to adapt to changes in tariff rules. Enhancements will include expanded enrollment capabilities as more residential and small commercial customers participate in aggregator enrollments.

ConnectDER: In response to New York State Energy Research and Development ("NYSERDA") Future Grid Challenge, Con Edison and ConnectDER collaborated on a project to develop solutions to integrate clean and renewable energy into the electric grid. Con Edison and ConnectDER were selected via a competitive solicitation process and awarded \$2.3M to support the execution costs of the project. In order to maximize efficiency and better serve customers, Con Edison regularly evaluates new forecasting and monitoring technologies. DER's penetration is growing every day and impacts the net load the Company serves; as a result, it is becoming more important to forecast DER at granular levels that account for output, correlation with net load, and geographical effects. The objective of the

project is to increase the existing electric grid’s capabilities to serve load and integrate distributed renewables while reducing distribution costs to consumer and system upgrades to achieve New York’s aggressive decarbonization goals and statewide scale-up of renewable energy resources. This project will help enhance grid reliability and integrate renewables by installing 2,400 ConnectDER devices at identified customer locations within Con Ed’s territory. Additionally, a core tenet of market services and the DSP is information sharing. A more granular understanding of the system dynamics at the grid edge will

Justification Summary:

Con Edison has created a foundational DSP that continues to integrate DER, compiles and shares increasingly complex information and identifies areas within the electric grid where modern solutions can create the requisite system flexibility to increase hosting capacity and operate a safe and reliable electric system while accommodating increased penetration of DER. Further investment in this platform will continue to leverage this foundation and increase the capabilities in the areas of system planning, DER integration and system operation to create more optimization and opportunity at the grid edge. These advancements continue to drive DER adoption as a core tenet of utility practice and are necessary to accelerate the transition to a more flexible distribution grid that will achieve state energy goals.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

The DSP is a critical element to Con Edison delivering on our Clean Energy Commitment that includes “100% Clean Electricity by 2040.” Enabling these grid edge and customer facing tools will continue to create the system flexibility needed to transition towards a clean energy future and achieve state goals.

Risk 1 Name: Customer Energy Solutions. Compliance to support a constructive relationship with regulatory bodies and establish our role as leaders in the clean energy future.

Risk 1 Description:

Complies with REV Order, JP and NYS Clean Energy/CLCPA objectives

2. Supplemental Information

Alternatives:

Alternatives:

- New York State regulators and leaders are committed to continue building the DSP. Not completing the DSP is not an option.
- In lieu of our large and substantive investments, another alternative could involve changing the timing or deployment of the DSP components which would translate to smaller investments per year. This would have negative impacts on the momentum we have created, and we also believe this would not be advisable.

Risk of No Action:

- Risk of No Action: As stated above, no action is not an acceptable course of action for several reasons.

Non-financial Benefits:

Non-financial Benefits: By building a DSP, the path is clear for greater penetration of DER and ultimately achieving the REV goals which benefits customers and Con Edison.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

Program breakdown by Project for 2022-2026:

	2022	2023	2024	2025	2026
REV - DSPP					
IOAP	\$1,300,000	\$ 600,000	\$600,000	\$600,000	\$600,000
DERMS	\$2,500,000	\$ -	\$ -	\$ -	\$ -
DMAP	\$1,667,000	\$ -	\$ -	\$ -	\$ -
DMTS	\$3,333,000	\$5,000,000	\$5,500,000	\$6,000,000	\$6,000,000
DRMS	\$9,560,000	\$9,960,000	\$9,900,000	\$9,900,000	\$9,900,000
Modernizing Protective Relays	\$16,000,000	\$30,600,000	\$30,600,000	\$30,600,000	\$30,600,000
VVO	\$10,500,000	\$ -	\$ -	\$ -	\$ -
CVO	\$10,000,000	\$15,000,000	\$15,000,000	\$15,000,000	
Additional Projects:					
Connect DER	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000
IT SCADA Upgrade	\$ 4,500,000				
Budget	\$ 60,360,000	\$62,160,000	\$62,600,000	\$63,100,000	\$48,100,000

2. Major financial benefits

Summary of Financial Benefits (if applicable) and Costs: DSP investments will ultimately provide streamlined integration of DER, more efficient decarbonization and lower costs to customers. For the company, they provide a rate base investment that helps us increase operational flexibility and resiliency:

- The SCADA upgrades provide visibility and remote functionality of the Network Protectors so that the Company can minimize back-feed conditions and have more insight into what is happening in the secondary grid.
- Hosting Capacity analysis aids the Company understand the impact of DG in the network and on the overhead to understand where the Grid may need to be reinforced to meet planning needs and help to operate DG in an optimized fashion. The Company can better understand the types of DG and the effects it has on the grid so that it has a better understanding of how to factor these technologies into our system forecasting.

3. Total Cost (\$000)

Capital: \$296,320.0

O&M: \$12,240

4. Basis for estimate

- Basis for Estimate: Con Edison has over 5 years of experience building out the DSP and its various components that helps inform our estimates. As the building blocks for the DSP are discrete projects and largely leverage existing projects with incremental improvements, the costs were estimated based on scope of work estimates by the individual project owners (most of which had funding for these elements in the previous rate case).

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan
Lack of grid investments will limit the DER integration and reduce hosting capacity.	DSP investments will increase grid flexibility and expand DER interconnection capability.

Technical Evaluation/ Analysis

- Technical Evaluation/Analysis: The DSIP will include many technical evaluations and analyses that will guide the decision making for the building block programs. It is anticipated that these analyses will cover:
 - o DER capacity analysis supported by load flow analyses
 - o Analysis of the impact of greater DER penetration on the Network Reliability Indicator (NRI)
 - o Analysis of locational benefits and costs
 - o Lessons learned through demonstration projects
 - o Analysis of how each type of DER reduces peak load and energy usage, and modifies load shape
 - o Analysis of the costs and benefits of Volt/VAR Optimization (VVO)

Project Relationships (if applicable)

DER integration and Management Program AMI

DCX

Forecasting Technologies

3. Funding Detail

Historical Spend

	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Forecast 2021</u>	<u>Historic Year**</u> (O&M only)
Capital	14,659.3	23,699.8	21,289.7	24,535.1	44,329.2	
O&M	38.4	45.5	81.1	907.8	1,434.7	695.4
Regulatory Asset	0	1.4	357.1	388.1	1,132.0	

** For Rate Case only

NOTE: 2020 Actuals include a (\$9.3M) credit to consolidate historical GIS expenses with \$33.8M in DSPP investments that year.

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	60,360	62,160	62,600	63,100	48,100
O&M	740	3,500	3,300	2,500	2,200
Regulatory Asset	1,100				

*O&M Request ('22-'26) includes DSP MAC budgeted in Distribution Planning and Portfolio Planning and Analysis

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	9,235	9,511	9,578	9,655	7,360
M&S	18,128	18,668	18,800	18,950	14,446
A/P	24,560	25,367	25,555	25,767	19,701
Other	915	942	948.6	956.2	728.9
Overheads	7,523	7,672	7,772	7,772	5,865
Total	60,360	62,160	62,600	63,100	48,100

Total Gross Cost Savings / Avoidance by Year:						
	<u>Request 2021</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings						
O&M Avoidance						
Capital Savings						
Capital Avoidance						
Total Ongoing Maintenance Expense by Year:						
	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>	
O&M	740	3,500	3,300.	2,500	2,200	
Capital	60,360	62,160	62,600	63,100	48,100	
Regulatory Asset	1,100					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology Panel
Exhibit IT-6
Gas IT Projects

Item #	Program Name	Page #
1	2023 OM Gas Transaction System Replacement Upgrade	2
2	FIS Gas Transaction Sys Project 2025	8
3	SmartApp Replacement - Gas	14
4	Utilizing AMI Data for Firm Interruptible Gas Marketer Forecasting	19

Information Technology 2022

1. Project / Program Summary

1. Project / Program Summary			
Type: ☒ Project ☐ Program		Category: ☐ Capital ☒ O&M ☐ Regulatory Asset	
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: Gas Transaction System Replacement Upgrade			
Project/Program Manager: Heidi Cinquegrana		Project/Program Number(Level 1): 22924441	
Status: ☐ Initiation ☐ Planning ☒ Execution ☐ On-going ☐ Other :			
Estimated Start Date: 4/1/2018		Estimated Date In Service: 5/1/2022	
A. Total Funding Request (\$000) Capital: \$1913 O&M: \$400 per year 2023+		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: \$400		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
This project implements the recommendations of the Gas Transaction System Replacement Phase 0 project. The recommended solution must meet the requirements of purchasing, scheduling, accounting for and reporting of physical gas transactions.			
Justification Summary:			
The IGS system is the main tool to manage the Company's gas portfolio. The system must be maintained and flexible to meet the changing market and economic conditions as well as meeting new marketer programs being proposed. - Energy Management's Gas Supply Department processes approximately \$1 billion in wholesale gas transactions, and requires a supportable software platform to track and schedule energy transactions, as well as perform proper risk oversight functions. - The Gas Supply business changes frequently and requires a flexible platform to accommodate new business opportunities. - The proposed solution should provide additional opportunities for automating accounting functions such as Accounts Payable (AP), Accounts Receivable (AR), and General Ledger (GL). - Energy Management and Energy Risk Management are frequent areas of audits, and require strict compliance with Sarbanes Oxley (SOX) controls, and audit capabilities.			

- The gas industry is rapidly changing and the company requires updated software to ensure flexibility to participate in new markets and products. The proposed solutions should enable the Company to take advantage of industry best practices based on input from other utilities and market participants.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name: Department.Energy Management.Inability to transact with counterparties	Risk 1 Description: The Gas Transaction System enables recording and transfer of information with counter parties.
Risk 2 Name: Department.Energy Management.Full recovery of all fuel costs	Risk 2 Description: System must accurately record transactions to recover costs.
Risk 3 Name: Department.Energy Management.Inaccurate record keeping and counterparty data	Risk 3 Description: Inaccurate record keeping can result in financial loss to the Company
Risk 4 Name: Department.Energy Management.Transactions are improperly executed	Risk 4 Description: Improper transactions may result in financial loss
Risk 5 Name: Department.Energy Management.Cybersecurity	Risk 5 Description: Unauthorized transactions may occur if cyber security is not maintained
Risk 6 Name: Department.Energy Management.Fraud	Risk 6 Description: Unauthorized transactions may result in financial loss

2. Supplemental Information

Alternatives:

This project is planned to go-live in April 2022 and the required IT resources and software maintenance are necessary to maintain the health of the system after its stabilization period. If the IT resources are not available than this may impact the Company's ability to purchase, schedule, account for and report physical gas transactions.

Risk of No Action:

The risk of no action would be the inability to provide a flexible gas transaction processing platform to meet the needs of our gas customers as identified in the Requirements Definition project,

Non-financial Benefits:

Efficient management of energy portfolio, reduced errors, and standardized reports (internal & external)

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

3. Total Cost (\$000)

The cost includes \$200k associated with the software vendor's maintenance package and \$250K for two IT support resources.

4. Basis for estimate

Historical rates and quote from vendor.

5. Conclusion	
Project Risks and Mitigation Plan	
Risk	Mitigation Plan
Scope of reporting requirements and technical specifications	
Technical Evaluation/ Analysis	
N/A	
Project Relationships (if applicable)	
The current IGS system currently interfaces with Pricing Database System (PDS),Gas Daily Operations (GDO), and the Allegro Risk Management system. The Requirements Definition project will determine the impact on these systems	

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital		1,888.8	3,002	3,243.3		2,614
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	1913	0	0	0	0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	154				
M&S					
A/P	1697				
Other	0.0				
Overheads	76				
Total	1927	0.0	0.0	0.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M		400	400	400	400

Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic	
Project/Program Title: FIS Gas Transaction System (GTS) Enhancements and Upgrade	
Project/Program Manager: Heidi Cinquegrana	Project/Program Number (Level 1): 20726335
Status: ☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☐ Other: _____	
Estimated Start Date: February 2025	Estimated Date In Service: September 2027
A. Total Funding Request (\$000) Capital: \$5,274 O&M:	B. ☐ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: Capital:	D. Investment Payback Period: (Years/months) (If applicable)
Work Description: Presently, Energy Management is pursuing a capital effort to replace the current Integrated Gas Supply (IGS) system with FIS Gas Transaction System (GTS), which is planned to be deployed in 2022. This system acts as the operational and accounting system of record, used by gas supply to record and schedule deliveries of natural gas purchases to the Companies' service territory. In addition, it identifies, assembles, analyzes and reports the organization's transactions for accrual purposes, accounts for the related assets and liabilities and allocates the various costs of natural gas purchases to the various end uses. From 2025 -2027, Energy Management plans to upgrade and enhance the system. Major outputs of this effort include: - Upgrading the FIS GTS application to a newer version, resulting in the consolidation of the product two versions /clients installed: Align 3 (A3) - locally saved version and Align 5 (A5) – web-based version, into one single upgraded version. The upgraded version consolidates the following screens, features, and functionality: Master Contract Management, Static / Reference data entry and configs (locations, IAs, Data Mapping and Pricing formula), Variable Commodity Rates, Exercising Call Options (deals), Capacity Releases entry (manual and loader), GDO and EDI Inbound data retrieval and processing (Actualization), Actualization Marketers (measurements), Inventory Management - balancing and adjustments entry, Valuation Process (cost allocation), Power generators Cashout Settlement - Implementing enhanced and/or new application features and capabilities to eliminate in-system workarounds: workflow sequence and data entry; full utilization of the planning and mobile capabilities. Examples include: - Screen and process consolidation for scheduling and invoicing functions - Full implementation of the data reporting, graphs, and analytics feature - Extension of FIS GTS Loader functionality to include other manually intense tasks such as Contract Demand Rates and Fuel and variable rates entries/ updates (in bulk)	

- New planning feature / functionality to look ahead and simulate/plow various scenarios for portfolio Optimization. This will entail Integration of the FIS GTS various modules to the planning for the exchange of data
- Implement No Notice functionality to automate the manual process of entering rankings, thresholds, allocations, and daily results for the agreed upon daily imbalances with the pipeline as part of the system balancing for the CE and ORU service territory
- Enhancement of the EDI interface to include non-EDI pipelines
- Notification information postings, restrictions, and pipeline conditions through EDI or through integration with S&P
- Integration of the FIS GTS and the FUELS standalone module for the exchange of data
- Enhance existing tools / interfaces to automate applicable business activities
- Modernization of FIS GTS Application to the Cloud

Justification Summary:

The FIS GTS system is scheduled to go-live in 2022 with the goal of consolidating every facet of the gas lifecycle to a single product and to integrate with Gas Daily Operations (GDO) system, Interstate Pipelines Electronic Bullets and Boards (EBBs), PDS, the ICE trading platform and Oracle AP/AR. While this project is realizing many of its planned benefits, the incorporation of many other business processes and work streams into the FIS GTS system has presented challenges and are likely not be realized. For example, automation and/or streamlining of the middle and back-office tasks/activities were not fully realized and the need for additional product development for some features is necessary. The latest version of the FIS GTS product has the necessary enhanced features and functionality in response to some of these recognized constraints and limitations identified in the previous versions (e.g., Power Plant module). Implementing these along with full expansion of the of the enhanced data reporting, graphs, and analytics tool, will allow the Company to fully realize the benefits of FIS GTS.

Upgrading FIS GTS to a newest version will require the current application to migrate to the cloud. Modernizing this software platform will enable users to access all functionality and perform all activities using the web-based interface version of the application (A5), resulting in increased accessibility, faster system response and application performance, and increase in productive time as they will no longer need to log into two system to perform their daily activities. Additionally, this is in alignment with our business continuity plan and will help alleviate the substantial effort to support and maintain two versions of the product. The gas industry is changing rapidly and migration to the cloud provides increased flexibility and the ability to innovate faster while simplifying IT. Similarly, the workforce is changing and expects their interactions with systems to be intuitive and similar to their consumer experience.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

This project will help sustain or improve the current risk assessment and the likelihood and controllability of the following Energy Management department risks:

- Inability to Transact with Counterparties – FIS GTS enables recording and transfer of information with counter parties. It also helps maintain adequate pipeline capacity that enables the Company to access a broad spectrum of suppliers in different geographic locations
- Full Recovery of All Fuel Costs – FIS GTS helps accurately record and reconcile gas supply and pipeline transactions to recover costs.
- Inaccurate Record Keeping and Counterparty Data – The proposed project enhancements help mitigate the reliance on manual data input, processing, and reporting.

- Transactions Are Improperly Executed - Automating interfaces between the transaction system and the general ledger and Accounts Payable will reduce manual tasks and reduce the chance for errors.

2. Supplemental Information

Alternatives

The alternative to this project is to not update the system which would mean not addressing the inefficiencies and limitations of the current system.

Risk of No Action

The risk of no action would be the inability to provide a flexible gas transaction processing platform to meet the growing needs of our gas customers, regulators, and stakeholders. Additional risks include:

- Current A3 version is not user friendly or intuitive, increasing time required to perform workarounds
- Older FIS GTS versions may no longer be supported by FIS
- Maintaining and patching 2 client versions
- In case of hardware equipment failure, operations and back office may be unable to perform essential functions in the A3 version

Non-Financial Benefits

General benefits include simplified vendor support, efficient management of energy portfolio, reduced errors, and enhanced reports (internal & external), improved user experience, reduced training complexity, improved security, improved workflows and data integration / consistency among departments, and improved data visibility and traceability across groups and business areas and data analytics.

New features such as screen and process consolidation, a planning tool, and no-notice agreements functionality can help improve and facilitate automation of business processes. Planning for the purchase of gas is currently done in spreadsheets outside the system, using inputs and data from the system. No notice functionality will streamline and automate parts of the manual process of entering rankings, thresholds, allocations, and daily results for the agreed upon daily imbalances with the pipeline as part of the system balancing for the CE and ORU service territory. Incorporating these functions into FIS GTS would eliminate the need to transfer data to spreadsheets daily, reduce errors leveraging the granularity and visibility of the data to optimize planning and overall operations.

Other manually intense tasks such as Contract Demand Rates and Fuel and variable rates entries/ updates, will be streamlined by expanding and leveraging tools such as Loaders (in bulk). In the same way, the original project successfully sought the implementation of the functionality to enable the scheduling group to use the FIS GTS to send the nominations directly to the EBBs and receive post nomination cycle quantities through EDI for the 4

major pipelines. This eliminated the need for the double entry of the nominations in both the system of record and the EBBs. This not only resulted in time savings and operational efficiencies, but in a reduction in human errors. This new project is seeking to expand that functionality to include the additional non-EDI pipelines and storage facilities to maximize the benefits and will also pursue to include informational postings about pipeline operational conditions from the EBBs through EDI or integration with S&P.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

The financial benefits of this project are increased productivity, enhanced functionality, and continued ability to support regulatory requirements.

3. Total cost

The total cost of this project is estimated to be \$6.9 million.

4. Basis for estimate

The high-level estimate to complete this project is approximately 36 months. The estimate is based on the complexity of the FIS GTS system and expected work related to the existing interfaces with Gas Daily Operations (GDO) system, the Interstate Pipelines Electronic Bullets and Boards (EBBs), PDS, the InterContinental Exchange (ICE) trading platform and Oracle AP/AR system. Given the complexity of the system we expect to engage a system integrator, internal resources, and an increase in the number of contractors required to successfully complete the project.

5. Conclusion

The original FIS GTS system initial implementation was the cornerstone and foundation for the consolidation of systems covering multiple commodities to reduce maintenance costs and increase efficiency (Application Rationalization and Portfolio Optimization). The system facilitates the automatic integration of data and centralized data analytics resulting in more effective risk mitigation strategies, increased transparency, more effective trending and analytics.

The expansion of the solution, proposed version upgrade and eventual migration to the cloud, should allow IT to eventually reduce the internal support needed for FIS GTS. Maintenance costs have increased with the FIS annual fee, but we expect costs and efficiencies to be realized as subsequent projects incorporate other commodities such as oil, financial instruments and electricity onto a single platform and eliminating the separate systems currently in place.

Project Risks and Mitigation Plan

Risk 1 - Risk of underestimating the costs

Mitigation plan: Initial estimates will be revised, refined, and updated periodically, as we approach the initiation of the project and refine the scope

Risk 2 - Risk of project delays, and scope creep

Mitigation plan: The project will require a system integrator to provide specialized technical, functional, and project management experience and capabilities.

Technical Evaluation / Analysis
Project Relationships (if applicable)

3. Funding Detail

Historical Spend

	<u>Actual 2016</u>	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2021</u>
Capital							
O&M							

Total Request (\$000):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital				1,900	3,374
O&M*					

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor				225	225
M&S					
Contract Services				1,541	2,531
Other					484
Overheads				134	134
Total				<u>1,900</u>	<u>3,374</u>

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>

O&M					
Capital					

*If whitepaper is supporting a capital project/program this refers to implementation O&M

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/ maintenance if capital isn't deployed)

Project Status:

- Initiation – New project, not authorized yet
- Planning – Project authorized, not started yet
- Executing – Project in-flight
- On-going – Annual program

Information Technology 2022

1. Project / Program Summary

Type:	☐ Project ☒ Program	Category:	☒ Capital ☐ O&M ☐ Regulatory Asset
Work Plan Category:	☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic		
Project/Program Title: SmartApp Replacement - Gas			
Project/Program Manager: Kavitha Subbiah		Project/Program Number(Level 1): 25546227	
Status:	☐ Initiation ☒ Planning ☐ Execution ☐ On-going ☒ Other :		
Estimated Start Date: 1/10/2022		Estimated Date In Service: 12/31/2023	
A. Total Funding Request (\$000) Capital: 1,625.0 O&M:		B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 450.0		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description:			
Work Description: The current SmartApp system is used to record and monitor field work for gas operations. The objective of this project is to migrate and enhance applications from the vendor supported SmartApps platform to a mobile platform using approved technology. Some of the use cases include: A form to enter Distribution and Transmission Hold Point records A checklist form for Gas Personnel in the field to fill out to make sure they are adhering to job specifications. App to post pdf of bill for third party billing to be reviewed by Con Edison for approving pay. App to post pdf of weekly billing containing daily hours for third party inspectors. Information such as OT and ST pay is included in the pdf. Application used by third party inspectors to include their sketches, fuses included, layout, work order forms and joiner qualifications for a job. App to enter gas valves for specific jobs in the field. App to identify issues in the field and propose solutions that should be sent to Gas Engineering. App to document potential defects on tools used by mechanics so that purchasing can be made aware of this as well. App to propose changes surrounding the scope of work that is sent to Gas Engineering for review. App for opening ticket and paving order created.			
Justification Summary:			
The apps are operationally required by Gas Operations to adhere to the job specifications and to ensure that the third party inspectors capture fuses, layout, work order forms and joiner qualifications for a job. The information documented in this app will be used for third party billing to be reviewed by coned before approving payment. In addition the app will help identify issues in the field and propose solutions that should be sent to Gas Engineering			

for spec revisions. It also would assist in the documentation of potential defects on tools used by mechanics so that purchasing can be made aware of the situation.

The current system has shared year costs O&M subscription cost of 2.2M. The replacement of the platform support and migration of the forms will result in overall cost reduction to the company savings of 1.5M O&M dollars annually. Additionally, we will be on the new IT roadmap which ensure support, Cybersecurity, and IT approved technology.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

This project has relationships to Gas Central

Risk 1 Name: Corporate ConEd.Regulatory and Compliance.Fraud

Risk 1 Description:

Controls for validating cost and compatible units of work by contractors.

Risk 2 Name: Department.Construction.Cybersecurity

Risk 2 Description:

Newer system based CECONY latest Cyerber controls.

2. Supplemental Information

Alternatives:

Remain on the current platform: The current platform is manual and requires change,
This process is to labor intensive and would cause backlog in the processing of inspections

Risk of No Action:

Corporate Risk (Cyber Security) Compliance

Non-financial Benefits:

This deployment will provide increased transparency for our contractor workforce with regards to field activities and documentation in addition to use of technology.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

This system will reduce use of the temporary clerical services and reduction in head count starting in 2023.

2. Major financial benefits

Savings from the platform subscription and service support costs of \$2.2M / year beginning 2025

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (1,625.0) = Total Cost (1,625.0)

4. Basis for estimate

Estimate is based on comparison to similar sized projects developed using same technology

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Analysis is driven by the ITs Enterprise architecture standards and follows the guidelines

Project Relationships (if applicable)

Relationship to WMS systems such as Gas Central

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital						
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	1,075.0	550.0	0.0	0.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	0.0	150.0			
M&S					
A/P	0.0	325.0			
Other	1,075.0				
Overheads		75.0			
Total	1,075.0	550.0	0.0	0.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings		500.0	1,100.0	1,100.0	
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M		150.0	150.0	150.0	

Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☒ Capital ☐ O&M
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic	
Project/Program Title: Utilizing AMI Data for Interruptible Gas Marketer Forecasting and Retail Choice Information System ("RCIS") Migration	
Project/Program Manager: May Cheng and Heidi Cinquegrana	Project/Program Number (Level 1): 21569647
Status: ☒ Initiation ☐ Planning ☐ Execution ☐ On-going ☐ Other: _____	
Estimated Start Date: 1/1/2023	Estimated Date In Service: 7/1/2023
A. Total Funding Request (\$000) Capital: \$1,080 (2023) O&M:	B. ☐ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: \$690 (2023 - 2025) Capital:	D. Investment Payback Period: (Years/months) (If applicable)
Work Description: The Transportation Customer Information System (TCIS) is a software used by marketers to communicate gas operational information with Con Edison. TCIS has many functions, including the ability to communicate gas scheduling information, control access security, generate reports, post messages to the internet, store rates, create invoices and vouchers, and track enrollments/de-enrollments. There have been recent capital projects enhancements to TCIS, which include the completion of the TCIS rewrite project and changes to the daily and monthly interruptible marketer programs. In 2021, TCIS was enhanced to include the implementation of capacity release, implementation of rebill adjustments, and include a display of AMI meter reading data. This project proposes to enhance TCIS' capability to leverage AMI data to improve forecasting accuracy. The project should be able to address the following firm and interruptible marketer forecast requirements: - Obtain and store AMI data for firm transportation customers in TCIS - Update the Estimated Load Following report from monthly billing data to AMI data - Test the integrity of the heat factor and baseload calculation with the new AMI data - Modify the existing user interface to reflect the forecast - Modify the Estimated Load Following report to use AMI data, in place of monthly billing historical data. - Modify the forecast methodology to reflect the use of AMI data.	

The work will also include the migration of Energy Management functionality from RCIS to TCIS. The functionality includes:

- Daily Delivery Service (DDS) Invoicing
- DDS administrative reports
- DDS rates
- Gas ESCO editable fields

Justification Summary:

MI data will allow the Company to utilize daily information for daily forecasts, improving accuracy. The largest variations of forecast compared to actual exist in the shoulder months where citygate allocations are the lowest. Providing a more accurate forecast, especially during the shoulder months, would decrease the amounts to the citygates, decrease the true up at the end of the month, and decrease the imbalance on the system. The financial implications vary by season and market conditions. However, the program's goal is to decrease the cashout because it causes a difference between the cost spent to provide the gas and the revenue the Company receives for the gas.

Additionally, DPS Staff and marketers have frequently requested the forecasts to be updated with AMI data.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

This project helps to achieve the Company's goals by refining its forecasting methodology. The project would impact the forecasted usage of transportation customers, which comprises approximately 50% of all gas customer load. The implementation of AMI allows for a more granular view of data, which allows the Company to improve its forecasts. This would result in more accurate delivery amounts by marketers on behalf of their customers and reduce the amount of cashouts. Cashouts have the potential to impact all gas customers due to price differentials.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection

The alternative would be to continue existing processes without incorporating AMI data into the forecasting process. However, this is not recommended as the PSC and marketers have suggested changes.

Risk of No Action

Risk 1

There is a risk that cashout volumes could increase to high levels, resulting in marketers potentially filing complaints with the PSC.

Risk 2

Marketer deliveries may vary widely from actual consumption, which increases difficulty in operations to balance the daily load requirement.

Risk 3

The Company has been asked by Staff to utilize AMI data in its forecasting methodology. If this is not addressed in a timely manner, then this may result in poor relationships with our regulators, customers, and other key stakeholders.

Non-Financial Benefits

This project can improve the experience and satisfaction of marketers who routinely ask questions about the existing forecast. Lastly, this could keep customer costs as close to actual spend as possible by reducing the volume of marketer cashouts.

The successful migration of the functionality from RCIS to TCIS would result in the retirement of the RCIS application. TCIS is better optimized for performance because it is built on newer technology. The migration of RCIS functionality to TCIS includes benefits for both IT and Business users, in streamlining the number of support applications, and providing a better user experience with TCIS.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

3. Total cost

The total capital cost for this project is \$1,080k and includes the following:

- Hiring a vendor to design, develop, and deploy the software enhancements
- Energy Management and IT employee labor to support this project

Post-project O&M is related to labor to maintain the system (e.g., security scans, triage any defects, interface monitoring, service pack deployments, etc.).

4. Basis for estimate

The cost estimate is based on historical expenditures of several contracted software developers and discussions with a contracted business analyst and company employees.

5. Conclusion

The benefits of this project, as defined above, are pivotal to continue to meet the increasing expectations of the Company's stakeholders (e.g., regulators, customers, etc.) and to improve the accuracy and effectiveness of its forecasting capabilities.

The completion of the RCIS migration work to TCIS will result in the retirement of the RCIS application, which aligns with the corporate initiative to consolidate systems.

Project Risks and Mitigation Plan

Risk 1 Mitigation plan

To mitigate the potential of project overruns in time and costs, the project team will catalog the deliverables into the Azure work management system and track deliverables in order to meet deadlines and proactively drive remedial action, as necessary.

Risk 2 Mitigation plan

A potential risk of the project is insufficient testing which may lead to production issues if the product is deployed without comprehensive testing. To assist with testing, the project team will employ a business analyst from IT.

Technical Evaluation / Analysis

An analysis was conducted on forecasted usage vs consumption during the shoulder months of October and April using the monthly data for forecast. The data indicates that the forecasted usage is not accurate enough during the periods of constrained citygate allocations.

Project Relationships (if applicable)

n/a

3. Funding Detail

Historical Spend

	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2021</u>
Capital	\$1,490,989	\$1,421,356	\$1,437,401		\$1,120,901
O&M					

Total Request (\$000):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	960*	720			
O&M*					

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2022 *</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor	104	92			

M&S					
Contract Services	768	943			
Other	32				
Overheads	56	45			
Total	960	1,080			

* The 2022 forecasted dollars will be requested in 1Q22.

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M		90	300	300	
Capital					

*If whitepaper is supporting a capital project/program this refers to implementation O&M

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Project Status:

- Initiation – New project, not authorized yet
- Planning – Project authorized, not started yet
- Executing – Project in-flight
- On-going – Annual program

Information Technology Panel
Exhibit IT-8
IT O and M Whitepapers

Item #	Program Name	Page #
1	Construction - Survey Mapping Repository	2
2	Construction Field Smart Forms 2018 -2022 (IT-KONY)	6
3	Gas 5013 Replacement	13
4	IT Telecommunications O_M	20
5	Information Technology Risk Management and Compliance	26
6	IT Portfolio Management	31
7	Oracle Strategic Partnership (OSP) – Run Phase	36
8	Secure Coding Training	42
9	Mainframe O&M	47

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program		Category: Capital ☒ O&M ☐ Regulatory Asset	
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic			
Project/Program Title: Construction - Survey Mapping Repository			
Project/Program Manager: Robert Davis		Project/Program Number(Level 1): 20782709	
Status: ☐ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date: 1/1/2012		Estimated Date In Service: 11/30/2023	
A. Total Funding Request (\$000) Capital: 340.0 O&M:		B. ☒ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: 225.0 Capital:	
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M:		D. Investment Payback Period: (Years/Months) (If applicable)	
Work Description: • Survey Mapping Repository for the electronic storage of Survey field data will allow the mapping of Company assets, structures and field survey data. This will make digital Survey information available across departments.			
Justification Summary: We require an upgrade to the Construction Survey environment so the eGIS portal can support of the current mapping platform. The current environment has been in place since 2016. The following needs to be updated for increased Cybersecurity and performance for use with Con Edison mapping portal: : • On premise ESRI mapping software upgrade. • Database Server Upgrade • Server Environment upgrade based on the current utilization. This includes the required information technology services for the upgrade. Once the upgrade is completed, O&M support is required to maintain the system.			

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name: Department.Construction.Relationship with Stakeholders	Risk 1 Description: Provide reliable engineering field drawings and conditions to our customers, Electric, Gas, Steam and Transmission

2. Supplemental Information

Alternatives:

Risk of No Action:

The environment needs to be upgraded.

Non-financial Benefits:

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

N/A

2. Major financial benefits

This enables different commodities to see various views of Survey grade assets as it relates to Geographical reference. This helps in planning, reduction of damages, and safety.

3. Total Cost (\$000)

All Previous Actuals (3,404.3) + Cur. Yr. Sanctioned Forecast (256.7) + Next 5 Years Est. (340.0) = Total Cost (4,001.0)

4. Basis for estimate

Historical Costs

5. Conclusion

The project is necessary to maintain availability the current collection of survey information gathered over the last fifteen years. This information provides valuable insight in the planning process.

Project Risks and Mitigation Plan

Risk	Mitigation Plan

None	

Technical Evaluation/ Analysis

Project Relationships (if applicable)

None

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital	524.2	527.0	3.6	-	0	256.7
Implementation O&M*						
Regulatory Asset						

* ** For Rate Case only

Total Request (\$000):

Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	340.0	0.0	0.0	0.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor	0.0				
M&S					
A/P	0.0				
Other	340.0				
Overheads	0.0				
Total	340.0	0.0	0.0	0.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance	75.0	75.0	75.0		
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	50.0	50.0			
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: Capital ☒ O&M ☐ Regulatory Asset		
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic			
Project/Program Title: Construction Field Smart Forms 2018 -2022 (IT-KONY)			
Project/Program Manager: Franklin Alvarez	Project/Program Number(Level 1):		
Status: ☐ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other :			
Estimated Start Date: 9/1/2015	Estimated Date In Service: 12/31/2022		
A. Total Funding Request (\$000) Capital: 206.7 O&M:	B. ☒ 5-Year (starting next year) Cost Savings (\$000) ☐ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: 100.0 Capital:		
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 500.0	D. Investment Payback Period: (Years/Months) (If applicable)		
Work Description: • Migrate remaining public improvement applications from the existing KONY platform to the Angular platform.			
Justification Summary: The project is necessary to have public improvement applications on one systems, for Cyber Security compliance and to update processes and work flows.			
Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation) test			
Risk 1 Name: Corporate ConEd.Regulatory and Compliance.Fraud	Risk 1 Description: Provide transparency to actual field observations and conditions		
Risk 2 Name: Department.Construction.Cost Impact of	Risk 2 Description:		

Municipal Projects	Review of actual costs and item of work tracked by supplier and field inspector

2. Supplemental Information

Alternatives:

Risk of No Action:

Non-financial Benefits:

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

3. Total Cost (\$000)

All Previous Actuals (2,009.1) + Cur. Yr. Sanctioned Forecast (996.7) + Next 5 Years Est. (206.7) = Total Cost (3,212.5)

4. Basis for estimate

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan
Technical Evaluation/ Analysis	
Project Relationships (if applicable)	

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year** (O&M only)</u>	<u>Forecast 2021</u>
Capital	322.8	352.3	210.7	856.3	0	996.7
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):
Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	206.7	0.0	0.0	0.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor					
M&S					
A/P					
Other	206.7				
Overheads					
Total	206.7	0.0	0.0	0.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings					
O&M Avoidance	100.0				
Capital Savings	0.0				
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	0.0	500.0	0.0	0.0	
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/ project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology

2022

1. Project / Program Summary

Type: ☒ Project ☐ Program				Category: Capital ☒ O&M ☐ Regulatory Asset	
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic					
Project/Program Title: Gas 5013 Replacement					
Project/Program Manager: Cathy Serrano			Project/Program Number(Level 1): L1_Gas 5013 Replacement / 25524254		
Status: ☐ Initiation ☐ Planning ☐ Execution ☐ On-going ☒ Other : <u>Design</u>					
Estimated Start Date: 1/1/2022			Estimated Date In Service: 10/1/2022		
A. Total Funding Request (\$000) Capital: 850.0 O&M:			B. ☐ 5-Year (starting next year) Cost Savings (\$000) ☒ 5-Year (starting next year) Gross Cost Avoidance (\$000) O&M: \$7,000 Capital:		
C. 5-Year (starting next year) Ongoing Maintenance Expense (\$000) Capital: O&M: 435.6			D. Investment Payback Period: (Years/Months) (If applicable)		
Work Description: • With Electric Operations discontinuing use of Bentley Passport products, the Bentley 5013 application license has become cost prohibitive for Gas Operations to continue its use. As a result, Gas Operations is partnering with IT to implement a mobile electronic drawing tool (EDT) as replacement for the Bentley 5013 solution, to support leaks and other field drawing needs. In addition to offering all the required Con Edison drawing functionalities provided by the Bentley 5013 solution, EDT will provide a device agnostic and user-friendly drawing interface. Leveraging modern technologies and development tools, EDT will be easily integrated with other applications such as WMS ARM, and extendable for future Gas Operation drawing needs such as replacing SmartApps. In 2022, implementing the EDT solution, will include but not limited to the following high-level activities: • Complete development of mobile drawing tool • Convert existing leak drawings into new EDT format • Integrate mobile drawing tool with Gas ARM • Conduct testing (system and user acceptance) of the solution • Train work force in the use of the new tool • Deploy solution to Gas Operations by end of Q3 2022 Once deployed, ongoing maintenance support is needed as well.					

Justification Summary:

Gas Operations' Emergency Resource Center (GERC) field users leverage an existing vendor software package (Bentley 5013) to create field sketches for leak migration/tracing. As the Con Edision eGIS capital project is on-going, and eventually replacing the Bentley software suite functionality, the licensing model for the software has become cost prohibitive. The Gas Operations department would be the sole user of this platform, and be required to bear the full licensing cost burden, which is estimated at \$1.4M annually. An evaluation was performed on the current O&R ELDT (Electronic Drawing Tool) software application, as an option for use by CECONY Gas Operations. With modifications along with enhancements to make the tool a native mobile application, the ELDT tool will be implemented in CECONY.

This product is a "home grown" software package.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

Risk 1 Name: Corporate ConEd. Safety and Environment. Gas Distribution Event

Risk 1 Description:

Requirement is to provide this level of capability in the new software system, to minimize safety risks as a result of incorrect tracking of Gas Leak events. This is a PSC requirement for gas leak management

2. Supplemental Information

Alternatives:

Continue to license Bentley Suite while looking for alternative sketching tool through RFP process.

Risk of No Action:

Continue to license the Bentley suite of applications with Gas Operations fully absorbing the licensing cost for the Bentley vendor software (approximately \$1.4M annually).

Electric and Gas Ops currently split the cost of licensing the Bentley Passport Suite of applications. Electric Ops will discontinue using Bentley Passport applications. If Gas does not replace the Bentley 5013 solution, Gas Operations will be left to absorb the full cost by itself. This includes licensing products that it will not use, since the license are not sold individually but as a bundle (suite).

Non-financial Benefits:

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

Reduction in approximately \$1.4M of annual licensing costs to Bentley

3. Total Cost (\$000)

All Previous Actuals (0.0) + Cur. Yr. Sanctioned Forecast () + Next 5 Years Est. (850.0) = Total Cost (850.0)

4. Basis for estimate

Estimate based off similar projects with similar effort and complexity. The estimates were compiled jointly by IT and Gas Operations, assessing the programming effort required, appropriate testing staffing and duration required.

Additionally, estimated costs for integration with Gas Operations' new Mobile Work Management vendor product, CGI OpenGrid Field, were incorporated.

5. Conclusion

Project Risks and Mitigation Plan

Risk	Mitigation Plan

Technical Evaluation/ Analysis

Project Relationships (if applicable)

Gas Central

3. Funding Details

Historical Spend by Year (\$000):

	<u>Actuals 2017</u>	<u>Actuals 2018</u>	<u>Actuals 2019</u>	<u>Actuals 2020</u>	<u>Historic Year**</u> (O&M only)	<u>Forecast 2021</u>
Capital					0	
Implementation O&M*						
Regulatory Asset						

** For Rate Case only

Total Request (\$000):
Total Request by Year (\$000):

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital	850.0	0.0	0.0	0.0	0.0
Implementation O&M*					
Regulatory Asset					

*If Whitepaper is supporting a capital project/program this refers to implementation O&M.

Capital Request by Elements of Expense (\$000):

<u>EOE</u>	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Labor					
M&S					
A/P					
Other	850.0				
Overheads					
Total	850.0	0.0	0.0	0.0	0.0

Total Gross Cost Savings / Avoidance by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M Savings		1,400.0	1,400.0	1,400.0	1,400.0
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
O&M	39.6	158.4	79.2	79.2	79.2
Capital					

4. Definitions

Total Funding Request: All funding requested for program or project over program/ project lifecycle, including all capital, O&M, retirement, and contingency expenses.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes if capital isn't replaced)

Information Technology 2022

1. Project / Program Summary

Type: ☐ Project ☒ Program	Category: ☐ Capital ☒ O&M
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: IT Telecom O&M	
Project/Program Manager: Raymond Amara/ Alecia Copeland	Project/Program Number (Level 1): TBD
Status: ☐ Initiation ☐ Planning ☐ Execution ☒ On-going ☐ Other: _____	
Estimated Start Date: 1/1/2023	Estimated Date In Service: 12/31/2025
A. Total Funding Request (\$000) Capital: \$0 O&M: \$9,849 (RY 2023 - 2025)	B. ☐ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: (RY 2023 - 2025) \$20,178 Capital: \$0	D. Investment Payback Period: (Years/months) (If applicable)
Work Description: The company relies on innovative ways to keep its network infrastructure operating seamlessly with the assistance of various telecommunication, data networks and data centers. This program allows for security and support for all networks and major capital programs, projects, and initiatives that are implemented under the capital programs for CCTN, Grid Modernization, Corporate Data Center Improvements and XM8 critical radio systems. Technology solutions are purchased through capital investments which include negotiated maintenance and warranty periods. Once that period has expired, the contract becomes an expense to the Company, in addition newer solutions may only offer a SaaS model. During the following five years, operating and maintenance costs on the products, applications and infrastructure described below will increase and new expenses for maintenance will be incurred. Infrastructure Operations and Maintenance The O&M activities pertain to the major infrastructure categories below: 1. CCTN/Data Network Infrastructure – Outside plant fiber and network equipment including routers, switches, gateways, cybersecurity appliances, multiplexers, channel-banks, modems, Fiber Distributed Data systems and various cable management and cabling systems and the Stratum clocking infrastructure.	

2. Radio Infrastructures – 800MHz voice radio system, 450 MHz Man-Down radio system, 6GHz microwave systems, WiFi and satellite systems, Grid-Mod 4G/5G infrastructure and their various subscriber units including portables, mobiles, control stations, base stations, repeater stations, broadband data micro & femto cells and modems, radio frequency distribution systems, waveguides and antenna systems including microwave dishes.
3. Telephony Infrastructures – The VoIP system, turret system, dispatch console system, Automatic Ring-Down network, recorder systems, tele-collaboration systems, various hardware gateway interfaces and subscriber units consisting of VoIP phones and cell phones.
4. Common Plant support systems – Internal power distribution, UPS, Rectifier, Converter, Inverter, battery systems, surge suppression, grounding, bonding and lightning protection systems, HVAC systems, Fire detection and suppression systems, equipment rack systems, rooms, cabinet and enclosures, physical security access control systems, environmental and application monitoring systems, and lighting systems.

The O&M services performed on the foregoing plant includes:

- Telecom and Data Network infrastructure including private & carrier wired & wireless network and telecommunication applications and systems.
- Data Center improvements to HVAC, power, cabling and all critical systems and components.
- Collaboration Systems Services
- Outsourcing and Service Vendors.
- Communications Facilities leases include radio towers, communication spaces and outside plant fiber.
- Equipment warranties and technical support including licenses.
- Preventative maintenance programs
- Major remediation work
- System reliability programs
- Break-Fix and repairs.

Carrier usage rates and expansion of carrier services, fees, and taxes

Apart from the infrastructure implemented and used at Con Edison, communication requirements are supplemented by commercial carrier services including various wireline and wireless services. These services incur monthly recurring charges (MRC) based on monthly usage required to support company operations. These MRC include additional fees and taxes. Although the rates are aggressively negotiated to minimize usage cost the actual usage varies depending on activity and new deployments.

Infrastructure Support Services

This work is performed by a combination of employee and vendor resources. Con Edison spends about \$12 million annually for these services that are provided by more than 100 vendors including

outsourced services, specialized service providers, managed service providers, systems support providers, equipment and hardware providers and telecom software and license providers.

Infrastructure Systems

The network and telecommunications infrastructure consists of the Corporate Communications Transmission Network, the Land Mobile Radios systems, the SCADA radio systems, the corporate data network, the control operations recorder, turret and dispatch console systems, the VoIP telephone system, the multimedia collaboration and teleconferencing systems, the monitoring systems, the common support systems, the facilities housing the equipment and the outside and inside plant fiber optic and cable systems, the software including applications, firmware and middleware and the subscriber units associated with these systems.

The objectives of the work are to maintain all critical systems in optimal condition and operate them in an efficient, proactive manner that maximizes the life span and utility of the system. To maintain the balance between private infrastructure and supplemental services provided by commercial entities while minimizing usage cost through economy of scale-based negotiation.

The work entails various preventative maintenance programs across all critical systems executed on a schedule that almost eliminates major failures that substantially impact major operations.

Increase in O&M costs:

The increase in equipment through sustained targeted capital investments in the CCTN outside plant fiber expansion; and upgrade of equipment through ongoing migration from legacy technologies that were in service for the past several decades to the new technology platforms such as MPLS and LTE; and expansion of broadband wireless infrastructure to support Grid-Mod (Grid Modernization) including significant expansion in sensor networks, and the overall transformation of the telecom outside plant infrastructure from copper to fiber to provide more resiliency and survivability from super storms like Sandy, have resulted in increased O&M cost associated with routine maintenance of equipment and systems; increases in usage, fees, taxes, warranties and licenses; and preventative inspection and remediation and repair services to maintain these infrastructures in an optimal operational state.

Some of the equipment systems expanded and upgraded under the capital CCTN, XM8 and Grid-Mod programs include the various land mobile radios systems and their subscriber units, the various dispatch consoles and repeater systems, the turret and their recorder systems, and the new IP based telecollaboration system that facilitate remote worker productivity. These systems are maintained by a group of highly specialized vendors like Microchip, Cisco, Nokia, Ericsson, Power Systems, HVAC systems, board, card & component level repairs and engineering services contractors. There has also been a substantial increase in field support for the hundreds of end points associated with Grid-Mod.

Justification Summary:

The value of the Company's technology investments is maintained through support contracts for its various hardware and software platforms. The support is used to assist during issues, as well as to keep the software up to date, patch cybersecurity vulnerabilities, replace hardware failures, and take advantage of new release features within the products. IT provides critical

services, and these vendor support services contracts allow for sustainability and supportability of the environment and increases reliability and availability of the network, business applications, infrastructure, and PCs. These contracts are part of the IT strategy to reduce risk and provide sustainability and supportability of the various platforms. Without having these contracts in place, the Company will incur a significant support risk.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

This program supports future growth, allows for security and support for all networks and major initiatives such as CCTN, Grid Modernization, Corporate Data Network, and critical radio systems.

2. Supplemental Information

Alternatives

The alternative to the vendor provided O&M services is an expansion of the company workforce that includes significant training which will be very costly. The vendor services secured via the competitive procurement process are more cost effective and in reducing operating costs through economies of scale and avoidance of hiring specialized skillsets or re-training for employees.

Risk of No Action

A lapse in these critical support services will result in gradual deterioration of systems that will adversely affect operations of all commodity businesses.

Non-Financial Benefits

The support services provide the following benefits:

- Increased reliability and efficiency
- Improved workflows and communication between departments
- Regulatory compliance

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required): N/A.

2. Major financial benefits:

Controlling escalating O&M costs.

3. Total cost

The total incremental cost over the rate years 2023-2025 is estimated at \$9,849,000 resulting in a \$20,178,000 annual on-going O&M spending.

4. Basis for estimate

Estimates are based on historical cost for these ongoing O&M services.

5. Conclusion

Additional O&M funding should be provided to avoid a lapse in these critical support services that will result in gradual deterioration of systems that will adversely affect operations of all commodity businesses and put the energy delivery systems in jeopardy.
Project Risks and Mitigation Plan The most common risks associated with O&M activity and services are increasing costs, supportability, and supply chain delays. Use of the competitive procurements process will help manage costs; timely systems platform migrations will address obsolete unsupportable technologies; and upfront bulk purchases together with re-prioritization will help manage supply chain delays.
Technical Evaluation / Analysis Technical evaluations are based on responses from vendors that participate in the competitive procurement of these services. All system O&M is performed in strict compliance with the system manufacturers to ensure reliable service and protect warranty and sustainability requirements.
Project Relationships (if applicable) This program supports future growth, allows for security and support for all networks and major capital programs, projects, and initiatives such as CCTN, Grid Modernization, Corporate Data Network, and XM8 critical radio systems.

3. Funding Detail

Historical Spend

	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2022</u>
Capital						
O&M	<u>6,423</u>	<u>7,295</u>	<u>11,866</u>	<u>12,284</u>	<u>10,329</u>	<u>13,800</u>

Total Request (\$000):

Total Request by Year

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital					
O&M*	<u>13,800</u>	<u>\$17,878</u>	<u>\$18,878</u>	<u>\$20,178</u>	<u>\$20,178</u>

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor					
M&S					
Contract Services					
Other					
Overheads					

Total	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M	<u>13,800</u>	<u>\$17,878</u>	<u>\$18,878</u>	<u>\$20,178</u>	<u>\$20,178</u>
Capital					

*If whitepaper is supporting a capital project/program this refers to implementation O&M

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Project Status:

- Initiation - New project, not authorized yet
- Planning - Project authorized, not started yet
- Executing - Project in-flight
- On-going - Annual program

Information Technology 2022

1. Project / Program Summary

Type: ☐ Project ☒ Program	Category: ☐ Capital ☒ O&M
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic	
Project/Program Title: IT Risk Management & Compliance	
Project/Program Manager: Jenny Brito	Project/Program Number (Level 1):
Status: ☐ Initiation ☐ Planning ☐ Execution ☒ On-going ☐ Other: _____	
Estimated Start Date: 01/01/2023	Estimated Date In Service: 06/01/2023
A. Total Funding Request (\$000) Capital: O&M: \$500,000	B. ☐ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: \$2,500,000 Capital:	D. Investment Payback Period: (Years/months) (If applicable)
Work Description: The IT Risk Management & Compliance Section will establish a new section within the Office of the Chief Information Officer (OCIO). Core activities that will be performed by the workgroup will include: - Developing a 5-yr <i>Technology Risks and Compliance Roadmap</i> - Increasing the maturity level of ITs risk and compliance management capabilities and implementing a standardized risk framework for technology risk management - Enhancing IT compliance programs and establishing control standards for the use and implementation of new IT systems throughout the Company - Reducing IT risks to internal, external customers and stakeholders through the systematic identification, evaluation and remediation of technology and compliance risks - Providing risk insights to the IT leadership team about emerging technology risks and changes/new compliance requirements The scope of activities to be undertaken by this section includes: - Conducting and/or coordinating self-assessments to evaluate compliance with IT controls, standards, and policies and procedures - Enhancing IT risk awareness and conducting risk and compliance training to IT employees - Supporting IT and working with Auditing and Corporate Compliance in connection with audits, compliance, and other reviews performed in the IT Department - Reporting on the status and timely completion of audit recommendations - Overseeing Business Continuity Planning (BCP)/Disaster Recovery coordinating activities	

- Maintaining and supporting preparedness for Event/Crisis response (Emergency Response Plan, Coastal Storm Plan, Emergency Drills, System Emergency Assignment coordination)
- Overseeing software license management
- Implementing a new Policy and Procedures System that will enable IT to:
 - o Replace the use of manual spreadsheets with a robust policy and procedures system that sends automated reminders to document owners to ensure that all policy and procedures documents are reviewed, updated, and approved timely
 - o Initiate a program to standardize all IT policy and procedures and establish a review and update cycle
 - o Classify and mark sensitive policy and procedures, if not done so already and tag documents to ensure conformance with specific compliance requirements (PII, SOX, etc.)

Justification Summary:

IT Risk Management & Compliance activities are currently performed within each IT section. These activities are performed ad-hoc, rely on the use of manual spreadsheets, and may divert IT people resources from their core job responsibilities. The IT Risk Management & Compliance Section will centralize ITs risk and compliance management activities, increase functional capabilities, and develop risk mitigation plans for emerging technology risks and implement monitoring controls for new compliance requirements.

The IT Risk Management & Compliance Section will establish a dedicated workgroup to include 3 *Information Technology Risk and Compliance Analysts* who will:

- Coordinate and monitor IT risks and compliance issues;
- implement a robust policy and procedures system with automated workflows to replace the processes currently being performed manually
- initiate a 5-yr. plan to standardize all IT policy and procedures (>500 policies, guides, job aids, checklists, etc.);
- provide a single point of reference/contact for IT, employees, management, auditors, and regulatory bodies.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

The IT Risk Management & Compliance Section is aligned to the risk management strategies, establishes a dedicated workgroup with the knowledge, experience, and expertise to address increased technology and compliance risks.

The program reduces reputational risks due to early identification of technology risks, compliance issues, and lessens impacts to customers through the mitigation of avoidable risks.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection

Maintaining the status quo is unacceptable for the following reasons:

- The current IT risk and compliance process is fragmented and performed manually. It is currently being coordinated by one employee with a background in auditing and risk

management. The current maturity level will remain sub-optimal without an increased commitment of people, resources and funding. IT operational, reporting and compliance risks continue to increase rapidly. An investment now addresses emerging risks as well as establishing a long-term plan to advance ITs risk and compliance capabilities. Without this investment, IT risks will continue to increase without offsetting risk mitigation actions and may expose the company to a number of issues due to inadequate risk and compliance management. <u>Alternative 2 description and reason for rejection</u> <u>Alternative 3 description and reason for rejection</u>				
Risk of No Action <u>Risk 1</u> See above.				
Non-Financial Benefits - Increases efficiency of risk and compliance management activities across all areas within IT as well as risk and compliance reporting at the enterprise level - The implementation of a policy and procedures system improves data accuracy, reduces the need to perform manual processes, and enforces system controls within the policy review and approval workflows - Improves the quality, useability, and value of IT risk and compliance reports to the audit community, regulators, and other stakeholders - Facilitates stronger compliance due to the use of a standardized risk and compliance framework - Increases the consistency of IT operations due to standardization in the structure of policy and procedures				
Summary of Financial Benefits and Costs (attach backup) - Cost-benefit analysis (if required) - Major financial benefits - Total cost - Basis for estimate - Conclusion				
Project Risks and Mitigation Plan <table><tr><td>Risk 1</td><td>Mitigation plan</td></tr><tr><td colspan="2">Difficulty obtaining resources with required skills and experience in IT risk and compliance. IT will work with HR and other organizations to recruit and hire talent and cross-train employees as needed.</td></tr></table>	Risk 1	Mitigation plan	Difficulty obtaining resources with required skills and experience in IT risk and compliance. IT will work with HR and other organizations to recruit and hire talent and cross-train employees as needed.	
Risk 1	Mitigation plan			
Difficulty obtaining resources with required skills and experience in IT risk and compliance. IT will work with HR and other organizations to recruit and hire talent and cross-train employees as needed.				

Risk 2	Mitigation plan
Current policy and procedures document repository is extensive, not centralized, and in different file formats (Word, pdf, etc.). Clear and concise policies are at the core of operational excellence and therefore, reliable customer service. The implementation of a robust policy and procedures system will initiate a long-term plan to standardize policy and procedures.	
Technical Evaluation / Analysis	
Project Relationships (if applicable)	

3. Funding Detail

Historical Spend

	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2021</u>
Capital					<u>0</u>	
O&M						

Total Request (\$000):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital					
O&M*		<u>\$500</u>	<u>\$500</u>	<u>\$500</u>	<u>\$500</u>

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor					
M&S					
Contract Services					
Other					
Overheads					
Total					

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>

O&M		<u>\$500</u>	<u>\$500</u>	<u>\$500</u>	<u>\$500</u>
Capital					

*If whitepaper is supporting a capital project/program this refers to implementation O&M

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Project Status:

- Initiation - New project, not authorized yet
- Planning - Project authorized, not started yet
- Executing - Project in-flight
- On-going - Annual program

Information Technology 2022

1. Project / Program Summary

Type: ☐ Project ☒ Program	Category: ☐ Capital ☒ O&M
Work Plan Category: ☐ Regulatory Mandated ☐ Operationally Required ☒ Strategic	
Project/Program Title: IT Portfolio Management	
Project/Program Manager: Ana Bolivar	Project/Program Number (Level 1):
Status: ☐ Initiation ☐ Planning ☐ Execution ☒ On-going ☐ Other: Re-structure	
Estimated Start Date: 01/01/2023	Estimated Date In Service: 06/01/2023
A. Total Funding Request (\$000) Capital: O&M: \$450	B. ☐ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: \$2,250 Capital:	D. Investment Payback Period: (Years/months) (If applicable)
Work Description: Information Technology (IT) seeks to further develop its Portfolio Management Office (PMO) to enhance and mature portfolio management capabilities, to include advanced analytics, metrics, increased oversight, and controls to provide corporate guidance on IT investments as the portfolio continues to grow. The IT PMO manages the Company's IT capital portfolio, provides guidance and a standard approach for the management of technology projects. Over the next 2-5 years the aforementioned items will need to be addressed and/or built out for the organization to strategically and effectively drive technology investments across the Company, particularly as the IT capital portfolio continues to increase. This work will require the addition of three (3) qualified employees, as outlined in the funding requested below.	
Justification Summary: In 2016, IT created the IT Portfolio Management Office (PMO) to facilitate the execution of a technology portfolio of projects that is aligned to Con Edison's IT strategic goals and guiding principles, and to enable the delivery of IT projects that are on time, on scope and on budget, to deliver value to our customers. The IT PMO has made progress toward these goals since its inception: - The consolidation and optimization of a capital portfolio of IT projects taking place across the Company during the capital budgeting cycle - The registration and evaluation of technology projects in accordance with CEI CI-215 <i>Acquisition, deployment and support of Information Technology</i>	

- Alignment of IT projects with IT's guiding principles (promote one enterprise, excel at the basics, foster/promote innovation, implementation methodology) and long term strategy, and improvement of delivery
- The promotion and application of project management best practices across IT

To elevate the abilities of the team, the IT PMO is looking to enhance and mature portfolio management capabilities, to include improved analytics, metrics, oversight, and controls. Through these initiatives, the IT PMO aims to bring better utilization of funding, a strategic approach to project implementation, identification of interdependencies between projects and management thereof, and more efficient and timely delivery of projects, scheduling, resources, and cost agility (shifting these items quickly, as needed). Successful execution of these projects will aid in the safe delivery of energy services and improved customer experience to our rate payers.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

5-Year Long-Range Plan: With IT investments needed to support day to day operations, enhance field work, and meet the expectations of our customers the trend of an increase in IT investments in the next 5-years supports the need for Portfolio Management. The IT PMO will enhance policy/procedure compliance, better allocate the IT capital budget and provide advanced analysis and metrics to ensure the portfolio is adding value as expected.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection

The alternative to further developing IT's Portfolio Management Office would be a continuation of current practices around project and portfolio management. The expansion of the PMO is needed as the portfolio continues to grow and the Company invests in technology projects.

Alternative 2 description and reason for rejection

Alternative 3 description and reason for rejection

Risk of No Action

Risk 1

The status quo regarding capital project spend and planning is not as effective as it can be to invest in technology projects as it needs to be matured. IT's Portfolio Management Office will drive change both for the organization and the Company, providing optimization on multiple fronts, such as costs, resources, scheduling, and scope for IT investments.

Risk 2

The IT PMO seeks to be proactive in the management of the IT portfolio of projects. With the existing staff, the organization will continue working in a reactive manner, providing a simplistic support and basic analysis which will not sustain strategic investments and instead will continue to work on emergent needs. This approach would not align with the expectations and demands of our customers that rely on our energy systems with no downtime.

Risk 3

Non-Financial Benefits

Non-financial benefits include improving review and monitoring of project spend, schedules, and better portfolio management to support the goal of strategically and effectively driving technology investments and utilization across the Company.

Additionally, the IT PMO continues to serve as liaisons not only between different areas of IT, but also between business units across the Company. We work to improve information flow and communication between all departments and organizations in the pursuit of united strategic and operational goals.

Summary of Financial Benefits and Costs (attach backup)

1. Cost-benefit analysis (if required)

2. Major financial benefits

None

3. Total cost

\$ 2,250,000 in labor cost over 5 years (2023-2027).

4. Basis for estimate

This estimate is for the salary of three (3) full time employees to join the IT PMO

5. Conclusion

The expansion of the IT PMO will support a growing capital portfolio of projects and provide alignment with strategic investments, enhanced governance oversight, and advanced reporting metrics to make better investment decisions.

Project Risks and Mitigation Plan

Risk 1	Mitigation plan
Not finding skilled personnel to fulfill this role	The IT PMO needs more personnel to better manage the current portfolio, so even if the portfolio stops growing the additional personnel will add value in managing the current portfolio

Risk 2	Mitigation plan
Technical Evaluation / Analysis	
Project Relationships (if applicable) None	

3. Funding Detail

Historical Spend

	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2021</u>
Capital					<u>0</u>	
O&M						

Total Request (\$000):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital					
O&M*		<u>\$450</u>	<u>\$450</u>	<u>\$450</u>	<u>\$450</u>

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>
M&S	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>
Contract Services	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>
Other	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>
Overheads	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>
Total	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>
O&M Avoidance	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>
Capital Savings	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>
Capital Avoidance	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M	<u>\$0</u>	<u>\$450</u>	<u>\$450</u>	<u>\$450</u>	<u>\$450</u>
Capital	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>

*If whitepaper is supporting a capital project/program this refers to implementation O&M

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Project Status:

- Initiation – New project, not authorized yet
- Planning – Project authorized, not started yet
- Executing – Project in-flight
- On-going – Annual program

Information Technology 2022

1. Project / Program Summary

Type: ☐ Project ☒ Program	Category: ☐ Capital ☒ O&M
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Oracle Strategic Partnership (OSP) – RUN phase	
Project/Program Manager: Mike Policastro	Project/Program Number (Level 1):
Status: ☐ Planning ☐ Design ☐ Engineering ☐ Construction ☒ Ongoing ☐ Other: _____	
Estimated Start Date: n/a	Estimated Date In Service: n/a
A. Total Funding Request (\$000) Capital: O&M: \$121,071 Retirement:	B. ☒ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: \$7,400 Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: Capital:	D. Investment Payback Period: (Years/months)
Work Description: Con Edison is requesting finding for costs associated with its Oracle Strategic Partnership (OSP). OSP facilitates portfolio standardization, and predictable Operations & Maintenance expenditures with Oracle. In May 2018, Con Edison and Oracle established a Perpetual Universal License Agreement (PULA). Oracle Corporation is a global provider of mission critical enterprise technology and is one of Con Edison's largest IT vendors supporting: - Customer care, billing, and energy efficiency - Enterprise Resource Planning (ERP) including finance and supply chain, human resources and payroll, and Business Intelligence (BI) - Outage and distribution system management - Corporate hardware, integration software, and database management systems Con Edison has been an Oracle customer since 1990.	
Justification Summary: Oracle Strategic Partnership provides CEI and its subsidiaries: - Unlimited, on-premise use of Oracle utility and business software products including upgrades and replacements - Innovate on new technologies that benefit from Oracle's industry leadership and enable Con Edison to improve business processes and customer service - Discounted pricing for utility and business software and cloud-based applications - Ability to influence Oracle product development	

• Dedicated Oracle resources to assist with solution implementation • Credits for consulting services and training • Alignment with our corporate IT strategy • Reduced legal and procurement costs over contract life • Fixed support costs • Deliver and adopt software and services that are "best in class" with respect to scope, functionality, performance, and quality • Collaborate, utilizing Con Edison's knowledge of the industry to assist Oracle in improving their solutions and Oracle will provide Con Edison input to key solution design decisions • Upside potential: the more technology we consume the greater the value and the higher degree of application/platform/hardware standardization
Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation) Con Edison purchases of Oracle software will likely increase over the next decade as it implements its one enterprise system.

2. Supplemental Information

Alternatives <u>Alternative 1 description and reason for rejection</u> Dollars are contracted/committed spend with Oracle. Exiting the OSP would incur significant budget rebalancing, increased cost to evaluate continued and discontinued Oracle solutions, and increased cost to adjust technology platforms because of said evaluation. <u>Alternative 2 description and reason for rejection</u> <u>Alternative 3 description and reason for rejection</u>
Risk of No Action <u>Risk 1</u> See alternatives <u>Risk 2</u> <u>Risk 3</u>

Non-Financial Benefits Ability to influence Oracle product development Alignment with our corporate IT strategy Standardizing on Oracle platforms provides opportunity for streamlined integrations between systems.
Summary of Financial Benefits and Costs (attach backup) 1. Cost-benefit analysis (if required) n/a 2. Major financial benefits When migrating to applicable cloud solutions, Con Edison receives credits (cost reductions) towards on-premise PULA support costs. The current level of cloud subscriptions translates to approximately \$1,480,000 in annual credits with the potential to increase significantly as more cloud solutions are adopted through 2027. 18% to 20% savings expected to be achieved over 10 years (2018 through 2027) 3. Total cost The Oracle Global Business Unit (GBU) Cloud Services organization supports the cloud offerings provided by the following: • Communications Global Business Unit (CGBU) • Financial Services Global Business Unit (FSGBU) • Health Sciences Global Business Unit (HSGBU) • Hospitality Global Business Unit (HGBU) (former Micros Cloud Services) • Construction and Engineering Global Business Unit (CEGBU) • Retail Global Business Unit (RGBU) • Utilities Global Business Unit (UGBU) Con Edison's usage includes the Primavera suite of project management software and Opower software in support of the Company's Digital Customer Experience (DCX) solution. Oracle Fusion Applications (APPs) include, but is not limited to: • Oracle Fusion Financials manages financial flows, including assets, ledgers, cash cycle, invoices and payments, accounts receivable, collections, and setup of subledger accounting and tax configuration. • Oracle Fusion Governance, Risk, and Compliance integrates business intelligence, process management, and automated controls enforcement to enable sustainable risk and compliance management. • Oracle Fusion Human Capital Management provides employee management for an organization. • Oracle Fusion Procurement manages the procurement process including requisitions, purchase orders, and supplier negotiations.

- Oracle Fusion Supply Chain Management integrates and automates all key supply chain processes, from design, planning, and procurement to manufacturing and order fulfillment. Con Edison's usage includes Enterprise Performance Mgt. (EPM), Enterprise Resource Planning (ERP), and Human Capital Management (HCM).

Oracle Universal Cloud Credits (UCC) provides a simpler buying experience. You can subscribe to a single set of credits for all infrastructure and platform as-a-service (IaaS and PaaS) cloud services. Con Edison's usage of UCC is reviewed annually and only committed for the current year.

PULA Support: Perpetual Universal License Agreement (PULA) yearly support costs established in 2018 (see "Work Description" section). Dollars include Shelving Credits.

Support costs to manage the partnership with Oracle include a consultant; approximately \$180k annual cost respectively.

4. Basis for estimate

Dollars are a combination of contractual and estimated costs.

5. Conclusion

Dollars are contracted/committed spend with Oracle.

Project Risks and Mitigation Plan

Risk 1
See above.

Risk 2

Technical Evaluation / Analysis

n/a

Project Relationships (if applicable)

There are multiple projects under the OSP, with dependencies across multiple projects. For example: Business Intelligence (BI) platform for Human Capital Management (HCM) and Enterprise Resource Planning (ERP), and Chart of Accounts design for ERP/HCM.

3. Funding Detail

Historical Spend

	<u>Actual 2016</u>	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2020</u>
Capital						
O&M					<u>\$14,022</u>	
<u>Retirement</u>						

Total Request (\$000):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital					
O&M*	\$19,302	\$20,889	\$23,813	\$27,577	\$29,490
Retirement					

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor					
M&S					
Contract Services					
Other					
Overheads					
Subtotal					
Contingency**					
Total					

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings	<u>\$1,480</u>	<u>\$1,480</u>	<u>\$1,480</u>	<u>\$1,480</u>	<u>\$1,480</u>
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M					
Capital	<u>\$19,302</u>	<u>\$20,889</u>	<u>\$23,813</u>	<u>\$27,577</u>	<u>\$29,490</u>

*If whitepaper is supporting a capital project/program this refers to implementation O&M

**Please refer to the Corporate Contingency Guidelines

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Total Contingency: Total contingency expense according to the Corporate Contingency Guidelines

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Information Technology 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☐ Capital ☒ O&M
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Secure Coding Training	
Project/Program Manager: Erica Carvino	Project/Program Number (Level 1):
Status: ☐ Initiation ☐ Planning ☐ Execution ☒ On-going ☐ Other: _____	
Estimated Start Date: Jan'2023	Estimated Date In Service:
A. Total Funding Request (\$000) Capital: O&M: \$292K	B. ☐ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: \$105M Capital:	D. Investment Payback Period: (Years/months) (If applicable)
Work Description: This is a program designed to train developers in secure coding practices. Auditing has recommended that a formal training program be implemented to train all developers annually in secure coding and industry best practices. This is required for all employees who are engaged in architecting, designing, developing and supporting IT applications. The scope of this initiative includes the following activities: - Procure annual subscription licenses from a reputable training provider/platform - Annually review training curriculum to ensure relevance of training content - Perform administrative oversight of secure coding training program to ensure awareness and compliance	
Justification Summary: Due to rapidly changing technology and an increase in cyber-attacks, developers must stay abreast of secure coding best practices, including prevalent vulnerabilities, and standards. This, along with centralized code management and built-in cyber scanning capabilities will mitigate/eliminate coding issues as code is developed, maintained, and changed over time. The training program will provide awareness in the following areas: - Securing Coding Procedure - Cyber security standards and best practices (OWASP, SANS etc.) in: - Web and API development - Mobile Development - Database designs	

- o Cloud Computing • Source code analysis for software bug detection and vulnerabilities • Code quality analysis for code maintainability • Automatic integration with existing DevOps tools to enabled continuous integration and deployments (CI/CD). • Analytics on quality and vulnerability data.
Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation) The investment in training program aligns with IT's Journey to Zero.

2. Supplemental Information

Alternatives <u>Alternative 1 description and reason for rejection</u> No real alternative; self-learning by developers is not a sustainable option. <u>Alternative 2 description and reason for rejection</u> <u>Alternative 3 description and reason for rejection</u>
Risk of No Action <u>Risk 1</u> Increased vulnerabilities and unsafe coding in our applications. There is an inherent risk exposure, especially for public facing websites and mobile applications. <u>Risk 2</u> <u>Risk 3</u>
Non-Financial Benefits • Promotes coding standards and adoption of best practices across the enterprise
Summary of Financial Benefits and Costs (attach backup) 1. Cost-benefit analysis (if required) Not Available

2. Major financial benefits

- Information Security invests a great deal of time in its existing manual code review process. The secure coding training will improve code quality and decrease overhead involved in review/fix cycles.
- Developers spend substantial time remediating application vulnerabilities after the application is in production. Developers can identify and prevent security issues and improve time efficiency for their team, which is a cost improvement.
- Con Edison relies on critical business data for its day-to day business operations. A cyber breach resulting in the loss of sensitive data such as customer and employee information can result in financial liabilities.

3. Total cost

The total project cost is \$292K.

4. Basis for estimate

Historic purchases are used as well as vendor presentations and Internet sources. The requested expense includes implementation costs (labor and material), pre-set maintenance and support fees negotiated as part of the initial purchase agreement.

5. Conclusion

The project is in alignment with IT strategy to invest in automation tools and train our developers on secure coding. This will not only enhance cyber protection but also align with modern DevOps methodologies. Current processes are not sustainable as they involve manual effort to detect potential vulnerabilities in the software code.

Project Risks and Mitigation Plan

Technical Evaluation / Analysis

Information Security has completed an initial study of potential training partners/platforms that meet the stated goals and identified PluralSight as the preferred platform (at this time) that is one of the standards across the industry.

Project Relationships (if applicable)

Not applicable.

3. Funding Detail

Historical Spend

	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2021</u>
Capital					0	
O&M						

Total Request (\$000): \$292K

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital					
O&M*					

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
Labor					
M&S					
Contract Services					
Other					
Overheads					
Total					

*Total includes contingency

Total Gross Cost Savings / Avoidance by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M		<u>90K</u>	<u>97K</u>	<u>105K</u>	<u>105K</u>
Capital					

*If whitepaper is supporting a capital project/program this refers to implementation O&M

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Project Status:

- On-going – Annual program

Information Resources 2022

1. Project / Program Summary

Type: ☒ Project ☐ Program	Category: ☐ Capital ☒ O&M
Work Plan Category: ☐ Regulatory Mandated ☒ Operationally Required ☐ Strategic	
Project/Program Title: Mainframe O&M	
Project/Program Manager: Andrew Donegan	Project/Program Number (Level 1):
Status: ☐ Initiation ☐ Planning ☐ Execution ☒ On-going ☐ Other: _____	
Estimated Start Date: Jan 1, 2022	Estimated Date In Service: Ongoing
A. Total Funding Request (\$000) Capital: O&M: 50,038,563.00 (5 year total)	B. ☐ 5-Year Gross Cost Savings (\$000) ☐ 5-Year Gross Cost Avoidance (\$000) O&M: Capital:
C. 5-Year Ongoing Maintenance Expense (\$000) O&M: Capital:	D. Investment Payback Period: (Years/months) (If applicable)
Work Description: The CECONY Mainframe hardware environment supports many critical Applications. has been executing ease in operating and maintenance software support costs, for both IBM and our 3rd party software vendors, is a result of a recent requirement to increase computing resources on the CECONY mainframe. The CECONY mainframe environment runs critical corporate applications including Customer Information System (CIS), Emergency Control System (ECS) production batch systems that support Customer Billing (CUBS), Automated Metering Infrastructure (AMI), and other processes that support the business of Con Edison. The CECONY mainframe is also used for testing copies of production state to validate application upgrades and changes prior to moving to a live production environment. In the past few years, the CECONY mainframe has consistently seen growth in processing on the mainframe environments. The current batch billing schedules have caused latent demand with critical application testing and impacting both customer and internal processing performance. The demand for additional resources put on the mainframe by critical business groups: AMI, with the additional borough creation and daily batch streams, DCX has accelerated the need for additional computing resources. This new requirement will in turn increase our annual support costs incurred and paid to both IBM and our 3rd party software vendors. The CECONY mainframe also functions as the disaster recovery platform for the Orange and Rockland mainframe (both mainframe systems can function on the alternate machine during a system event impacting mainframe services at one of the locations.)	

Justification Summary:

See above. The increase in the CECONY annual support costs is directly related to the yearly increase in third party software cost that we see every year and to support old hardware technology on our CECONY platforms.

In 2020, a mainframe health check assessment was initiated by two outside vendors to assist in evaluating the current operational state and provide configuration recommendations to potentially improve current state performance. While the vendors did provide technical recommendations for system tuning (note all recommendations were implemented, providing benefits to specific applications / system functions), through their recommendation, based on the analysis and presuming no significant change in operational requirements, normal business growth still results in the need for additional computing power. As per their evaluation, there may be potential life extension/refinement opportunities in the production job/batch universe, but they did not see anything that would lead them to believe there will be a significant improvement to the overall health of the computing power. Their recommendation is to increase the compute power of the equipment, especially based on our test environments workloads over the last few years.

Relationship to Broader Company Plans and Initiatives (e.g. Long-Range Plans, CLCPA Initiatives, Risk Mitigation)

The project will create a more healthy, robust and secure CECONY Mainframe environment. This will allow us to continue to support our legacy application as mandated by legal requirements as we achieve our goals to migrate off the mainframe with certain application workloads. Executing on outdated mainframe software exposes CECONY to more errors and unreliable services. Risks of not maintaining state of the art levels of mainframe software on our CECONY processing environments could result in a reduction in critical system uptime.

2. Supplemental Information

Alternatives

Alternative 1 description and reason for rejection

We can remain at existing levels of Mainframe software support but it will be at higher maintenance support rates for the extended maintenance support and leave us vulnerable for more system errors due to back level software.

Alternative 2 description and reason for rejection

Alternative 3 description and reason for rejection

Risk of No Action

Risk 1

Risks of not maintaining state of the art levels of mainframe software on our CECONY processing environments could include a reduction in critical system uptime.

Risk 2

The cost associated to IBM and third party software vendors for extended support agreements for back level software.

Risk 3

Non-Financial Benefits

The CECONY mainframe supports mission critical applications such as the Customer Information System (CIS), Emergency Control System (ECS) and Automated Metering Infrastructure (AMI). In addition to the production batch cycle which accommodates updates to the master customer database, bill payment and processing, customer outage information. The CECONY Mainframe is also serves as the primary Disaster Recovery solution for our Orange and Rockland Co. Mainframe. The need for additional compute power will improve the performance, response times and integrity of these critical applications.

Summary of Financial Benefits and Costs (attach backup)

N/A

1. Cost-benefit analysis (if required)
2. Major financial benefits
3. Total cost
4. Basis for estimate
5. Conclusion

Project Risks and Mitigation Plan

These are yearly renewal requirements for the Mainframe Software contracts that support the CECONY mainframe mission critical applications such as the Customer Information System (CIS), Emergency Control System (ECS) and Automated Metering Infrastructure (AMI).

Technical Evaluation / Analysis

Information Technology performs planning and analysis for the increase in compute power based on current performance statistics and projected data processing growth (5 years).

Project Relationships (if applicable)

The CECONY Mainframe environment support many mission critical applications including CIS, ECS, DCX and AMI. Many of these application have seen an increase in the mainframe computing environment due to growth in these areas. The mainframe will be supporting these mission critical applications as they migrate to distributed server environments. In addition, the

CECONY mainframe will need to support any legacy applications that will remain after the CORE project. We need to keep the CECONY Mainframe healthy, robust and secure to ensure we can support these major initiatives.

3. Funding Detail

Historical Spend

	<u>Actual 2017</u>	<u>Actual 2018</u>	<u>Actual 2019</u>	<u>Actual 2020</u>	<u>Historic Year</u> (O&M only)	<u>Forecast 2021</u>
Capital						
O&M					<u>7,600,000</u>	<u>8,132,000</u>

Total Request (\$):

Total Request by Year:

	<u>Request 2022</u>	<u>Request 2023</u>	<u>Request 2024</u>	<u>Request 2025</u>	<u>Request 2026</u>
Capital					
O&M*	<u>8,701,240</u>	<u>9,310,327</u>	<u>9,962,050</u>	<u>10,659,394</u>	<u>11,405,552</u>

Capital Request by Elements of Expense:

<u>EOE</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>
Labor					
M&S					
Contract Services					
Other					
Overheads					
Total					

Total Gross Cost Savings / Avoidance by Year:

	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>
O&M Savings					
O&M Avoidance					
Capital Savings					
Capital Avoidance					

Total Ongoing Maintenance Expense by Year:

	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>
O&M	<u>\$8,701,240</u>	<u>\$9,310,327</u>	<u>\$9,962,050</u>	<u>\$10,659,394</u>	<u>\$11,405,552</u>
Capital					

*If whitepaper is supporting a capital project/program this refers to implementation O&M

4. Definitions

Total Funding Request: All funding requested for program or project over program/project lifecycle or for on-going programs the five-year requested amount, including all capital, O&M, retirement.

Cost Savings: Reductions in costs that are currently being incurred (e.g., reduced annual maintenance cost relative to today)

Cost Avoidance: Reductions in anticipated future costs that don't occur today (e.g., anticipated short-term fixes/maintenance if capital isn't deployed)

Project Status:

- Initiation – New project, not authorized yet
- Planning – Project authorized, not started yet
- Executing – Project in-flight
- On-going – Annual program