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Corporate Instruction

SUBJECT

CAPITAL GENERAL EQUIPMENT BUDGETING, ORDERING, AND CONTROL

1.0 PURPOSE -- To provide procedures for the budgeting, ordering, and dispensing of capital general equipment.

2.0 APPLICATION -- This Corporate Instruction applies to any Consolidated Edison Company of New York, Inc. (CECONY) organization or individual who intends to obtain capital general equipment as defined in paragraph 3.3. The terms *Corporate* or *Company* when used in this Instruction refer to CECONY unless otherwise stated.

3.0 DEFINITIONS --

3.1 Blanket Purchase Agreement (BPA) – An agreement with a supplier for specific goods and/or services at a defined, pre-negotiated price. BPAs include contract start/end dates, prices, terms and conditions, total amount limit, and specific line items. BPAs can be used by approved requisitioners subject to approval as detailed in the appropriate Delegation of Authorities—CECONY Corporate Policy Statement 000-1, "Delegation of Authorities" or O&R Policy 1.12, "Delegation of Authorities ("DOA")." Approved Purchase Requisitions that are issued pursuant to a BPA, will automatically be converted into Standard Purchase Orders (SPOs) by the Procurement System.

3.2 Business Improvement Services – The organization within Business Finance that performs the optimization analysis and provides the strategic value and ranking of projects and programs within the capital expenditure portfolio to the Optimization Teams. The Optimization Teams use this analysis to select and fund projects and programs in the next five-year business planning cycle.

3.3 Capital General Equipment (XM) – Specific categories of equipment (commonly termed XM) classified under the Uniform System of Accounts as General Plant, having a purchase cost of $500 or more, and a usage (life) expectancy of more than one year. EXHIBIT A summarizes information about Capital General Equipment including the applicable account codes, account code descriptions, and Company plant account. The Capital General Equipment (or XM) budget represents that portion of the capital budget devoted to the purchase of general equipment. As with other expenditures, XM funding plans should be prepared on a five-year horizon.

3.4 Capital Optimization Process – The Capital Optimization Process aligns and ranks all capital requests with the Corporate Strategic Drivers, Risks, and Benefits. Proposed capital budget requests are grouped under one of three

categories: (1) regulatory mandated, (2) operationally required, and (3) strategic. The Company has adopted a strategic alignment methodology to evaluate projects and programs so that funds are allocated to reduce operating risks and meet strategic objectives. This methodology takes into account the portfolio's cost, benefits, and weighted strategic value allowing for analysis of all projects and programs as an integrated portfolio.

3.5 **Contract Purchase Agreement (CPA) –** An agreement with a supplier for unspecified goods or services. A CPA does not constitute an obligation to purchase any volume of goods or services by the Company. Requisitions issued pursuant to a CPA will be routed through Purchasing for placement of an SPO based upon the provisions of the applicable CPA. CPAs include contract start/end dates and terms and conditions. CPAs do not include specific line items.

3.6 **Computer Resource Coordinator (CRC) –** The individual in a user organization who reviews and processes requests for all PC hardware and software tracks and reports the effect of these requests on various budgets. Reference paragraph 4.1c for additional information on procuring computer equipment.

3.7 **General Equipment (XM) Coordinator –** The individual in a user organization, also known as the XM Coordinator, who is responsible for managing a specific general equipment category including coordination and processing of budget requests, monitoring expenditures, and providing variance explanations to Cost Management. EXHIBIT A identifies the organization supplying the General Equipment Coordinator for each XM category.

3.8 **Optimization Teams –** Optimization Teams are comprised of subject matter experts selected to review and prioritize various projects and programs. Optimization Teams analyze and select the projects and programs proposed for the next business planning cycle best aligned with their five-year plans.

3.9 **Optimization Tool –** A software program that is located in the Microsoft Project Portfolio Server. The Optimization Tool is used by XM Coordinators to determine the capital optimization for a project or program that is to be included in the capital budget process. The Optimization Tool is illustrated in EXHIBIT B.

3.10 **Purchase Requisition –** The document by which a request for all goods or services is made and approved as required in the Procurement System. All Purchase Requisitions require project, organization, expenditure type, and task (POET) information. These four fields constitute the Company's accounting structure.

3.11 **Requisitioner** – A person who requests goods or services through the Procurement System.

3.12 **Shared Services Cost Management –** The organization responsible for distributing the approved annual capital budget by general equipment category, providing budgetary guidance and information to the respective XM Coordinators, and preparing and issuing monthly capital general equipment variance expenditure reports, including variance to annual budgets for all organizations.

3.13 **Standard Purchase Order (SPO) –** A document, which authorizes the purchase of goods and/or services. SPOs will only be generated on the basis of an approved Purchase Requisition. SPOs may be generated on a standalone basis (spot buy) or they may be issued pursuant to the provisions of a specific BPA or CPA.

3.14 **Strategic Alignment Committee –** The group that assigns priority and funding commitments for common capital projects based on the Committee's optimization criteria.

3.15 **User Organization –** The section or group that will ultimately use the general equipment item.

4.0 PROCEDURES --

4.1 User Organizations –

a. Annually, organizations will identify their capital general equipment requirements to be included in a new five-year business plan. This process will be administered by the respective XM Coordinator, who will meet with user organizations to determine the agreed upon equipment and funds desired. XM Coordinators will coordinate the assignment of priorities (i.e., Tier 1 – Equipment needed to protect the safety of employee's and customer's property or Tier 2 – Equipment beyond economical repair and needed operationally) and prepare one consolidated XM request that encompasses all user organizations. XM Coordinators will enter the requests (using the supporting documentation of the "white paper") into the Optimization Tool, which is illustrated in EXHIBIT B.

b. The Strategic Alignment Committee will determine the appropriate funding level for XM and all other common capital projects. The respective shared services organization (e.g., Central Field Services for transportation equipment) will submit optimized capital requests during the annual business planning process. Periodically, the XM budgets will be reviewed and, if necessary, reprioritized to adapt to evolving financial constraints.

c. When capital general equipment that was approved in the budget is required, the user organization requiring the equipment will request the item from the XM Coordinator and will follow the respective process/ procedure. For example, computer equipment available in the Procurement System can be ordered directly by an authorized Computer Resource Coordinator in accordance with Corporate Instruction CI-320-14, "Acquisition of Materials, Supplies, or Services." Upon

written approval, the Computer Resource Coordinator can order computer equipment using a Corporate Procurement Card (P-Card), as covered in Corporate Instruction CI-320-11, "Corporate Procurement Card (P-Card)." Substitute items may be requested within the limitations of the user organization's authorized funds and the availability of the equipment within the budget year.

d. When an organization requires equipment beyond its budget allotment, those requirements, including the projected increases in funding and the proposed offsets or decreases, should be submitted to the XM Coordinator and addressed by the Strategic Alignment Committee through its quarterly review process. Approved changes for the current budget year and subsequent four years of the business plan will be reflected in forecast updates.

e. EXHIBIT C sets forth categories of equipment that are inventoried, the frequency at which inventories are taken, and the methodology for conducting inventories. In addition, it lists XM items that require Company-issued tracking numbers and systems that are available to track those items.

f. Any capital general equipment identified as "missing" should be reported using a Security Incident Report Form with a copy to the XM Coordinators for appropriate action.

g. The user organization is responsible for attempting to resolve problems pertaining to capital general equipment purchases and should call the appropriate XM Coordinator for advice and counsel. If the user organization reports the problem to the Action Line, the XM Coordinator must be copied. (Reference Corporate Instruction CI-240-2, "The Action Line.")

4.2 General Equipment Coordinators –

a. Upon the Board of Trustees approval of the one-year capital budget, XM Coordinators will be notified by Shared Services Cost Management of the XM budget for each class of general equipment.

b. A committed dollar report will be prepared quarterly, or more frequently

upon the request of Shared Services Cost Management, showing by organization and equipment category, funds used, funds transferred to another category, items pending payment, and uncommitted funds to be used in managing available funds for the remainder of the year.

c. Each XM Coordinator will issue Purchase Requisitions for capital general equipment against approved Blanket Purchase Agreement(s) (BPA) for those items. For items not available through a BPA, the XM Coordinator or his or her designee will process capital general equipment Purchase Requisitions for Standard Purchase Orders. XM Coordinators may use their P-Card for the purchase of capital general equipment, if approved in accordance with Corporate Instruction CI-320-11, "Corporate Procurement Card (P-Card)."

d. XM Coordinators will monitor commitments and manage expenditures to avoid exceeding the authorization levels established in the approved one-year budget. Any increases or decreases in the total amount budgeted for their respective capital general equipment needs will be addressed through the Strategic Alignment Committee review process. All approved changes for the current budget year and subsequent four years will be reflected in forecast updates.

e. Capital general equipment purchases for special events, such as Corporate emergencies or events involving insurance reimbursements will be segregated and kept track of separately from the normal costs of business.

4.3 <u>Corporate Accounting</u> –

a. Property Record will provide written accounting rulings and advice to the XM Coordinators and user organizations to resolve accounting questions related to capital general equipment.

b. Project Accounting will prepare and process Transfer and Correction Memorandums as requested by XM Coordinators or Shared Services Cost Management personnel.

c. Property Record will review the capitalization dollar level for all XM items periodically.

4.4 <u>Business Finance</u> –

a. Financial Budgeting and Forecasting will submit capital general equipment requests to the Board of Trustees for approval as part of the annual capital budget process.

b. Shared Services Cost Management will coordinate with the XM coordinators to ensure proper implementation of segregation numbers during designated events.

5.0 EXHIBITS --

5.1 EXHIBIT A – Summary of General Equipment for Capital Accounts

5.2 EXHIBIT B – Illustration of the Optimization Tool

5.3 EXHIBIT C – Matrix of Required XM Inventory Controls

6.0 RESPONSIBILITIES -- Responsibilities for the budgeting, ordering, and dispensing of capital general equipment are specified in section 4.0.

7.0 ADVICE AND COUNSEL -- The Vice President of Business Finance will provide advice and counsel on this Instruction.

EXHIBIT A

Summary of General Equipment for Capital Accounts

CAPITAL BUDGET ITEM	ACCOUNT CODE	ACCOUNT CODE DESCRIPTION	PSC ACCOUNT	EXAMPLES	XM - General Equipment Coordinator
XM1	n/a n/a	OFFICE FURNITURE, BUSINESS MACHINES, MODULAR OFFICE PARTITIONS, CARPETING, SAFES	391000	DESKS, CHAIRS, TABLES, COPYING MACHINES, CABINETS, BOOK CASES, DRAFTING ROOM EQUIPMENT, SAFES, WINDOW TYPE AIR CONDITIONERS, SAFES AND SECURITY CONTAINERS, ETC.	FACILITIES AND FIELD SERVICES
XM2	n/a	TRANSPORTATION EQUIPMENT	392000	AUTOMOBILES, ELECTRIC VEHICLES, MOTOR TRUCKS, MOTORCYCLES, REPAIR CARS/TRUCKS, TRACTORS/TRAILERS, OTHER TRANSPORTATION VEHICLES, AND VEHICLES WHERE MOUNTED EQUIPMENT CAN BE EASILY REMOVED AND USED FOR TRANSPORTATION	FACILITIES AND FIELD SERVICES
XM3	n/a	STORES EQUIPMENT	393000	INCLUDES THE COST OF PORTABLE AND INSTALLED EQUIPMENT USED FOR THE RECEIVING, SHIPPING, HANDLING, AND STORAGE OF M&S AND CAPITAL ITEMS: STORAGE BINS, ELEVATING AND STACKING EQUIPMENT, COUNTER, CHAIN FALLS, HOISTS, WHEEL BARROWS, STENCIL MACHINES, BATTERY CHARGERS, ETC.	FACILITIES AND FIELD SERVICES
XM4	n/a	SHOP EQUIPMENT	394000	EQUIPMENT USED SOLELY IN GENERAL SHOPS (GENERATING STATION SHOPS EXCLUDED): FLOOR GRINDERS, LATHES, MILLING MACHINES, SCRIBERS, BRAZING AND WELDING EQUIPMENT, DRILL PRESSES, SHAPERS, JIB CRANES, HOISTS, VISE BAND SAWS, AIR COMPRESSORS, PORTABLE TOOLS, ETC.	CONSTRUCTION
XM5	3760	LABORATORY EQUIPMENT (TESTING)	395000	PORTABLE ELECTRIC, CHEMICAL AND MECHANICAL INSTRUMENTS AND LABORATORY EQUIPMENT USED FOR SYSTEM-WIDE TESTING PURPOSES SUCH AS VOLTMETERS, AMMETERS, WATTMETERS, GAS AND VAPOR TESTERS, ANALYZERS, AMPLIFIERS, RECORDERS, VIBROMETERS, TACHOMETERS, PRESSURE GAUGES, ANEMOMETERS, LABORATORY BENCHES, ETC.	FACILITIES AND FIELD SERVICES

EXHIBIT A (Cont'd)

Summary of General Equipment for Capital Accounts

CAPITAL BUDGET ITEM	ACCOUNT CODE	ACCOUNT CODE DESCRIPTION	PSC ACCOUNT	EXAMPLES	XM - General Equipment Coordinator
XM6	n/a	TOOLS & WORK EQUIPMENT	394000	TOOLS USED IN GENERAL CONSTRUCTION OR REPAIR WORK: PNEUMATIC HAMMERS, DRILLS, TOOL CARTS, SUBMERSIBLE & PORTABLE PUMPS, CHAIN SAWS, LAWN MOWERS, GRAVELY TRACTORS, CONCRETE MIXERS, SMALL TRENCHERS, SURVEYING EQUIPMENT, HEAVY DUTY FLOOR CLEANING EQUIPMENT, ROWBOATS, HYDRAULIC JACKS, BATTERY CHARGER, STEAM CLEANERS, PARTS WASHERS, WORK BENCHES, VISES, ENGINE STANDS, POWER PAK, TIRE REPAIR EQUIPMENT, BODY SHOP TOOLS AND PAINTING EQUIPMENT, GRINDERS, DRILLS, LATHES, PRESSES, GREASING AND LUBE EQUIPMENT, GASOLINE PUMPS AND STORAGE TANKS, DYNAMETERS, ETC.	FACILITIES AND FIELD SERVICES
XM7	n/a	MISCELLANEOUS EQUIPMENT	398000	RECREATIONAL, CAFETERIA, AND KITCHEN EQUIPMENT, MEDICAL (INCLUDING HOSPITAL AND INFIRMARY), WATCHMAN'S CLOCKS, SAFETY EQUIPMENT, TRAINING EQUIPMENT, INHALATORS, RESUSCITATORS, SIGN AND ADVERTISING DISPLAYS, FIRE PROTECTION EQUIPMENT, AUDIO VISUAL EQUIPMENT, PHOTOGRAPHIC EQUIPMENT, ETC.	FACILITIES AND FIELD SERVICES
XM8	n/a	COMMUNICATION EQUIPMENT	397000	ALL COMMUNICATIONS EQUIPMENT USED ANYWHERE IN GENERAL COMPANY OPERATIONS: TRANSMITTERS, RECEIVERS, AMPLIFIERS, REFLECTORS, TOWERS, RADIO TELEPHONES, VEHICLE-MOUNTED RADIOS, WALKIE TALKIES, MICROWAVE EQUIPMENT INCLUDING SWITCHING EQUIPMENT, FIBER OPTIC EQUIPMENT, FAX MACHINES, ETC.	INFORMATION RESOURCES
XM10	n/a	COMPUTER EQUIPMENT	391000	ALL ELECTRONIC DATA PROCESSING EQUIPMENT AND RELATED COMPUTER EQUIPMENT	INFORMATION RESOURCES
XM13	n/a	POWER-OPERATED EQUIPMENT	396000	AIR COMPRESSORS W/VEHICLE, BACK-FILLING MACHINES, BORING MACHINES, BULLDOZERS, CRANES & HOIST, DIGGERS, PILE DRIVERS, PIPE CLEANING/COATING/WRAPPING MACHINES, TRACTORS (CRAWLER TYPE), TRENCHERS, AND OTHER POWER-OPERATED EQUIPMENT	FACILITIES AND FIELD SERVICES
XM15	3761	LABORATORY EQUIPMENT (CHEMICAL)	395000	EQUIPMENT PURCHASED SOLELY FOR USE BY THE CHEMICAL LABORATORY: GAS, STEAM, AND ELECTRIC TESTING EQUIPMENT, VOLTMETERS, ANALYZERS, LAB BENCHES, MICROSCOPES, ETC.	FACILITIES AND FIELD SERVICES

EXHIBIT B

Illustration of the Optimization Tool

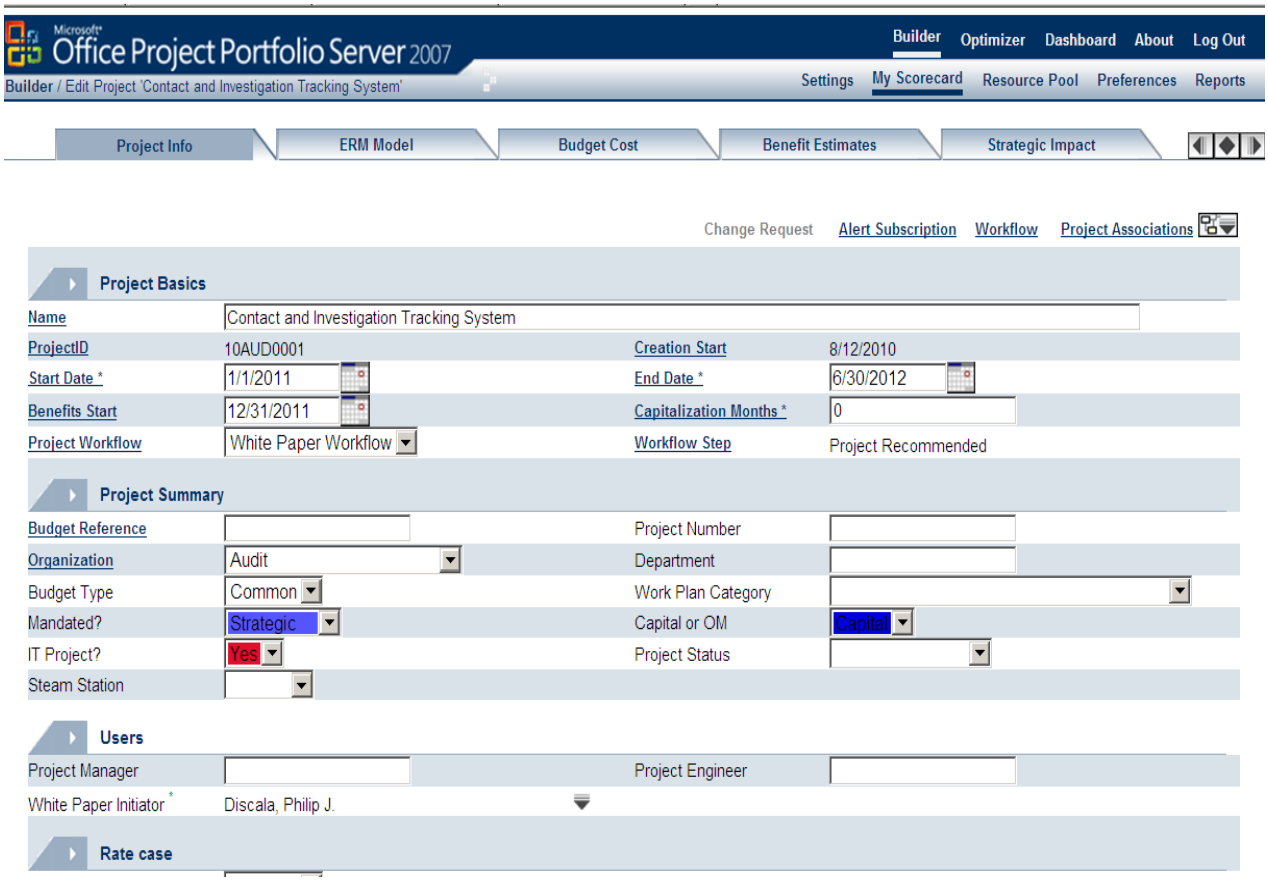

EXHIBIT B (Cont'd)

Illustration of the Optimization Tool

EXHIBIT B (Cont'd)

Illustration of the Optimization Tool

EXHIBIT C

Matrix of Required XM Inventory Controls

Matrix Equipment By XM	Inventory Tag Required	Inventory Required	Inventory Method Cycle For Inventory	Tracking System
XM1 Office Furniture	No	No	Not Applicable	Not Applicable
XM2 Transportation Equipment	Vehicle # Assigned	Yes	Annual State Inspection	VMS
XM3 Stores Equipment	No	No	Not Applicable	Not Applicable
XM4 Shop Equipment	No	No	Not Applicable	Not Applicable (1)
XM5 Lab Equipment (Testing)	Yes	No	Not Applicable	Mainsaver
XM6 Tools & Work Equipment	No	No	Not Applicable	Not Applicable
XM7 Safety & Miscellaneous Equipment	No	No	Not Applicable	Not Applicable
XM8 Communication Equipment Portable (Faxes, Radios) Stationary (Hubs, Switches)	 No No	 Yes No	 Every Three Years N/A	 ET/TEMS (2) Not Applicable
XM10 Computer Equipment – Mainframes, Servers, Desktop & portable PCs, and printers	No	Yes	Every Year via CCC for PC's	SMS/CCC (3)
XM13 Power-Operated Equipment	Vehicle # Assigned	Yes	Annual State Inspection	VMS
XM15 Lab Equipment (Chemical)	Yes	No		Mainsaver

1. Applicable to Construction for less than 100 pieces of equipment used at Van Nest Shops.

2. See Corporate Instruction CI-330-10, "Security and Use of Mobile and Portable Communications Equipment," which calls for a full inventory of radios every three years. Inventory of telephone lines covered in Corporate Instruction CI-310-11, "Inventory of Telecommunication Lines" calls for an inventory of telephone lines every three years when the FAX Machine should be verified with the line.

3. Information Resources performs a daily inventory of servers and personal computers on the network for deployment of software patches. Personal computers will be placed into inventory by Computer Cost Central (CCC) when they are shipped from the vendor.

X	Capital
	O&M

2016 – Shared Services / General Equipment

Project/Program Title	XM 1 – Office Furniture and Equipment
Project Manager	Richard Luong
Hyperion Project Number	10025701
Organization's Project Number	2XM0001
Status of Project	Ongoing
Estimated Start Date	Ongoing
Estimated Completion Date	Ongoing
Work Plan Category	Operationally Required – Critical Repair

Work Description:

The XM-1 budget represents the portion of the Capital Budget devoted to the purchase of general office furniture, business machines, modular office partitions, floor carpeting, drafting room equipment, safes, security containers, book cases & cabinets, and window air conditioners. Facilities and Field Services' Operations Services group is the control agency for XM-1.

An organization requiring purchase of capital General Equipment classified as XM-1 must submit a written request to Facilities and Field Services' Operations Services for purchasing such equipment. The XM-1 budget coordinator reviews each request and notifies the requesting organization of any items that may be available in our recycled inventory. Additionally, the request is reviewed to confirm that the total cost is within the requesting organization's budget allotment and then initiates the procurement process.

Justification Summary:

Furniture, partitions, and other equipment categorized as XM-1 in the General Equipment capital budget are necessary in order to provide for a workplace environment for all divisions and departments within the Company.

Supplemental Information:

- Alternatives: There are no alternatives, per se, but the Company does employ various mitigation efforts. Facilities and Field Services recycles desks, chairs, and office partitions as a general practice whenever possible. Furniture and office equipment are evaluated before being replaced; items found to be in good operating condition are stored onsite and become part of the recycled inventory to be reused in temporary work assignments, remote office trailers, shops, etc. Only those items that are deemed beyond economical repair are disposed of.

  In addition, there are several contracts available to purchase new furniture; these contracts were competitively bid, and whenever possible, new orders are consolidated to take advantage of volume discounts.

It should also be noted that at any given time, organizational priorities are shifted to meet each organization's requirements. Each organization anticipates their budget needs by identifying their future furniture requirements. This includes forecasting temporary deployment of extra crews in the field that would require office furniture. Organizations submit corresponding requests for the following year's General Equipment during the capital budgeting process.

- Risk of No Action: The Company's work forces would be prevented from meeting their objectives in an efficient and safe manner without functioning furniture and other office equipment. It would also create personnel issues with those employees who, due to their medical conditions, require ergonomic furniture to be able to perform their duties.

- Non-financial Benefits: Procuring the appropriate office furniture for the Company will create a safe working environment for employees by replacing broken and damaged furniture. In addition, procurement of ergonomic furniture can positively impact productivity by reducing potential injuries, such as repetitive strain injuries, and minimize lost time due to such injuries.

- Summary of Financial Benefits (if applicable) and Costs: N/A

- Technical Evaluation/Analysis: N/A

- Project Relationships (if applicable): None

- Basis for Estimate: The final invoice price for specific furniture that will need to be purchased or replaced is typically not known for future years. Replacement in future years is based on the anticipated needs of each operating organization and historical spending.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
753	**652**	**873**	**965**		**1,146**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor	7					
M&S		422	716	886		1,096
A/P	643	74	58	3		
Other		107	62	41		15
Overheads	103	48	37	35		35
Total	**753**	**652**	**873**	**965**		**1,146**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
1,341	**925**	**905**	**872**	**870**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor					
M&S	1,177	803	785	755	753
A/P					
Other	148	111	109	107	107
Overheads	16	11	11	10	10
Total	**1,341**	**925**	**905**	**872**	**870**

X	Capital
	O&M

2016 – Shared Services - General Equipment

Project/Program Title	XM 2 / XM 13 - Vehicles and Equipment
Project Manager	Salvatore Tarantola
Hyperion Project Number	10025750
Organization's Project Number	N/A
Status of Project	Ongoing
Estimated Start Date	Ongoing
Estimated Completion Date	Ongoing
Work Plan Category	Operationally Required – Critical Repair

Work Description:

The XM-2 and XM-13 general equipment categories provide for the annual replacement of mobile equipment such as cars, trucks, cranes and construction equipment used throughout CECONY's Operations. The control agent for this equipment, as set forth in CI 610-2, *Capital General Equipment Budgeting, Ordering and Control*, is Facilities and Field Services' (FFS) Automotive Engineering (AE) section. The Company owns approximately 4,000 over-the-road, self-propelled vehicles. Factoring in other pieces of mobile and mounted equipment, such as trailers, knuckleblooms, and compressors, the Company owns approximately 5,000 pieces of rolling equipment.

As a result of Gas Operations' expansion program, additional XM-2 and XM-13 funding for the purchase of additional vehicles and equipment to support Gas Operations' accelerated hiring program from 2017 through 2019 has been included in the forecast. This accelerated hiring initiative will require the purchase of approximately 200 additional vehicles during the period between 2017 and 2019, at a cost of approximately $17 million. The additional vehicles will include approximately 78 underdeck compressor trucks, 4 large dump trucks, 5 large backhoes, 5 rack trucks, 3 welding trucks, 29 pick-up trucks, 46 mini-backhoes, and 2 small knuckleboom trucks.

Table #1 – Historical and YTD Class Inventory count:

Class	Description	2013	2014	2015 YTD
0	Passenger cars	662	637	643
2	Mini-vans, SUVs	1120	1092	1125
3	Pick-ups, Vans, Light duty trucks	797	808	765
4	Step-vans	814	833	835
5	Medium-duty trucks	246	243	242
6	Heavy-duty trucks	416	411	411
	Total Mobile Fleet	**4,055**	**4,024**	**4,021**
8	Trailers	350	348	357
9	Construction equipment: Forklifts, Backhoes, Compressors	554	506	494
	Total Fleet	**4,959**	**4,878**	**4,872**

Justification Summary:

Maintaining an annual vehicle replacement program reduces vehicle maintenance (O&M) costs and vehicle downtime by providing Operations with new vehicles and equipment which displace older, unreliable, and potentially unsafe vehicles and equipment. New vehicles and equipment facilitate the operating organizations' ability to perform routine maintenance and the ability to respond to system emergencies and events in lieu of slowing down response times due to out-of-service vehicles that are unavailable. The annual vehicle replacement program also introduces new vehicles into the fleet that meet the latest fuel efficiency, emissions, and safety requirements. New vehicles also incorporate the latest advances in technology which enable the operating groups to be more productive.

Supplemental Information:

- Alternatives: The sole alternative to the fleet replacement program would include extending the service life of incumbent vehicles in lieu of replacing them, while simultaneously increasing the cost to maintain them as well as increasing the potential for these vehicles to become unsafe as they age, and obsolete as design/functionality technology advances. There are no other acceptable alternatives.

- Risk of No Action: Risk of no action would mean older and less reliable equipment would be kept in service. Vehicle availability would decrease substantially, and in some cases equipment would age beyond our ability to purchase replacement components. The consequences could have an adverse effect on Operations' ability to respond to emergencies efficiently, and have a negative impact on maintenance and capital projects. If vehicles and equipment are not available to respond to emergencies, it could adversely affect the Company's ability to achieve many of the Reliability Performance Mechanism (RPM) targets. It's also conceivable that continuing to operate aged equipment could put the public and our employees at risk due to catastrophic failure of aged components, and the potential for environmental releases due to failed gaskets and seals.

- Non-financial Benefits: The timely replacement of fleet vehicles and equipment helps to ensure their reliability, and to meet applicable motor vehicle safety standards and incorporate the latest vehicle technology designed to reduce fuel consumption and engine emissions. The back-ends (aerial devices, cable pulling apparatus, cranes, etc.) of work trucks also incorporate the latest design technologies that improve performance and efficiencies of the units, as well as incorporating features that allow for their safe operation.

- Summary of Financial Benefits (if applicable) and Costs: AE projects the equipment requiring replacement and the associated capital spending over a five year horizon. For planning purposes, it shares this information along with the suggested allocations between various operating areas for operational planning. The specific assets that will be replaced and exact invoice pricing cannot be known in a five-year forecast. The plan is developed roughly six months in advance of the purchase cycle. Specific vehicle replacements will usually be on the condition of similar assets at the time of delivery. The funding requested for budget cycle 2016 through 2020 was developed by prioritizing critical work vehicles needed to perform core functions and extending the recommended lifecycle of the remaining fleet. However, units held beyond their useful life without funding for replacement will escalate maintenance costs. In addition, AE strives to standardize equipment specifications and works with vehicle/equipment manufacturers to engineer-out high maintenance designs and common causes of failures. This reduces the maintenance cost stream over the life of the asset, and increases the age at which it should economically be replaced. Therefore, long-term capital expenditures associated with replacements are reduced. AE strategically designs purchase agreements to best leverage its buying power, which helps to reduce up-front cost of the equipment.

- Technical Evaluation/Analysis: AE maintains a table of various asset-types and their optimal economic replacement age. This is a starting point and is further refined by looking at the specific assets chosen as candidates for replacement. Based on that review, AE may decide to retain an asset that has performed better than its peer group or accelerate the replacement of an asset that is performing poorly.

  XM-2 and XM-13 projected expenditures are related to the replacement of existing equipment, based on a historic methodology to levelize spend by replacing a similar number of vehicles that comprise the critical and work-truck sectors of the fleet. Additionally, AE has methodology for selecting mobile equipment for replacement based on reliability, availability, age, mileage, and maintenance history. AE maintains a database of these assets and their associated operating costs, and reviews the information annually to determine which assets to replace.

  Further, AE uses a method referred to as the *lifecycle* model to determine which fleet assets should be replaced. The method uses historical, actual, and expected maintenance data to determine a point at which it is most economical to replace an aging asset rather than face increasing maintenance costs and reduced reliability. This optimizes Operations' overall cost to own and maintain these assets.

- Project Relationships (if applicable): N/A

- Basis for Estimate: The vehicle and equipment replacement estimates are based on lifecycle analysis, historical maintenance costs, and estimated vehicle replacement costs.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Actual 2015
31,246	**32,916**	**35,656**	**36,608**		**20,322**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Actual 2015
Labor	798	830	882	915		2
M&S						1,414
A/P	27,156	34,096	30,069	30,934		52,242
Other	3,292	(2,010)	4,705	4,759		642
Total	**31,246**	**32,916**	**35,656**	**36,608**		**54,300**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
40,977	**48,085**	**49,121**	**45,963**	**38,537**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor	18	18	18	18	18
M&S	6	6	6	6	6
A/P	39,178	46,198	47,204	44,073	36,726
Other	1,229	1,232	1,249	1,265	1,282
Overheads	546	631	644	601	505
Total	**40,977**	**48,085**	**49,121**	**45,963**	**38,537**

X	Capital
	O&M

2016 - Shared Services / General Equipment

Project/Program Title	XM 3 - Stores Equipment
Project Manager	Richard Luong
Hyperion Project Number	10025788
Organization's Project Number	2XM0003
Status of Project	Ongoing
Estimated Start Date	Ongoing
Estimated Completion Date	Ongoing
Work Plan Category	Operationally Required – Critical Repair

Work Description:

The XM-3 budget is designated for the replacement of Stores equipment including storage bins, pallet racks, pipe racks, shelving, and strapping/wrapping equipment. This equipment is used for store room operations. Facilities and Field Services' Operations Services group is the control agency for XM-3.

Items covered under the XM-3 category are typically replaced when they are found to be in an unsafe operating condition and deemed beyond economical repair or if a procedure or specification is changed. Additionally, some equipment is purchased to increase operational efficiency. For example, Cousins wrapping and banding machines have been purchased as upgrades for the replacement of existing equipment, which allows for faster wrapping and banding of boxes and equipment for delivery.

Justification Summary:

Stores equipment that is categorized as XM-3 in the General Equipment capital budget is required in order to facilitate the efficient handling of material required by Company work forces in the replacement, reinforcement, and / or refurbishment of the electrical, gas, and steam systems.

Supplemental Information:

- Alternatives: Maintain the existing equipment beyond its useful life. This would result in increased maintenance and repair costs, potential delays to the operating organizations, and increased risk of employee injury. In addition, without these funds, the ability to take advantage of new equipment technologies, such as advanced shelving systems, would limit efforts to improve ergonomics and operational efficiencies, potentially having an adverse effect on employee productivity and safety.

- Risk of No Action: The tools and equipment purchased through the XM-3 budget would need to be maintained beyond their useful life, provided the manufacturers still produce the parts needed to make repairs. Additional information on the risks of this option are detailed in the Alternatives section.

- Non-financial Benefits: This equipment is necessary for the safe storage and transport of materials needed throughout the Company. For example, wrapping and strapping machines allow for the quick and safe packaging of materials for transport. Without these machines,

employees would need to find other means of packaging materials, which may be slower (impacting productivity), or place additional unnecessary physical stresses on employees, resulting in potential injuries.

- Summary of Financial Benefits (if applicable) and Costs: N/A

- Technical Evaluation/Analysis: Equipment is evaluated before being replaced, and only those that are deemed beyond economical repair or unrepairable are replaced. However, there are occasions when equipment is purchased due to operating or work practice changes, requiring a new type of device that addresses the new requirement. In addition, the majority of contracts utilized to purchase new equipment are competitively bid and, where possible, orders are consolidated to take advantage of volume discounts.

- Project Relationships (if applicable): None

- Basis for Estimate: Specific Stores equipment to be replaced and their final invoice price are market driven and therefore not known for future years. Replacement in future years is based on the anticipated needs of each operating organization.

Total Funding Level ($000):

Historical Spend

Actual 2011	**Actual 2012**	**Actual 2013**	**Actual 2014**	**Historic Year** (O&M only)	**Forecast 2015**
$113	**$66**	**$150**	**$378**		**$410**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	**Actual 2011**	**Actual 2012**	**Actual 2013**	**Actual 2014**	**Historic Year** (O&M only)	**Forecast 2015**
Labor						
M&S						
A/P						
Other						
Overheads						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
490	**416**	**416**	**424**	**437**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor					
M&S	445	378	378	385	396
A/P					
Other	40	34	34	34	35
Overheads	6	5	5	5	5
Total	**490**	**416**	**416**	**424**	**437**

X	Capital
	O&M

2016 – Central Operations / Construction Services

Project/Program Title	XM 4 - Shop Equipment
Project Manager	Thomas Barrett
Hyperion Project Number	10025803
Organization's Project Number	PR.2XM004 – XM4
Status of Project	Ongoing
Estimated Start Date	Ongoing
Estimated Completion Date	Ongoing
Work Plan Category	Strategic Support (XM's only)

Work Description:

Construction Service's Shop Operations is the Control Agency for XM4 Shop equipment. The XM4 budget is designated for the purchase of equipment utilized at the Van Nest Shop Operations' facility. The equipment includes floor grinders, lathes, milling machine, scribers, brazing and welding equipment, CNC machinery, jib cranes and hoists. The purchase and use of the equipment is based upon the work load, which includes routine maintenance as well as emergency fabrication and repair of specialized parts such as: turbines, boilers, pumps, motors, switchgear and bus work, and Gas regulating stations. The Van Nest Shop supports the steam generating stations, electric and gas distribution operations, sub-station and transmission operations. The impact of not having equipment funding to support this work would have a severe impact on steam production, electric and gas distribution as well as substation and transmission operations.

Justification Summary:

This shop equipment is required to maintain system reliability as it provides an internal workforce with the assets to quickly return power generation equipment, transmission and distribution, and Gas regulating equipment to service in an expedited manner. This reduces the risk of long down times and forced customer outages.

Supplemental Information:

Alternatives: An economic and time base comparison is made between contracting the work out vs. performing the work in house. In most cases, on an emergency basis, contracting out is not cost effective due to the premiums applied because of short notice associated with emergency work. Another factor is the time lag involved with getting a contractor and equipment on-site within the specified time frame needed to perform the work on an emergency basis.

Risk of No Action: The machinery and equipment would need to be maintained beyond their useful life, provided the manufacturers still produce parts needed to make repairs. No action would have an adverse effect to the electric, gas and steam system reliability. Without funding for replacement equipment, the Company would risk not being able to restore equipment in a timely, or cost effective, fashion during an emergency.

Non-financial Benefits: This equipment replaces outdated machinery with state of the art technology. This technology is energy efficient, environmentally friendly, consumes less oil product, and improves employee safety through incorporation of the latest OSHA approved "method of point" presence sensing devices and guards.

Summary of Financial Benefits and Costs: N/A

Technical Evaluation/Analysis: Equipment is evaluated before being replaced, and only those that are deemed beyond economical repair or unrepairable are replaced. However, there are occasions when equipment is purchased due to operating or work practice changes, requiring a new type of device that addresses the new requirement. In addition, the majority of contracts utilized to purchase new equipment are competitively bid and, where possible, orders are consolidated to take advantage of volume discounts.

Project Relationships (if applicable): None

Basis for Estimate: Specific shop equipment to be replaced and their final invoice price are market driven and therefore not known for future years. Replacement in future years is based on the anticipated needs.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
164	**143**	**0**	**527**	**N/A**	**97**

Historical Elements of Expense:

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor	0	0	0	0	N/A	0
M&S	0	0	0	0	N/A	0
A/P	135	127	0	515	N/A	94
Other	29	16	0	12	N/A	3
Total	**164**	**143**	**0**	**527**	**N/A**	**97**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
330	**400**	**400**	**400**	**400**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	0	0	0	0	0
M&S	0	0	0	0	0
A/P	300	363	363	363	363
Other	27	32	32	32	32
Overheads	3	5	5	5	5
Total	**330**	**400**	**400**	**400**	**400**

X	Capital
	O&M

2016 – Shared Services / General Equipment

Project/Program Title	XM5 / XM15 - Lab and Test Equipment
Project Manager	Richard Luong
Hyperion Project Number	10024870
Organization's Project Number	2XM5/15
Status of Project	Ongoing
Estimated Start Date	Ongoing
Estimated Completion Date	Ongoing
Work Plan Category	Operationally Required – Critical Repair

Work Description:

The XM-5 budget is designated for the replacement of portable electronic measurement instrumentation, including: volt meters, ammeters, gas testers, recorders, analyzers, pressure gauges, etc. These devices are used to safeguard the safety of employees, and to manage, monitor, and operate the gas, electric, and steam systems. Facilities and Field Services' Operations Services group is the control agency for XM-5.

Items covered under the XM-5 category are typically replaced when they are found to be in an unsafe operating condition and deemed beyond economical repair or if a procedure / specification is changed, requiring an enhancement in the devices currently used. An example of this is the normal replacement of items such as Doble test sets, hi-pot test sets, or the technological advances in gas detectors covered under XM-5. The gas detector devices are used by field mechanics in many organizations throughout the Company to monitor the atmospheric conditions. When the electro-chemical sensors in the older detectors failed, they did not provide an indication to the operator, which could have resulted in personnel operating in a dangerous environment. Corporate EH&S addressed this concern and newer technology was identified to replace the existing instruments. The newer devices not only had sensors that provide an indication of failure, they also had the ability to test additional types of gases and provide data logging features that were beneficial for incident investigation. These units also denied access to use of the instrument when its calibration interval had expired.

Justification Summary:

Lab and test equipment that is categorized as XM-5 in the General Equipment budget is required in order to facilitate the measurement and testing requirements needed to be performed by Company work forces in the replacement, reinforcement, and refurbishment of the electrical, gas, and steam systems.

Supplemental Information:

- Alternatives: Maintain existing equipment beyond their useful life. This would result in increased maintenance and repair costs, potential delays to the operating organizations, and increased risk of employee injury. In addition, without these funds, the ability to take advantage of new instrument and equipment technologies, such as noise reduction, ergonomics, and operational efficiencies, would be limited, potentially having an adverse effect on employee and public safety.

- Risk of No Action: The instruments and equipment purchased through the XM-5 budget would need to be maintained beyond their useful life, provided the manufacturers still produce the parts needed to make repairs. Additional information on the risks of this option are addressed in the Alternatives section.

- Non-financial Benefits: Equipment in this category is necessary to safeguard employees in the field through measuring and monitoring environmental conditions in the field, and alerting employees to potential hazards. In addition, some equipment in this category is used to measure and monitor conditions on the electric, gas, and steam systems, and assist in identifying potential issues.

- Summary of Financial Benefits (if applicable) and Costs: N/A

- Technical Evaluation/Analysis: Instruments and equipment are evaluated before being replaced, and only those that are deemed uneconomical to repair or devices that are obsolete with repair parts no longer available are replaced. However, there are occasions when equipment is purchased due to operating or work practice changes, requiring a new type of device that addresses the new requirement. In addition, the majority of contracts utilized to purchase new tools and equipment are competitively bid and, where possible, orders are consolidated to take advantage of volume discounts.

- Project Relationships (if applicable): None

- Basis for Estimate: Specific instrumentation and test equipment to be replaced and their final invoice price are not known for future years. Replacement in future years is based on the anticipated needs of each operating organization. Expenditures forecasted are lower than prior forecasts due to a change in the Company's vendor for some gas detector devices to monitor atmospheric conditions. This change eliminates the need to purchase certain types of detectors.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
3,835	**2,935**	**3,254**	**5,851**		**4,561**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor	2					
M&S		593	1,626	5,500		4,433
A/P	3,461	1,208				
Other		978	1,492	162		
Overheads	372	145	136	189		128
Total	**3,835**	**2,935**	**3,254**	**5,851**		**4,561**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
5,099	**4,848**	**4,773**	**4,792**	**4,890**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor					
M&S	4,472	4,252	4,185	4,202	4,291
A/P					
Other	567	539	531	533	541
Overheads	60	57	57	57	58
Total	**5,099**	**4,848**	**4,773**	**4,792**	**4,890**

X	Capital
	O&M

2016 – Shared Services / General Equipment

Project/Program Title	XM 6 - Tools and Work Equipment
Project Manager	Richard Luong
Hyperion Project Number	10025830
Organization's Project Number	2XM0006
Status of Project	Ongoing
Estimated Start Date	Ongoing
Estimated Completion Date	Ongoing
Work Plan Category	Operationally Required – Critical Repair

Work Description:

The XM-6 budget is designated for the replacement of tools and equipment used for general construction and repair, such as portable pumps, chain saws, hydraulic jacks, pneumatic hammers and drills, hydraulic cutting and crimping tools, tire repair equipment, etc. These devices are used to manage and operate the gas, electric, and steam systems. Facilities and Field Services' Operations Services group is the control agency for XM-6.

Items covered under the XM-6 category are typically replaced when they are found to be in an unsafe operating condition and deemed beyond economical repair, or if a procedure or specification is changed.

Justification Summary:

Capital tools that are categorized as XM-6 in the General Equipment capital budget are necessary in order to facilitate the efficient repairs to be performed by Company work forces in the replacement, reinforcement, and refurbishment of the electrical, gas, and steam systems.

As a result of Gas Operations' expansion program, additional XM-6 funding for the purchase of additional tools and work equipment to support Gas Operations' accelerated hiring program from 2016 through 2019 has been added to the forecast. This accelerated hiring initiative will require the purchase of approximately $14.2 million in equipment such as tapping, fusion, drilling, and threading machines, cutters, saws, and pavement breakers.

Supplemental Information:

- Alternatives: Maintain the existing equipment beyond their useful life. This would result in increased maintenance and repair costs, potential delays to the operating organizations, and increased risks of employee injury. Without these funds, the ability to take advantage of new tool and equipment technologies, such as noise reduction, ergonomics, and operational efficiencies, would be limited, potentially having an adverse effect on employee and public safety. Additionally, the increase in the Gas Operations field forces would not have the tools and equipment necessary for them to perform their work.

- Risk of No Action: The tools and equipment purchased through the XM-6 budgets would need to be maintained beyond their useful life. Additional information on this option can be found in the Alternatives section.

- Non-financial Benefits: The tools in this category of equipment support the construction and repair activities of employees throughout the Company. For example, hydraulic cutting tools allow employees to cut through cable of various sizes quickly and with a minimal amount of physical effort, reducing the potential for strains and injuries. These tools allow employees to perform these activities efficiently and to minimize the potential for injury.

- Summary of Financial Benefits (if applicable) and Costs: N/A

- Technical Evaluation/Analysis: Tools and equipment are evaluated before being replaced, and only those that are deemed beyond economical repair are replaced. However, there are occasions when equipment is purchased due to operating or work practice changes, requiring a new type of device that addresses the new requirement. In addition, the majority of contracts utilized to purchase new tools and equipment are competitively bid and, where possible, orders are consolidated to take advantage of volume discounts.

- Project Relationships (if applicable): None

- Basis for Estimate: Specific work tools and equipment to be replaced and their final invoice price are not known for future years. Replacement in future years is based on the anticipated needs of each operating organization.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
3,635	**3,337**	**3,936**	**7,102**		**10,247**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of 500 thousand or more and, for all other organizations, projects/programs of 1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor		25		99		4
M&S		1,921	3,739	6,628		4
A/P	3,196	1,223	36	46		9,930
Other		(70)	3	52		2
Overheads	439	238	158	277		307
Total	**3,635**	**3,337**	**3,936**	**7,102**		**10,247**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
13,910	**11,314**	**9,681**	**7,798**	**7,042**

Request by Elements of Expense;

EOE	2016	2017	2018	2019	2020
Labor					
M&S	12,351	10,137	8,691	6,982	6,295
A/P	90	69	50	50	50
Other	1,305	975	826	674	614
Overheads	164	134	114	92	83
Total	**13,910**	**11,314**	**9,681**	**7,798**	**7,042**

X	Capital
	O&M

2016 – Shared Services / General Equipment

Project/Program Title	XM 7 - Miscellaneous Equipment
Project Manager	Richard Luong
Hyperion Project Number	10025850
Organization's Project Number	2XM0007
Status of Project	Ongoing
Estimated Start Date	Ongoing
Estimated Completion Date	Ongoing
Work Plan Category	Operationally Required – Critical Repair

Work Description:

The XM-7 budget is devoted to the purchase of miscellaneous equipment such as cafeteria and kitchen equipment, medical equipment, defibrillators, safety and training equipment, fire protection, and audio-visual and photographic equipment. Facilities and Field Services' Operations Services group is the control agency for XM-7.

An organization requiring purchase of capital General Equipment classified as XM-7 must submit a written request to Facilities and Field Services' Operations Services for purchase of such equipment. The XM-7 budget coordinator reviews each request to ensure that the total cost is within the requesting organization's budget allotment and then initiates the procurement process.

Justification Summary:

Kitchen equipment, medical equipment, safety equipment, and other equipment categorized as XM-7 in the General Equipment capital budget are necessary in order to facilitate required workplace environment and assist in training for all divisions and departments within the Company.

It should also be noted that at any given time, organizational priorities are shifted to meet the organization's requirements. Each organization anticipates their budget needs by identifying their future requirements. This would include forecasting deployment of extra crews in the field that would require additional safety equipment, such as emergency lifting devices. Organizations submit corresponding requests for the following year's General Equipment during the capital budgeting process.

Supplemental Information:

- Alternatives: There are no alternatives, per se, but the Company does employ various mitigation efforts. All miscellaneous equipment are evaluated before being replaced and only those that are deemed unrepairable are replaced. Facilities and Field Services recycles this equipment whenever possible as a general practice. In addition, the majority of contracts utilized to purchase new equipment are competitively bid and, whenever possible, orders are consolidated to take advantage of volume discounts.

- Risk of No Action: The Company's work forces would be prevented from meeting their objectives in an efficient and safe manner without some equipment, such as supplied air

respirators. It would also create personnel issues with those employees who, due to their daily work conditions, require safety, audio-visual, and training equipment to be able to perform their duties. For example, the safety lifting devices are used for employee protection in the event that a mechanic is overcome in a confined space to allow lifting out by fellow employees from above.

- Non-financial Benefits: This equipment is necessary for the safety of Company employees and also for some of the support operations of the Company, such as cafeteria food services. Additionally, equipment in this category is used to complement training and communication.

- Summary of Financial Benefits (if applicable) and Costs: N/A

- Technical Evaluation/Analysis: N/A

- Project Relationships (if applicable): None

- Basis for Estimate: The final invoice price for specific miscellaneous equipment that will need to be purchased or replaced is typically not known for future years. Replacement in future years is based on the anticipated needs of each operating organization and historical spending.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
922	**1,329**	**1,880**	**745**		**1,220**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor	13		8			
M&S		1,110	1,516	551		1,121
A/P	815	103	127	25		27
Other		41	116	141		12
Overheads	94	75	113	28		60
Total	**922**	**1,329**	**1,880**	**745**		**1,220**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
1,250	**1,203**	**1,199**	**1,195**	**1,228**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor					
M&S	980	938	940	931	961
A/P	25	25	25	25	25
Other	230	226	220	225	228
Overheads	15	14	14	14	15
Total	**1,250**	**1,203**	**1,199**	**1,195**	**1,228**

X	Capital
	O&M

2016 – Shared Services / General Equipment

Project/Program Title	XM 8 Communications Equipment
Project Manager	Terrence Walsh
Hyperion Project Number	XM0008
Organization's Project Number	20189303
Status of Project	Ongoing
Estimated Start Date	Ongoing
Estimated Completion Date	Ongoing
Work Plan Category	Oper – Critical Repair

Work Description:

The budget for XM8 provides the means for telecommunications equipment to support Company wireless and telephone networks which allow employees to communicate and access business systems including the Customer Information System, Outage Management systems, electric, gas, and steam monitoring and control systems as well as a myriad of all systems for example, financial, Human Resources, and legal systems. Information Resources' Operations Support Group is the control agent for XM8. The equipment and work planned in XM8 includes:

- Fiber interference work
- Telephony and video equipment replacements and upgrades
- Synchronous Optical Network (SONET) channel bank equipment
- Global Positioning System (GPS) circuit clocking upgrades
- Elimination of Verizon circuits using private microwave systems
- Network equipment for the Company private communications network called Corporate Communications Transmission Network (CCTN)
- Capacity increases and monitoring of various 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
- Video equipment

In 2015 the following work is expected to be completed:

- Implement the Polycom Video bridge replacement providing virtual video and web conferencing from any devices from anywhere
- Begin the replacement of the Company's private 800 megahertz radio system with a software model which allows relocating the footprint to our new server farm. This upgrade will position us to sustain the system for the next eight years and easily phase in the future FirstNet solutions or next generation voice over data networks radio capability
- Implement CCTN mux and channel bank replacements
- Install new VoIP phones at Flatbush Ave and Rye Headquarters
- Evaluate Multi Protocol Label Switching (MPLS) solution in CCTN

In 2016 a 10% increase in funding is requested over 2015 to expand the usage of MPLS in our private network to ensure critical substation circuits are up to date and functioning with our latest standard. Work planned includes:

- Complete the installation of the Company's private 800 megahertz radio system
- Replace T1 data circuits with CCTN Ethernet at tier 3 sites in Wide Area Network (WAN)
- Implement CCTN mux and channel bank replacements
- Expand use of MPLS at substations
- Install new VoIP phones at East River and E74th St

In 2017 work planned includes:

- Upgrade radio cell site infrastructure (antennas, cooling, generators)
- Begin replacement of handheld radios for Electric, Gas, and Steam
- Continue rollout of MPLS
- Implement redundant Global Positioning System (GPS) clocking system for circuit timing
- Evaluate new VoIP phones at WEA and substations for ringdowns (direct dial point to point)

In 2018 work planned includes:

- Upgrade radio cell site infrastructure
- Continue replacement of handheld radios for Electric, Gas, and Steam
- Continue rollout of MPLS
- Install new VoIP phones at WEA and substations ringdowns (direct dial point to point)

Justification Summary:

The XM-8 general equipment account provides a mechanism to maintain and grow communication tools, including wireless and wired technology, for the company. This includes telephones, radios, antennas, and associated electronic components necessary to provide private voice and data services as needed by operating areas.

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 would need to be purchased. Telecommunication 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, Nextel) has given leverage to obtain larger discounts. Information Technology has been utilizing contract negotiation best practices for price and duration of contracts. A third party provider, Gartner Group, has also been retained to formulate more strategic negotiation tactics.

- Risk of No Action: No action would likely result in multiple communication 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 restoration activities and the automation of the distribution system to maintain electric, gas, and steam services. Con Edison operates a wireless communication system for distribution data services. The system provides above-street radio coverage and is

used to minimize outage duration and provided more rapid restoration during system disturbances like storms and feeder trip-outs due to peak loading and faults. Con Edison operates a single master site wireless communication system for voice service. The system provides on-street radio coverage for Con Edison's operations personnel throughout its 660-square mile service territory. It incorporates a man-down safety feature that alerts control center personnel to substation operators in distress during switching operations on the transmission and distribution substation equipment and is essential to Con Edison's public utility services in both routine and emergency situations. This equipment is essential to provide both system reliability, as well as, employee safety.

- Non-financial Benefits: The proposed projects and use of CCTN at Con Edison offer the following other benefits:
  - Provide carrier diversity to critical communication circuits
  - Offer the highest level of cyber and physical security
  - Provide a higher reliability level than carrier circuits
  - Scale capacity over time through card replacements
  - Improve recovery time from communications failures
  - Provide services outside of the Telco carriers
  - Avoid construction delays and costs needed for carrier services

- Summary of Financial Benefits (if applicable) and Costs: N/A

- 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. Interaction with IT advisors, carriers, vendors, and Company employees ensure the selection of the optimal solutions.

- Project Relationships (if applicable): IT projects, completed or future, require and expect sufficient performance of the network.

- Basis for Estimate: Estimates are generated from Company engineering resources using maps, existing street conditions, and historical projects. Any purchases are made through competitive bids.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
1,545	**2,818**	**2,088**	**2,760**		**1,946**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor			481	686		484
M&S			35	12		8
A/P	1,391	2,539	1,072	1,519		1,071
Overhead	154	279	493	531		374
Other			7	12		8
Total	**1,545**	**2,818**	**2,088**	**2,760**		**1,946**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
2,812	**3,374**	**2,889**	**2,857**	**2,854**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	540	540	540	535	535
M&S	1,728	2,268	1,851	1,875	1,895
A/P	0	0	0	0	0
Other	153	201	164	167	168
Overheads	391	365	334	280	256
Total	**2,812**	**3,374**	**2,889**	**2,857**	**2,854**

X	Capital
	O&M

2016 – Shared Services / General Equipment

Project/Program Title	XM 10 Computer Equipment
Project Manager	Terrence Walsh
Hyperion Project Number	XM0010
Organization's Project Number	20189302
Status of Project	Ongoing Program
Estimated Start Date	Ongoing
Estimated Completion Date	Ongoing
Work Plan Category	Oper – Critical Repair

Work Description:

Items in XM-10 are critical computing components including the mainframe, servers, PCs, tablets, laptops, storage, network equipment for Local Area Networks (LANs), internet facing technology improvements to address remote access, and infrastructure needed to the Wide Area Network (WAN). Upgrades and technology refreshes are required to these components to continue to provide a reliable and accessible environment for critical resources located in server farms and to support server growth from new business system projects. Other equipment in this category includes Uninterruptable Power Supply (UPS) devices, network cabling, wireless networks, and the fiber channel networks used for electronic storage.

In 2015 the following work is planned and expected to be completed:

- Implement 10 GB Wide Area Network (WAN) links at ten core company locations improve network performance and allow for efficient server placement across multiple server farms.
- Upgrade the current building backbones at large company locations to the 7000 or 9000 Cisco switch to support higher speeds, maintain supportability, and take advantage of new cybersecurity features for segmentation.
- Evaluate and pilot Multi-Protocol Label Switching (MPLS) on the Corporate network to replace legacy communications protocol.
- Upgrade the virtual tape system for the mainframe to improve performance and capacity.
- Initiate departmental network switch (LAN) modernization to ensure supportability and new cybersecurity functionality for the network.

In 2016:

- We plan to continue with the multi-year project to perform a technology refresh for department LAN switches to the Cisco model 3850. There are over 1,000 switches in use and the replacements are needed to sustain network security levels, capacity requirements, and new support new features needed for MPLS technology – Target 250 switches
- Expand the use of Cisco Identity Services Engine (ISE) to achieve departmental network segmentation.
- Refresh server technology at 4 Irving Place, Grassland and Rye Service Center to avoid obsolescence.
- Refresh 20% of the desktop, laptop, tablet, printer, plotter, MDT inventory to avoid obsolescence.

In 2017:

- Refresh 20% of the desktop, laptop, tablet, printer, plotter, MDT inventory
- Continue with the multi-year project to perform a technology refresh for department LAN switches to the Cisco model 3850. There are over 1000 switches in use and the replacements are needed to sustain network security levels, capacity requirements, and new support new features needed for MPLS technology – Target 250 switches
- Upgrade bandwidth at tier 2 company sites
- Upgrade UPS and network backbone at Rye Headquarters
- Refresh router technology to avoid obsolescence
- Increase storage array capacity at Van Nest and Irving Place server farms to accommodate increases in electronic data creation.
- Maintain spare equipment inventory

In 2018:

- Refresh 20% of the desktop, laptop, tablet, printer, plotter, MDT inventory
- Continue with the multi-year project to perform a technology refresh for department LAN switches to the Cisco model 3850. There are over 1,000 in use and the replacements are needed to sustain network security levels, capacity requirements, and new support new features needed for MPLS technology – Target 250
- Upgrade Company wireless network at six core sites (4 Irving Place, TLC, Rye Headquarters, 30 Flatbush, and Van Nest)
- Upgrade UPS and network backbone at 30 Flatbush and Van Nest
- Increase storage array capacity at Van Nest and Irving Place server farms to accommodate increase in electronic data creation.
- Maintain spare equipment inventory

Justification Summary:

Without the equipment in XM-10, Con Edison's ability to provide reliable access to all company computing systems would be adversely impacted. This equipment is essential to the operation of the Company's day to day business activities and is integral to other company organizations including Electric, Gas, Steam, Customer Operations, Finance, and Transportation. XM-10 equips employees with technology and devices to access information and systems in the office, field, and remotely from home and ensures the core IT infrastructure is supportable, reliable, and accessible.

Supplemental Information:

- Alternatives: There are few 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.

  To reduce costs associated with XM-10, the Company employs various mitigation efforts. Computer and network hardware is purchased in bulk and competitively bid to take advantage of volume discounts. Information Technology has initiated programs to optimize its mainframe costs. One such program leverages IBM hardware and software products against non-IBM vendors, suggesting suitable IBM replacement products. Through the usage of monitoring tools, Con Edison discovered duplicate functionality between software products as well as products not being utilized. For products of which there are no suitable IBM replacements, Information Technology has been utilizing contract negotiation best practices

for price and duration of contracts. Third party experts are retained to formulate more strategic negotiation tactics. In addition, through performance tuning, Information Technology has been attempting to improve the run time efficiencies of several of the largest production batch jobs. Con Edison has adopted the use of virtual server and Storage Area Network (SAN) technology, which allows more efficient use of computer hardware and reduces costs.

- Risk of No Action:
  Risks include:
  - Increased Cybersecurity risks due to running unsupported equipment
  - Performance issues while accessing company systems
  - Obsolete infrastructure due to not keeping up with latest technology
  - Ability to provide business information in a timely fashion to employees would be impacted due to an unreliable environment.
  - Decrease in the availability, reliability, and security of the company's resources
  - Inability to implement new systems

- Non-financial Benefits:
  Benefits include:
  - Increased employee productivity as a result of access to business systems and other information
  - By ensuring the stability and performance of the Corporate Network and computers, energy delivery systems perform better as well as ability to response to customer outages
  - Optimized operation of the corporation on a day to day basis with streamlined internal and external employee communication

- Summary of Financial Benefits (if applicable) and Costs: N/A

- Technical Evaluation/Analysis: Items covered under the XM-10 categories are typically replaced on an industry standard practice of five to eight years or as business requirements dictate new technology specifications or requirements.

- Project Relationships (if applicable): XM-10 supports all IT projects for Con Edison.

- Basis for Estimate: IT uses historical spend on XM-10 to maintain a supportable infrastructure. Items covered under the XM-10 categories are typically replaced on an industry standard practice of five to eight years or as business requirements dictate new technology specifications or requirements.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
11,898	**14,562**	**11,710**	**18,695**		**19,812**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor			3,097	1,859		1,981
M&S				3,737		3,962
A/P	10,709	13,107	5,458	11,331		12,085
Overhead	1,189	1,455	3,155	1,744		1,783
Other				24		
Total	**11,898**	**14,562**	**11,710**	**18,695**		**19,812**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
5,379	**12,784**	**11,923**	**11,727**	**11,704**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	1,260	1,740	1,740	1,725	1,725
M&S	2,959	9,043	7,191	8,329	8,380
A/P	0	0	1,146	0	0
Other	263	803	740	740	744
Overheads	897	1,198	1,106	933	855
Total	**5,379**	**12,784**	**11,923**	**11,727**	**11,704**

General Equipment Request ($000s)

	Request 2017	Request 2018	Request 2019
XM1 - Furniture, Partitions	925	905	872
XM2/XM13 - Vehicles	48,086	49,121	45,963
XM3 - Stores Equipment	416	416	424
XM4 - Shop Equipment	400	400	400
XM5/XM15 - Lab & Test Equipment	4,848	4,773	4,792
XM6 - Tools	11,314	9,681	7,798
XM7 - Miscellaneous (AC's, VCR's, etc.)	1,203	1,199	1,195
XM8 - Telecommunications	3,374	2,889	2,857
XM10 - Computers	12,784	11,923	11,727
Total General Equipment	**83,350**	**81,307**	**76,028**

General Equipment Forecasts for Gas Operations' Increase

	Request ($000's)		
	RY1	RY2	RY3
XM1 - Furniture, Partitions	80	60	27
XM2/XM13 - Vehicles	8,132	6,695	2,110
XM3 - Stores Equipment	0	0	0
XM4 - Shop Equipment	0	0	0
XM5/XM15 - Lab & Test Equipment	214	139	45
XM6 - Tools	4,611	2,978	961
XM7 - Miscellaneous (AC's, VCR's, etc.)	11	7	3
XM8 - Telecommunications	68	48	16
XM10 - Computers	409	288	94
Total General Equipment	**13,525**	**10,215**	**3,256**

Category	Equipment Description		Units		
			RY1	RY2	RY3
XM1	Chairs		54	41	18
	Workstations / Desks / Other		8	5	3
		Total	**62**	**46**	**21**
XM2/XM13	Step-Van Spec 428U (Chassis)		37	31	10
	Step-Van Spec 428U (body & equipment)		37	31	10
	Supervisor vehicles Spec 234 (Colorados)		10	9	1
	Pick-ups w/liftgates spec 329		3	3	3
	Welding Trucks spec 422		1	1	1
	Rack trucks w/liftgates spec 449		2	2	1
	Dump Trucks (10 - 12 yard) spec 641		2	2	
	Rack truck w/knuckleboom spec 546		1	1	
	Mini Backhoes w/trailers (Kubota) spec 984T		23	18	5
	Full Size Backhoes Spec 984H		3	1	1
		Total	**119**	**99**	**32**
XM5/XM15	FR2 Gas Detectors		59	51	24
	Odorators		3	2	1
		Total	**62**	**53**	**25**
XM6	Tapping Equipment		123	79	26
	Fusion Equipment		98	63	20
	Pneumatic Digging Tools		351	227	73
	Pneumatic Saws		159	103	33
	Portable Generators		52	34	11
	Tampers & Compactors		42	27	9
	Hydraulic Pipe Cutters		66	43	14
	Miscellaneous Equipment		328	212	68
		Total	**1,219**	**788**	**254**
XM7	A/V Equipment		1	1	1
		Total	**1**	**1**	**1**
XM8	Cellphones		54	44	17
		Total	**54**	**44**	**17**
XM10	Laptops		14	10	4
	Tablets		40	34	13
		Total	**54**	**44**	**17**

Exhibit ___ (SSP-4)

Information Technology – Cyber Security Programs

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X	Capital
	O&M

2016 – Shared Services / Information Technology

Project/Program Title	Server Farm Infrastructure
Project Manager	Terrence Walsh
Hyperion Project Number	9XC9811
Organization's Project Number	10027261
Status of Project	Ongoing
Estimated Start Date	1/2015
Estimated Completion Date	12/2020
Work Plan Category	Oper - System Capacity

Work Description:

Information Technology plans to meet the Company's expanding server and storage needs while at the same time implementing a disaster recovery strategy by constructing server farms strategically located throughout the CECONY and O&R service territory, creating a diverse and redundant architecture. Server farms have already been constructed and are operational at Grasslands Substation, Rye Service Center, 30 Flatbush Avenue, 4 Irving Place, Van Nest, and Spring Valley (SVOC). A new server farm at Worth St. is planned for completion in 2018 and is documented in a separate white paper.

In addition to the installation of supporting infrastructure at the new server farms, significant enhancements of existing infrastructure at facilities currently housing the other existing server farms will be required. Components and systems such as server cabinets, network equipment, Uninterruptable Power Supply (UPS's), environmental and equipment monitoring, and power distribution wiring are among some of the enhancements that will be required. Storage area network (SAN) infrastructure and storage technology refreshes are also required. In the next few years we will be investing in monitoring tools and automation technology to transform services offered in the server farm including provisioning, monitoring, and capacity management.

The following work was targeted for completion in 2015:

- Evaluate and implement new monitoring tools to support storage arrays and server capacity – $550K (Q4 2015)
- 30 Flatbush Ave Rm 419 –Upgrade all Power Distribution Units (PDUs) to equivalent 8000 series - $16K (Complete)
- 30 Flatbush Ave Rm 520 – 8 Battery Shelves – $8K (Complete)
- 4 Irving Place DC1 Data Center – Silcon 80 Battery Replacement – $6K (Complete)
- 4 Irving Place DC1 Server Farm – Symmetra 80 Refresh – $60K (Complete)
- 4 Irving Place DC1 Server Farm – Upgrade all PDU's to equivalent 8000 series - $8K (Complete)
- 4 Irving Place DC1 Data Center – Upgrade all PDU's to equivalent 8000 series - $20K (Complete)
- Grasslands S/F – Upgrade all fiber and Gbics to SM & 10GE – $65K (Complete)
- Rye Headquarters – Rm 205 – Symmetra 80KW – Refresh - $40K (Complete)
- Spring Valley Server Farm – Environmental Monitoring Upgrades - $12K (Complete)
- Spring Valley Server Farm - Upgrade Power infrastructure in to Use iBusway – $100K
- Van Nest Server Farm - TAC interface and Monitoring of BMS – $90K

- Van Nest Campus – Add fiber capacity between Bldg 21 & 1601 - $100K

The following work is planned for 2016:

- 30 Flatbush - Install distribution circuits to from (2) 40 kW C-UPS to 5+ LAN Rooms - $90K
- 30 Flatbush - Install distribution circuits to from (2) 40 kW C-UPS to 5+ Lan Rooms - $80K
- 4 Irving Place DC1 – Power Ware 50 Battery Replacement - $8K
- 4 Irving Place DC1 – Power Ware 80 Battery Replacement - $12K
- Grasslands Server Farm – Upgrade all PDU's to equivalent 8000 series - $32K
- Rye Headquarters – Upgrade all fiber interfaces to Single Mode & 10gE – $90K
- Rye Service Center Server Farm- Upgrade all PDU's to equivalent 8000 series - $28K
- Van Nest Sever Farm - Upgrade Power infrastructure in to Use iBusway – $100K
- Van Nest Building #2 Cable Test Center - Refresh 40KW C-UPS, Install power feed and distribution circuits - $160K
- Grasslands, Rye Service Center, Van Nest, 4 Irving Place and 30 Flatbush – Environmental monitoring upgrades – $60K

The following work is planned for 2017:

- 4 Irving Place DC11 - Upgrade Power infrastructure in to Use iBusway – $100K
- Rye Service Center Server Farm - (2) Communications Room Symmetra 20 UPS's - Full refresh – $45K
- Rye Service Center - Upgrade storage array - $325K
- Grasslands - Upgrade storage array - $325K
- Rye Service Center & Grasslands – in row cooling system upgrades @– $350K
- Van Nest Server Farm – Battery Replacement - $50K
- Van Nest Building #1 Communications Room – Battery Replacement $6K

The following work is planned for 2018:

- 30 Flatbush Ave Rm 520 – (2) Symmetra 40KW UPS refresh - $50K
- 4 Irving Place DC11 - Battery Replacement - $280K
- Grasslands Server Farm – 16 Battery Shelves – $12K
- Rye Service Center Server Farm- Replace (24) battery shelves – $24K
- Spring Valley Server Farm - Upgrade storage array - $325K
- 30 Flatbush Ave - Upgrade storage array - $325K
- 4 Irving Place - Upgrade storage array - $325K
- 30 Flatbush Ave Room 419 – 8 Battery Shelves - $10K
- Spring Valley Server Farm - Battery Replacement - $150K

Justification Summary:

In order to meet server and storage equipment deployment requirements necessitated by the new applications and resource requirements of business units throughout the company, Information Technology has embarked on a program for accommodating these needs by maintaining and expanding capacity at server farms. The server farms are a combination of new facilities and upgrades to existing server locations and are being designed and constructed to meet our current design standards to optimize efficiency and incorporate green technology. The objective of the server farm program is to meet current and future computing and storage needs so as to maintain high server availability and facilitate disaster recovery and business continuity. The ability to scale computing resources and provide prompt delivery of resources is critical to the success of the Company. The criteria of diversity, minimal construction costs and future synergies are also key elements in establishing the design basis of the server farms.

Server technology continues to increase capacity in smaller and smaller form factors (blades). This evolution creates challenges for cooling and power. The projects mentioned above are intended to address this technology evolution.

The project identified in this white paper addresses departmental and corporate risks associated with:

- Failure of a growing portfolio of critical business application
- Failure of the Email System
- Infrastructure constraints
- Physical damage of corporate server farm

Supplemental Information:

- Alternatives: The alternative is to decentralize the IT infrastructure and allow hosting and deployment of hardware in less or unsecure areas lacking the proper HVAC and power systems needed for reliable business systems. The decentralized model described here was used in the late 90s and early 2000's. We moved away from that model to take advantage of operational economies of scale and significant reliability, availability, and supportability problems.

- Risk of No Action: The risk includes the inability to successfully implement new corporate initiatives such as Work Management and Mapping. Server Farm technology refreshes can be impacted if the facilities are not maintained. New technology rollouts will be delayed or cancelled due to an inability to implement them in a suitable production environment.

- Non-financial Benefits: Con Edison has implemented redundancy and diversity for the 3,100 servers currently supporting business applications and computer resources. These applications enable critical business functions for the company including financial systems, customer systems, and control systems. Servers also provide access to company data in the form of email, files, and maps. The ability to access these systems and resources is critical to the continuity of the Company. The amount of electronic data has grown 10 fold over the past 5 years. Server farms have been constructed and implemented in Grasslands, Rye Service Center, Spring Valley, and most recently, 4 Irving Pl. and Van Nest. This program will provide the Company with server farm reliability for these resources for the next 10 years.

- Summary of Financial Benefits (if applicable) and Costs: N/A

- Technical Evaluation/Analysis: Information Technology performs planning and analysis on upgrading server farm infrastructure. Redundant and diverse design considerations are used and implemented. The plan also factors in the any plans to build new server farms and the long term server farm requirements.

- Project Relationships (if applicable): Current and future business applications require infrastructure platforms to be available and supportable to ensure reliability, security, and accessibility. The Project One and Work Management, Mapping, and Customer Service Systems Company initiatives require significant resources to be successfully implemented and the current server farm capacity is not capable of supplying that capacity.

- Basis for Estimate: Historic purchases are used as well as vendor presentations and Internet sources.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
973	**1**	**1,092**	**1,571**		**1,301**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor	121		7	670		555
M&S	0		9	256		212
A/P	108		1000	123		102
Overhead	108		76	508		421
Other	637	1	0	14		12
Total	**973**	**1**	**1,092**	**1,571**		**1,301**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
1,383	**1,201**	**1,501**	**1,503**	**1,500**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	535	528	540	200	200
M&S	438	313	591	1,096	1,101
A/P	0	0	0	0	0
Other	39	28	52	97	98
Overheads	371	332	318	110	101
Total	**1,383**	**1,201**	**1,501**	**1,503**	**1,500**

X	Capital
	O&M

2016 – Shared Services / Information Technology

Project/Program Title	Server Farm Expansion
Project Manager	Terrence Walsh
Hyperion Project Number	21551718
Project Number	2XC9724
Status of Project	Design Phase Complete
Estimated Start Date	01/01/2015
Estimated Completion Date	12/31/2020
Work Plan Category	Operational - Critical Repair

Work Description:

This budget item is intended to develop plans and projects to maintain the infrastructure to provide and maintain a server farm environment for Con Edison IT assets necessary to service business applications and provide resources for file, emails, and other resources required to run the business. Con Edison hosts over 500 business applications and maintains over 3,000 server images. In addition, plans exist for several high end new systems to support Advanced Metering Infrastructure (AMI), Reforming the Energy Vision (REV), and Distributed Generation, and other utility of the future initiatives. Projects associated with this program include but are not limited to upgrading the physical facilities, HVAC, power systems, and providing monitoring tools and automation needed to manage and support the environment.

The following plans are targeted for work in 2015 and include:

- Expand the existing server farm at Van Nest to support the relocation of the mainframe and servers from data centers at 4 Irving Place which are designated for decommissioning. The legacy data centers support server and mainframe equipment displaced due to restacking efforts within 4IP required to comply with Local Law 26 at a cost of $10 million. This plan was chosen to take advantage of existing HVAC and power available at the existing server farm ($10 million) Due to delays in obtaining the necessary permits, completion is expected in early 2016.
- Equip the Van Nest expansion with network, server, and storage capacity ($3 million) (Complete)
- Implement tools to monitor and manage server and storage capacity and automate the operation to eliminate human error and improve provisioning and delivery of computing capacity ($2 Million) (Complete)

Plans for 2016 through 2019 include:

- Relocate the mainframe operation and associated infrastructure and equipment to Van Nest extension ($300k)
- Continue to transform the server farm operation in 2016 with more automation, self-service, and capacity management, and monitoring technology ($2 million)
- Begin initiative to construct a new server farm at the Company facility located at 30 Worth St in Yonkers at a total cost of $40 million. The server farm is a modular design and will be installed on a concrete pad near the parking lot on an area that is currently unused. The plan calls for construction to begin in 2017 and be completed in 2018. The Worth St. server farm will support new initiatives planned over the next 5 years including but not limited to:
    - AMI
    - DSP and other REV related systems

- New CSS
- New GIS mapping system

This work is potentially impacted by the success of cloud computing which is being evaluated in 2015-2016. Cloud computing may provide a further deferment of the construction of the new server farm.

Additionally, server farms constructed in early 2000's at Grasslands and Rye Service Center will eventually need to be emptied and decommissioned beginning in 2019. These server farms are not capable of supporting today's high density equipment from a cooling and power perspective. They are inefficient and capacity is limited. This new farm would support those workloads as well. The scalable design would also meet the demand for future growth in server and storage applications and accommodate the retirement of other less efficient server rooms, thus reducing the Company's IT carbon footprint. The new server farm will be implemented in three phases to reduce upfront costs and provide a scalable solution over many years.

The proposed structure will be modular, resistant to fire, flood, and explosions. In addition the design will be scalable so that investments can be made on expansions only when they are needed, but can be done very quickly.

Information Technology and Facilities Engineering will contract the consulting engineering firm which has performed the design and engineering work.

Justification Summary:

Information Technology (IT) department recommends the construction of a new server farm at the Company facility located at 30 Worth St in Yonkers at a total cost of $39.1 million. The server farm is a modular design and will be installed on a concrete pad near the parking lot on an area that is currently unused. The plan was originally planned for 2014 and 2015 however was delayed due to other corporate priorities. The plan now calls for construction to begin in 2017 and be completed in 2018.

The Company's restacking plan for 4 Irving Place has been accelerated in order to comply with Local Law 26. As each floor is renovated per the restacking plan, affected IT infrastructure is displaced and must be relocated elsewhere in order to maintain operations. Such infrastructure includes existing data centers on 4 and 17. Facilities Management and IT have established a plan to eliminate these data centers and relocate the essential equipment to the expansion at Van Nest server farm and this proposed new server farm at 30 Worth St. The existing data center on the 4th floor houses the Company's mainframe environment which runs critical business systems including the customer system and billing. Additionally, there are over 500 distributed servers running in the two data centers. The restacking plan includes the renovation of these two locations and conversion to traditional office space.

The Worth St server farm plan also provides for the Company's expanding server and storage needs by establishing a scalable architecture that would meet the demand for future growth in server and storage applications and accommodate the retirement of other less efficient server rooms thus reducing the Company's IT carbon footprint. The amount of electronic data has grown 10X over the past 5 years and the number of server images has grown by 12% each year. This project addresses corporate and departmental risks associated with:

- Failure of critical business application
- Significant IT Projects
- Failure of the Email System
- Infrastructure constraints
- Physical damage of corporate server farm

Supplemental Information:

- Alternatives: Keep the 4th and 17th floor data centers, Grasslands, and Rye Service Center server farms in operation to support the Company's mainframe environment and existing server and storage environment and provide compliance with Local Law 26 with the equipment in place. This would require maintaining the two data centers with the inefficient HVAC and power infrastructure going forward. This would also introduce water based fire suppression systems that would damage computing equipment if ever discharged.

  Another alternative would be to lease server farm capacity from cloud providers. Con Edison will be piloting and investigating this option. Certain workloads likely can fit in the cloud, but from a performance and data security risk standpoint, sensitive applications and data should reside in-house. Depending on the success of the cloud solutions, this may further defer the Worth St construction.

- Risk of No Action: The mainframe environment could continue to operate at 4 Irving Place with increasing costs to maintain the HVAC and power facilities. Action would be required to condition the locations to comply with Local Law 26 with equipment in place. This would also introduce water based fire suppression systems that would damage computing equipment if ever discharged.

- Non-financial Benefits: Server and storage applications enable critical business functions for the Company including financial systems, customer systems, and control systems. Servers also provide access to Company data in the form of email, files, and maps. The ability to access these systems and resources is critical to the Company. The amount of electronic data has grown 10X over the past 5 years. This project will provide the Company with scalable reliability for these resources for the next 10 years. Worth St will also present opportunities to deploy systems faster and access resources faster and more reliably than today.

- Summary of Financial Benefits (if applicable) and Costs: N/A

- Technical Evaluation/Analysis: Information Technology performs planning and analysis, based on a diverse and redundant design and goes through a security and flood map review before a location is selected. Projected server and storage growth are all factored in the design and selection. The modular and scalable design of the Worth Street Data Center is expected to support future changes in technologies and computing resource requirements.

- Project Relationships (if applicable): Irving Place Re-Stacking (Local Law 26) requires the relocation of multiple server rooms supported by dedicated business units and the data centers DC1 and DC2. This plan calls for the decommissioning of these data centers and conversion to office space. Future IT projects require IT infrastructure and new systems planned will require a reliable, secure, and efficient server farm environment. These include AMI, new CSS, GIS, and REV related applications.

- Basis for Estimate: Estimates were performed by central engineering for two sites, the 59th St steam plant and the Worth St location. The Worth St location was selected because it was approximately $2 million less and is preferred for a number of technology reasons:

  1) Location:

a. Access - real possibility of restricted access into Manhattan by car and limited or no mass transit for an extended period after a major storm event (i.e. post Sandy) or terrorist attack or threat
b. Diversity from Manhattan where we have numerous assets at 4 Irving Place
c. Flooding – 59th St is located on the river, has a Zone A classification and was flooded during Sandy. The Worth St location has been steady and reliable throughout all storms over the past 5 years

2) O&M Impact (logistics/support/costs):
   a. Damage and faults in the OH fiber system are more quickly detectable because at Worth Street because it's visible. Repair will not involve UG excavation work thus reducing restoration time by at least an order of magnitude. Similarly, annual inspection costs of OH fiber are much less costly than UG fiber. Most importantly, Con Edison does not have to deal with manhole burnouts, atmospheric testing, oil/environmental tags, flush trucks, damage to fiber caused by electric crews and other vendors (Con Edison & City) working in the manholes, replacement and clearing of collapsed duct, and installation of inner duct. Also Overhead fiber cables will not be in proximity to high pressure steam pipes. Our experience is that we can repair an overhead fiber break in 1-2 days where underground it can take 1-2 weeks
   b. Physical security costs are expected to be higher at 59th St, the security zone will be spread across 3 levels and a roof, and there are many windows on the west side of building
   c. At 59th St, moving heavy IT equipment up several levels in freight elevator could be problematic. Heavy traffic and street congestion will add to delays. At Worth St, elevators will not be needed for large repair items like UPSs, battery stacks and HVAC replacements, and there will be little to no congestion in terms of service vehicles and equipment and temp HVAC / chiller equipment if needed
   d. Troubleshooting problems will be made more difficult by having equipment on different elevations
   e. Access at Worth St may not be subject to TWICS or gen station security rules and work permitting, which adds significant delays to restoration time if there is a separate entrance / exit
   f. Facilities Operations has made a commitment to provide O&M support to server farm supporting infrastructure (generator, chiller plant, FM-200, switchgear) at Worth Street. There is no commitment from SBU to provide O&M support at 59th St. and we do not know that they have the required resources, expertise, and/or contracts in place to operate and maintain these complex and critical systems
   g. Consolidated Phase 2 and 3 server room at 59th St has a greater FM200 impact (media cost) upon system activation
   h. Parking is not readily available for bringing heavy equipment into the building

3) Availability: Consolidating Phase 2 and 3 (twice as many servers in one room/pod) will reduce server availability in the event of a fire / EPO activation, which would result in the loss of 50+ cabinets vs. the standard room configuration of 26 cabinets.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
0	**1,189**	**1,371**	**1,070**		**14,900**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor			59	251		3,495
M&S						0
A/P		919	1442	628		8,745
Overheads		270	(146)	190		2,646
Other			16	1		14
Total		**1,189**	**1,371**	**1,070**		**14,900**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
2,765	**9,992**	**30,000**	**1,500**	**1,500**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	960	960	960	300	300
M&S	177	5,652	21,619	881	892
A/P	809	1,083	1,080	0	0
Other	88	1,279	4,311	163	166
Overheads	731	1,018	2,030	156	142
Total	**2,765**	**9,992**	**30,000**	**1,500**	**1,500**

	Capital
X	O&M

2016 – Shared Services / Information Technology

Project/Program Title	Cloud Computing – Software as a Service (SaaS)
Project Manager	Terrence Walsh
Project Number	N/A
Status of Project	New
Estimated Start Date	1/1/2016
Estimated Completion Date	12/31/2020
Work Plan Category	O&M Computer Clearing

Work Description:

Deploy the next version of office business productivity products to employee computers using cloud services. Software as a Service (SaaS) is deployed with a monthly or annual subscription model as opposed to a capital investment of hardware and server software. Services available today provide up to date software for office productivity, which include e-mail, spreadsheets, documents, and presentations located in secure repositories within the Cloud for 1 terabyte of user storage. This provides offsite storage accessible by employees anywhere and includes software maintenance and updates as part of the monthly service subscription.

Justification Summary:

By 2018, Microsoft will discontinue its support of the current version (Office 2010). This includes Word, Excel, PowerPoint and Outlook. Since the mid 1990's, Con Edison has standardized on Microsoft desktop products. In the past few years, many companies have begun offering software solutions that provide interoperability with the traditional Microsoft Office suite. Microsoft has responded as well with SaaS offerings. SaaS offers the Company an opportunity to competitively subscribe to this software and because of the interoperability be flexible by licensing to users as opposed to PCs. This allows employees to use the software on multiple devices for the single charge making it cost efficient as well.

These services would also allow a large volume of files to be securely stored outside of our server farms, providing relief to internal computing resources and improving performance for critical business system applications.

SaaS also fits our strategic plan and response for disaster recovery from cyber-attack or other disaster by utilizing off site services and reducing the reliance on a single corporate network.

Supplemental Information:

- Alternatives: Alternatives include making a one-time purchase of the next version of Microsoft Office for approximately 15,000 computers and deploying to each. This locks us into specific pricing from a single vendor and prevents the realization of benefits including flexibility, performance, and disaster recovery as mentioned above. Operating with existing, unsupported software is another option however this is not ideal as it presents a significant cybersecurity threat.

- Risk of No Action: Failure to plan now will introduce significant cybersecurity risk and compromise the capability to interact with external stakeholders as current software will no longer be supported by the vendor.

- Non-financial Benefits: Benefits include: Instant and automatic access to the latest software and features; Automatic software versioning and patching; Secure access to information away from the office from any device; Improved disaster recovery through off-site storage; Improved performance of business systems running on Company server farm resources.

- Summary of Financial Benefits (if applicable) and Costs: Current estimates for this solution are $10 per user per month for 15,000 computers totaling $1,800,000 per year. Replacing the current version with a one-time purchase would require 15,000 licenses at $283 per computer totaling $4,245,000. In addition, an annual maintenance fee of $90 per computer would require an additional $1,350,000 per year to keep the product up to date.

- 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, 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.

- Project Relationships (if applicable): Computer desktop software is used by every employee to access Company business systems and resources.

- Basis for Estimate: Public websites; vendor sessions

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Overheads						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
50	**900**	**1,800**	**1,800**	**1,800**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor					
M&S					
A/P	50	900	1,800	1,800	1,800
Other					
Overheads					
Total	**50**	**900**	**1,800**	**1,800**	**1,800**

	Capital
X	O&M

2016 – Shared Services / Information Technology

Project/Program Title	Cloud Computing – Infrastructure as a Service (IaaS)
Project Manager	Terrence Walsh
Project Number	N/A
Status of Project	New
Estimated Start Date	1/1/2016
Estimated Completion Date	12/31/2020
Work Plan Category	O&M Computer Clearing

Work Description:

Today Con Edison hosts its entire server and storage infrastructure in Company owned and operated server farms. Beginning in 2016, we will be engaging and contracting with Infrastructure as a Service (IaaS) cloud service providers for server farm capacity to increase server and storage capacity for use at Con Edison. The capacity would be securely connected to the Company's network and provide multiple benefits. IaaS is deployed with a monthly or annual subscription model as opposed to a capital investment of a server farm and associated server and storage hardware. These services, sometimes referred to as a hybrid cloud, are available today to provide scalable solutions which are designed to be provisioned quickly and provide mobility between the service provider and company facilities offering Con Edison granular control over workload location. The hardware and facilities are maintained through the contract. The offerings have been vetted for performance as well as physical and cybersecurity and deemed acceptable for certain workloads. We expect to double the use of IaaS cloud services each year over the rate period.

Justification Summary:

Con Edison has constructed and maintained seven server farms hosting the vast majority of computing resources used in the support of the business areas. Two of those server farms are scheduled to be decommissioned within the next 2 years. A current capital project is underway to complete an expansion to an existing server farm in Van Nest in 2016. In addition, a future server farm is in planning for start of construction in 2017, and is not available for occupancy until late 2018. This investment in establishing the hybrid cloud will defer the construction and equipping of a planned new server farm at the Worth St. facility, and potentially reduce the existing footprint as current hardware reaches end-of-life (Est. 5 year). This can be accomplished without expending large amounts of server farm investments for future growth and only pay for capacity that is needed at any given time within the cloud. With potential high computing resource intensive projects on the horizon (e.g., Advanced Metering Infrastructure, Meter Data Management, REV distributed system platform applications, a new customer system as well as big data analytics) we plan to position ourselves to respond to needed capacity in an efficient and timely manner.

IaaS offers the Company an opportunity to competitively subscribe to this service across different providers to achieve mobility, interoperability, and competitive pricing for the service.

Server and storage capacity has increased over the past 5 years by 50% per year, and projections continue to suggest potentially an even greater growth rate. The tables below identify server and storage trends over the past years, and projections moving forward. This increase has put a tremendous pressure on the existing capacity within our server farms and the ability to timely implement new business solutions.

IaaS also fits our strategic plan and response for disaster recovery from cyber-attack or other disaster by utilizing off site services.

Jan 2013 – 2514 servers
Jan 2014 – 2928 servers
Oct 2014 – 3144 servers (current)
Jan 2016 – 3576 servers (projected)
Jan 2017 – 3941 servers (projected)
Jan 2018 - 4303 servers (projected)

Supplemental Information:

- Alternatives: Con Edison's current plan calls for maintaining large ERP type systems in house. Failing to establish a working Hybrid Data Center environment, the only option is to build a new Data Center – potentially multiple data centers, given that currently proposed projects in the next couple of years will require a significant growth in computing and storage resources.

- Risk of No Action:
  - Continue buying new hardware (Servers, networking equipment) and related support contracts.
  - Delay in deploying IT systems due to server farm capacity limitations
  - Inability to support projects that need burst capable compute resources due to lack of free computing and storage resources. (Scalability and Elasticity).
  - Decrease in the availability and reliability of Company's resources because adequate back and recovery systems may not be available.

- Non-financial Benefits: Benefits include: Increase business agility by deploying new IT systems in a timely fashion to respond to evolving utility business (REV). Maintain performance levels and respond to increased capacity and utilization without interruption. Improved disaster recovery through off-site capacity and backup; Improved performance of business systems running on Company server farm resources thought better performance tuning using scalable capacity in the cloud.

- Summary of Financial Benefits (if applicable) and Costs: Current estimates for this solution are $44,000 per year for a large server capable of hosting 15-20 server applications. The compute costs are only charged for active servers and this estimate is based on 40 hours per week. Storage is available at $300 a terabyte per year. We project several potential uses including remote access solutions as well as providing application developers with immediate and on demand access to their test and development environments, since these applications are not used on a 24x7 basis but if hosted internally would use capacity on a 24x7 basis. The ability to offload this server capacity will enable us to defer the building of a new server farm estimated to be $40-50 million until 2018 when the two data centers at 4 Irving Place will be decommissioned. We will be introducing in 2016 (which requires much work) and ramping up each year afterward as we become more comfortable and confident in the solution. We expect this to succeed, if we did not expect that we would have not delayed the new construction.

- 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, vendors and Company employees ensure the selection of the optimal solutions. Each implementation is done with technology evaluations and competitive commercial RFPs before selection and rollout

- Project Relationships (if applicable): Server farm capacity is needed for all IT business systems and new REV and other major initiatives.

- Basis for Estimate: Public websites; vendor sessions

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Overheads						
Total	**0**	**0**	**0**	**0**	**0**	**0**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
500	**1,000**	**1,500**	**2,000**	**2,000**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor					
M&S					
A/P	500	1,000	1,500	2,000	2,000
Other					
Overheads					
Total	**500**	**1,000**	**1,500**	**2,000**	**2,000**

	Capital
X	O&M

2016 – Shared Services / Information Technology

Project/Program Title	Enterprise Data Analytics Operations
Project Manager	Stephanie Bailey / Peter Maselli
Hyperion Project Number	N/A
Organization's Project Number	N/A
Status of Project	Not Started
Estimated Start Date	1/1/2016
Estimated Completion Date	N/A
Work Plan Category	Strategic

Work Description:

Con Edison is proposing to establish a central organization focused on providing data analytics to business areas. The group is referred to as the Enterprise Data Analytics Operations (EDA) and is intended to move the Company to better use information to drive business decisions. A total of 8 FTEs are planned in the organization beginning in RY1 and continuing through RY2 and RY3. EDA uses advanced mathematics and statistical methods applied to both internally-generated and external data. EDA, combined with the Company's reliance on training, professional experience and knowledge, leads to better quality decisions and actions. The primary objectives of EDA are:

- Influence culture and behaviors toward fundamental changes in decision-making processes that impact utility operations
- Empower users towards self-service Analytics and Business Intelligence
- Single Source of truth for Analytics and Data
- Consolidation of Analytics and BI tools with alignment to vendor product roadmap
- Leverage existing technology investments
- Automation of manual processes
- Governance for data and analytics

The operating model is a hybrid approach that utilizes existing analytics expertise embedded in business areas plus the addition of centralized resources to leverage across the company. Information governance, enterprise architecture and a Center of Excellence (COE) will reside at the enterprise level to ensure proper start-up and ongoing oversight for building out analytics capabilities and managing user adoption. The business area will manage projects and maintain business-specific solutions according to the skills and maturation of analytics in the business area.

Information Governance: Electric Work Management and Project One, two recently implemented major initiatives, moved the company forward in providing robust platforms for information management. These two platforms are still a minority portion of the application portfolio. With over 500 production databases, business areas struggle to find the source of data to answer important business questions on areas such as maintenance of assets, costs associated with operations, and other critical elements in an effort to operate efficiently. Information governance is the set of structures, policies, procedures, processes and controls to manage information at an enterprise level. It also is the ongoing development and maintenance of a Con Edison Data Warehouse that over time, based on priorities, consolidates data from disparate internal and external data sources for consumption across the company. Portions of time

from various individuals listed in "Basis of Estimate" section of this document, estimated at 1 FTE, are required to implement and maintain information governance.

Enterprise Data Architecture: Governance processes have been successfully implemented to ensure that technology investments align with strategic priorities and are justified with departmental business cases. Even so, while technology investments can be justified by their own merit, with hundreds of applications already in production and many options available in the market as solutions, it is possible that new, fully justified solutions could be implemented more cost effectively by leveraging existing data repositories. When new solutions are required, those solutions could potentially use common data sources that are "certified" with strong edits and validations and reviewed periodically for quality. An Enterprise Data Architecture function staffed by a full-time data architect along with data and business analysts, database administrators and data warehouse administrators will support Con Edison's investment decision-making and work prioritization process by contributing to optimal data designs and efficient resource allocation by rationalizing new projects against a catalog of data repositories and ensuring adherence to best practices.

Center of Excellence (CoE): A CoE refers to a team that provides leadership, change management and communication, best practices, support and training for analytics. Con Edison is in the early stages of its enterprise analytics journey. A CoE will accelerate growth and help the company realize the value of a data-driven organization sooner by focusing on higher priority initiatives that provide greater business value. A CoE helps apply skills and capabilities that can be reused across the organization. It helps control costs through shared infrastructure and tools and avoidance of redundant and/or inefficient processes or approaches. These strong mathematical and analytical skills are provided by Complex Event Modelers (CEP) that design solutions and Analytics and Visualization developers that specialize in the development tools.

These staffing requirements are summarized in the "Basis for Estimate" section below.

Justification Summary:

IBM was engaged to conduct an assessment of Con Edison's analytics readiness and to create a vision and roadmap for enterprise analytics based on internally planned projects and benchmarks to other utilities. Their study concluding in April 2015 revealed that Con Edison ranked 1.8 out of 5 on their analytics maturity scale. The utility industry average was 3 out of 5. With respect to the target maturity, it was recommended that the Company strive for a level 4 to 5 maturity based on the initiatives that are planned for the next three to five years.

This target state was primarily based on a point-in-time review of proposed initiatives to determine whether there were opportunities to combine data management work efforts of multiple projects. There were several types of data where it was determined that multiple planned or proposed projects would either create or use the data. One example was customer usage data, such as the kilowatt hours that customers use in a month. It was discovered that over 40 proposed initiatives (in addition to the proposed Advanced Metering Infrastructure initiative) would either create, modify use customer usage data. **Information governance** would seek to identify the data quality and timing requirements that would satisfy the needs of all or most of the initiatives. Information governance was cited as the top priority for the maturity curve. For example, Information Governance would prioritize data provisioning projects, such as combining funding from multiple projects requesting employee data to fund a portion of a data warehouse pertaining to human resources. **Enterprise data architecture** would provide the technical expertise to define optimal ways to store and retrieve data, e.g. through a centralized data warehouse, a

message hub or data virtualization[1]. The **Center of Excellence** would provide expertise to the individual initiatives as needed to help those project teams utilize the data once it is available. For example, the Complex Event Modeler might develop common computation routines surrounding customer usage forecasts or employee productivity while a Visualization developer would use the most appropriate tools to present results using trends, charts, navigations or other techniques based on the type of analysis either as an advisor to other teams or as a developer of corporate-wide views.

Supplemental Information:

Alternatives:

- Acquire supplemental funding on a project-by-project basis. This model is problematic because it asks a project to bear costs that are better shared across the enterprise. It would discourage centralized management and jeopardize the benefits already achieved with centralization. It also assumes a predictable flow of new projects to fund ongoing costs.

Risk of No Action:

- Data provisioning will likely occur as single point solutions. Initiatives with strong business cases will be able to fund these solutions based on their positive returns; however it will not be possible to determine how much more value could have been obtained had lower cost data provisioning methods been employed. The cost of data management will increase faster than it should due to redundancies in storage and access as well as the redundant data profiling and cleansing efforts.
- Data reconciliation will increase exponentially as more data sources are added.

Non-financial Benefits:

- Strategy: Operational excellence can be supported with predictive and prescriptive analytics. Libraries of analytical models created by one business area can be leveraged and reused by another business area, e.g., in the area of asset maintenance. Customer experience can be supported with customer focused analytics and data management.
- Information: Data will be available, current and of defined and measured quality.
- Analytics: Data-driven decision-making should be pervasive. Top-down non-financial goals can be set and performance measured consistently. Prediction, simulation and projection can be better integrated into business processes.
- Governance: The Company can achieve more proactive data quality and remediation. There will be enterprise management of master data which provides quality and consistency. Business users will have knowledge of what data exists, where it came from and where it is located. Governance provides improved compliance with security, privacy and in addition to monitoring and auditing ethical policies.
- Architecture: Operational architecture defines optimal utilization of infrastructure e.g., cloud, data virtualization, enterprise warehouse. It is essential to provide a uniform enterprise data model to be used as a standard for implementing all information applications for the Company.

[1] A centralized data warehouse houses data created from various sources. It is accompanied by clear information about the data (metadata), such as when the data was moved to the warehouse, definitions of the data inside the warehouse, and indicators about quality, such as whether default values were used. This method is useful for highly requested and used data. A message hub, also known as middleware, leaves the data in its original source, but gathers the data as it is needed to serve various needs. This method is useful for well-defined, repetitive requirements. It may also use the data warehouse as a source. Data virtualization leaves the data in place, either original source or data warehouse, but provides information and tools that enable business users to access the data without needing to know where the data actually resides. This method is useful for low to medium volumes of requests and ad hoc usage.

Summary of Financial Benefits (if applicable) and Costs:

- Not applicable; however, other utilities have estimated that they have lowered the cost of future IT capital projects by 10% or more through data reuse.

Technical Evaluation/Analysis:

- The roadmap was developed with IBM. IBM assessed our data management, analytics, technical architecture and applicable skills against their Library of Industry Best Processes, KPIs, Capabilities and Benchmarks for the Energy and Utility industry. Their findings revealed the overall low analytics maturity level (1.8 out of 5) for the Company and redundancy of data provisioning (such as the 40 initiatives require customer usage data discussed in the Justification), Specific areas of review and key recommendations are:
-

Review Area	Finding	Recommendation
Business Strategy: Connection of the importance of data in achieving Company's strategic imperatives.	Foundational (2.0): Understanding that there is need for better data governance to achieve strategies.	Implementation of information governance programs.
Information: Centralized data repositories, data models and standards.	Basic (1.9). Considered to be largest gap to close since most utilities target level 5. Silo (independent), transaction oriented data sources.	Data architecture, including data repositories (warehouse) and other data sharing techniques.
Analytics: Skills to perform predictive and descriptive analytics.	Various levels of capabilities (1.9). Most of the company performs descriptive (what has happened) versus predictive (what will likely happened) or prescriptive (what should we do for better outcome).	Staff for a Center of Excellence so that skills can be made available throughout the company.
Culture and Execution: A culture where everyone has respect for data.	Foundational (2.0). Analysis limited to available data. Unbalanced reliance on individual experience.	Information governance program coupled with a Center of Excellence to communicate benefits of analytics in decision making and to lead other change management initiatives.
Governance: Data as a corporate asset.	Basic (1.5). Aside from cybersecurity, privacy, and retention, limited policies around data. Quality, data location, timing, and data definition requirements are often dictated by producers of data without understanding requirements of all users of the data.	Information governance program, data architecture and a Center of Excellence provides frameworks and resources to implement governance.
Architecture: Ability to be responsive and flexible, and to sustain and reuse existing data assets.	Basic to Foundational (1.5). Middleware provides architectural backbone but has only been implemented for major initiatives and few smaller initiatives.	Construct an enterprise repository based on data demand. Data architects, analysts DBA's and administrators are required for implementation.

Project Relationships (if applicable):

- Not applicable

Basis for Estimate:

- The projection of resource requirements is based on the Con Edison Enterprise Data Analytics Strategy and Roadmap prepared by IBM, April 2015. Estimated resource requirements provide for on-going maintenance of the analytics environment. Resources are also allocated to capital projects; those allocations are excluded from the estimates below.

Position	Duties	O&M FTE
Enterprise Data Architecture		
Architect	Provides overall design data architecture solutions across business lines. Provides entity modeling, i.e., models defining major sets of data such as Assets, Employees, Customers.	1.0
Senior Data Analysts	Product evaluations, data definition standards, data objects (e.g., sources of data, classifications, summarizations), data quality reviews	0.5
Business Analysts	Problem statements, business requirements, process re-engineering, change management	1.0
Center of Excellence		
Complex Event Process (CEP) Designer	Designer of algorithms (mathematical formulas) to identify patterns from disparate data sources	0.5
Analytics / Visualization Developers	On-going operation and tuning of methods designed by CEP or data scientist and presentation of results.	0.5
Information Management		
Data Analysts/Modelers/Metadata	Detail design of data entities, attributes, data quality assurance (edits/validations), definitions, master data management	1.5
DBA	Operational data stores and data marts providing data to and from data warehouse	1.0
Data Warehouse Administration	Administration of ultra-high-volume data bases and processors.	2.0

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
220	**1,651**	**1,651**	**1,651**	**1,651**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor	220	1,651	1,651	1,651	1,651
M&S					
A/P					
Other					
Overheads					
Total	**220**	**1,651**	**1,651**	**1,651**	**1,651**

	Capital
X	O&M

2017 – Shared Services / Information Technology

Project/Program Title	IT Electric Ops - Business Systems Sustainability
Project Manager	Jeannine Haggerty
Project Number	N/A
Status of Project	New
Estimated Start Date	1/1/2017
Estimated Completion Date	12/31/2020
Work Plan Category	Operations - Distribution Control Center IT Support

Work Description:

This program is part of an IT's business systems sustainability initiative to ensure that Con Edison's Distribution Electric Control Center's (DECC) application portfolio remains sustainable due to the significant increase in both cyber security/application upgrades as well as new complex IT initiatives. Con Edison plans to increase the IT support staff to maintain the growing application portfolio by 3 people beginning in 2017.

Upgrades/Cyber Security Testing

These critical business systems reside on servers which also host an operating system (e.g. Windows Server or Linux) and also contain components which are required to connect to the network, other servers, databases, and also to protect again cyber-attacks. This is referred to as the IT Stack. The IT Stack requires regular upgrades and maintenance which includes testing for each upgrade. These platforms are critical to supporting the DECC's Application portfolio. The DECC has over 20 applications and 400 servers used to support the operations. These include Supervisory Control and Data Acquisition (SCADA) systems which control and monitor the electric distribution networks, visualization systems to depict the status of the system, a system to monitor transformers, and applications to display and map assets in the street.

The DECC's rely on several network and non-network SCADA and Outage Management applications to monitor and control Con Edison's electrical distribution grid. The DECC's IT Support personnel are responsible for ensuring these systems remain up 24/7/365 as well as maintain high availability and redundancy at all times.

Although Con Edison relies on best of breed vendors to support the IT Stack (Microsoft and Red Hat for operating systems, Oracle and Microsoft for databases and Microsoft for Visual Studio/.Net development platforms), these software platforms have required more frequent upgrades and testing due to critical security patches. Despite the fact that these upgrades and patches are not part of a traditional application upgrade, they still need to be subjected to thorough test processes to ensure the application will continue to function as expected on supported infrastructure.

To keep abreast of all these changes, it requires IT professionals to spend a significant amount of time testing the changes to ensure the application continues to work as designed. Although ongoing maintenance and support obligations have typically been estimated during the capital phase of a major software deployment, the current complexity, pace, and severity of the patch/upgrade cycle is rapidly exceeding any prior baselines.

SCADA and systems that help monitor & control the Electric Network continue to be one of the highest cyber security risks. As a result, vendors who develop/support these applications provide patches when vulnerabilities are identified. Fully patched environments are a cornerstone of a strong cybersecurity defense. Due to the evolving cybersecurity landscape, the frequency, risk, and criticality of security patches has significantly increased over the past two years. Recent examples include the Heartbleed vulnerability in the OpenSSL cryptographic library from April 2014 and the Shellshock vulnerability in the Unix BASH Shell (Bourne-Again Shell) from September 2014.

New IT Initiatives

In addition to the above Cyber concerns, new large IT initiatives are changing the entire Electric industry. The success of new initiative such as REV, AMI and Distribution Generation require complex IT solutions. Maintaining interfaces between REV applications and existing operational applications will require additional resources to ensure the confidentiality, integrity, and availability of these critical systems. The applications that will become critical for these projects will grow both the size & complexity within the Electric application portfolio. As such, this will require strong IT skills to maintain and address new requirements as well as incorporate new cybersecurity policies related to the REV initiatives.

Based on the above, the need to increase the DECC IT support staff is critical. These personnel must be able to support both the implementation of new IT initiatives as well as be knowledgeable enough to test upgrades to the IT stack and to respond immediately to cybersecurity threats.

Justification Summary:

Con Edison's DECC has to address several situations that are affecting how the Company should manage its IT system, including:

- Vendors supporting the underlying technologies of the IT Stack (operating system, databases and development platforms) are upgrading their software at a higher frequency
- Cybersecurity vulnerabilities continue to rise
- New IT initiatives are changing how the Electric industry operates and integrates with REV systems

To remain in compliance and be able to support the Electric Control Rooms, additional resources are required to test the applications that utilize these technologies.

Supplemental Information:

- Alternatives: Do not perform testing on the upgrades of the IT Stack (Operating System, Databases and application). Do not test applications prior to implementing changes to the IT Stack. Address production issues as they occur. Do not perform *timely* testing of patches related to cyber security threats. These alternatives are not recommended because they will negatively impact reliability and availability of the systems potentially leading to customer outages and outage response.

- Risk of No Action: If we choose not to test applications prior to implementing changes into production, or to quickly perform testing after a cyber-threat, this could jeopardize the ability of Electric Operations to conduct their day to day business. These include mission critical applications such as SCADA, Outage and Work Management and Mapping applications.

  Also, untested applications are at risk of being shut down or being made unavailable to users without prior notice in the event a serious vulnerability is discovered that cannot be remediated. Integration

with REV systems will be delayed affecting the timeline to deliver. Potential cyber vulnerabilities will exist for longer than optimal, increasing risk to Con Edison and its customers.

- Non-financial Benefits: Being able to quickly test patches due to cyber security alerts will ensure the applications function properly. If an application has security vulnerability that is not addressed as soon as possible, it could lead to the application failing and/or unauthorized access which could have an impact on the Electric grid and/or the company's image.

  Software upgrades and patches provide bug fixes, security enhancements, and improvements to stability, availability, and usability. Testing of these new changes can provide valuable experience, allowing production deployments to be conducted more efficiently.

  Thorough testing will minimize post-implementation issues, which can impact end-users ability to perform their jobs.

- Summary of Financial Benefits (if applicable) and Costs: In certain cases, critical security patches are deployed under emergency circumstances to protect IT assets against a publicized exploit or vulnerability. With a larger IT staff dedicated to testing and applying upgrades and critical patches, it will help ensure we have kept our critical IT assets in compliance and avoid the risk of cyber vulnerability.

- Technical Evaluation/Analysis: N/A

- Project Relationships (if applicable): N/A

- Basis for Estimate: Average salary for a mid-level IT Support Staff based on NYC market rates and includes a request for 3 full time employees.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Actual 2015
0	**0**	**0**	**0**		**0**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Actual 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
	360	**360**	**360**	**360**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor		360	360	360	360
M&S					
A/P					
Other					
Overheads					
Total		**360**	**360**	**360**	**360**

	Capital
X	O&M

2017 – Shared Services / Information Technology

Project/Program Title	IT Gas Ops - Business Systems Support & Sustainability
Project Manager	Nelly Jefferson
Project Number	N/A
Status of Project	Ongoing
Estimated Start Date	1/1/2017
Estimated Completion Date	12/31/2020
Work Plan Category	Operations - Critical Repair

Work Description:

This program is part of a business systems sustainability initiative to ensure that Con Edison's Gas application portfolio remains sustainable due to the significant increase in regulatory proceedings and compliance, Gas Operations five year growth plan, evolving business technology needs, obsolescence management and heightened cyber security awareness. In addition, new systems are planned to address new business objectives including:

- Gas Leak map
- Work tracker system
- Equipment tracking system
- Fuse-to-fuser
- Tunnel Inspections
- Robo calls

These drivers and new systems have increased the support needs for the gas organization and introduced new support challenges. Con Edison plans to increase the IT support staff to maintain the growing application portfolio by 2 people beginning in 2017.

These critical business systems reside on servers which also host an operating system (e.g. Windows Server or Linux) and also contain components which are required to connect to the network, other servers, databases, and also to protect again cyber-attacks. This is referred to as the IT Stack. The IT Stack requires regular upgrades and maintenance which includes testing for each upgrade. The majority of Gas' current applications were developed in-house. Given the criticality and complexity of these systems, additional resources are necessary to maintain the support needs and reduce the dependency on one key resource.

A number of application enhancements are required to support Gas' business needs in the area of regulatory compliance, reporting and enhanced processes. In addition to the applications, the support team performs upgrades to support the technical environment which includes operating systems, databases and Microsoft programming platforms, such as Visual Studio/.Net Platforms. A large part of these patches and upgrades are performed primarily for cyber security reasons. These upgrades are necessary to maintain a strong cyber security posture and defense. Fully patched environments are a cornerstone of a strong cybersecurity defense. In order to ensure continued patch support from vendors and system providers, regular upgrades of the IT Stack are critical. Due to the evolving cybersecurity landscape, the frequency and criticality of security patches is not expected to decline in the foreseeable future as vendors

supporting the operating systems, databases and development platforms are upgrading their software at a more frequent pace than ever before.

To keep abreast of all these changes, it requires IT professionals to spend a significant amount of time testing the changes to ensure the application continues to work as designed.

Justification Summary:

Regulatory and compliance, reporting and cybersecurity needs continue to increase. Vendors supporting the underlying technologies of the IT Stack (operating system, databases and development platforms) are upgrading their software at a higher frequency. To remain in compliance and implement these upgrades, two additional resources are required to test the applications that utilize these technologies.

Supplemental Information:

- Alternatives: Today business plans and projects are impacted by the necessity to pull resources to perform these tasks whenever they arise. Other alternatives were considered however these options would disrupt the Gas business area and rollout of the technology plan, they include:
  - Do not make application changes to support reporting needs.
  - Do not perform upgrades and remain on current version of Operating System, Databases and application.
  - Do not test applications prior to implementing changes to the IT Stack. Address production issues as they occur.
  - Purchase custom support contracts for end-of-life software and technology if available. These custom arrangements are highly discouraged and are far more costly than standard contracts for supported systems.

- Risk of No Action: If we choose not to test applications prior to implementing changes into production, and address issues as they occur, risk to applications not functionality could jeopardize the ability for Gas Operations to conduct their day to day business. These include mission critical applications such as Gas Inspection, Work Management and Mapping applications.

  Also, untested applications are at risk of being shut down or being made unavailable to users without prior notice in the event a serious vulnerability is discovered that cannot be remediated.

- Non-financial Benefits:
  - Meet regulatory and compliance reporting needs.
  - Software upgrades and patches provide bug fixes, security enhancements, and improvements to stability, availability, and usability. Testing of these new changes can provide valuable experience, allowing production deployments to be conducted more efficiently.
  - Thorough testing will minimize post-implementation issues, which can impact end-users ability to perform their jobs.

- Summary of Financial Benefits (if applicable) and Costs: In certain cases, critical security patches are deployed under emergency circumstances to protect IT assets against a publicized exploit or vulnerability. With a larger IT staff dedicated to testing and applying upgrades and critical patches, overtime needs for emergency patches would be significantly reduced, and the disruption to day-to-day IT operations would be similarly minimized.

- Technical Evaluation/Analysis:. N/A

- Project Relationships (if applicable): Business Systems Sustainability

- Basis for Estimate: Average salary for a mid-level IT Support Staff based on NYC market rates and includes a request for 2 full time employees.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Actual 2015
0	**0**	**0**	**0**		**0**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Actual 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
	240	**240**	**240**	**240**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor		240	240	240	240
M&S					
A/P					
Other					
Overheads					
Total		**240**	**240**	**240**	**240**

	Capital
X	O&M

2017 – Shared Services / Information Technology

Project/Program Title	Application Architecture
Project Manager	Stephanie Bailey
Hyperion Project Number	N/A
Organization's Project Number	N/A
Status of Project	Planning
Estimated Start Date	1/1/2017
Estimated Completion Date	Ongoing
Work Plan Category	Strategic

Work Description:

Application architecture is an information technology discipline (skills, processes) to describe the structure and interaction of the applications as groups of capabilities that provide key business functions and manage the data assets[2]. Application architecture promotes:

- Reuse: Using program logic or sets of data for more than one purpose, such as prescribing common logic to accommodate transaction workflows and approvals.
- Extensibility: Enabling the future growth of applications to accommodate additional functionality and improvements through enhancements.
- Maintainability: Employing practices to proactively identify defects (e.g. balancing routines, validations) and to easily transfer knowledge for maintenance purposes using techniques such as, programming conventions, publishing guidance and independent project reviews.
- Performance: Employing practices to achieve optimum throughput time (end-to-end time to process transactions) and response time (user productivity) while minimizing impact on the infrastructure.
- Scalability: Enabling future growth of applications to accommodate higher volumes of transactions.
- Integration: Promoting the use of middleware to control the transfer of data or processing control from one application to another.
- Usability: Promoting standards and conventions so that the end user experience of one application is intuitive and similar to others.

[2] Definition provided by The Open Group, a vendor and technology neutral industry consortium with over 400 member organizations. It is a certifying body and has developed The Open Group Architecture Framework (TOGAF), an industry standard framework that has is currently in its 9th version. TOGAF along with other frameworks have been used by the UNITE utility technology benchmarking consortium as a basis for developing its benchmarking models.

Application architecture achieves these objectives by:

- Providing structure for all technology architects (infrastructure, solution and data) in the form of "reference architectures" described below.
- Defining standards and guidelines for application development.
- Aiding in application design, helping to ensure a consistent use of infrastructure (e.g., error handling, authorization, authentication, audit, etc.)
- Selecting architecture principles, methodologies and tools that are flexible to meet the business requirements,
- Developing the future corporate direction based on Information Technology ("IT") trends.
- Explore emerging technologies as well as plan for the retirement of obsolete technologies

Information Technology has used highly-technical, deeply-experienced developers to guide application decisions for commodity and business shared service IT portfolios. These development leaders are known in the IT industry as solution architects. Their guidance assists in decision-making regarding the implementation, replacement or extension of new and existing applications, employing software such as reporting or web components, and building technology services that would be used for new commodity or shared service applications. Their success requires both a solid understanding of the business functions in their portfolio, e.g. customer and billing functions, as well as a deep understanding of the technologies in use in the portfolio, such as voice response technologies or billing calculators.

As the Company's portfolio continues to grow and general purpose tools become available, it is difficult for business area focused solution architects to have awareness and take advantage of technology that may be acquired or developed by other business areas. For example, a customer solution architect may be very familiar with voice response or call center technology but would not necessarily be aware that the same technologies could be leveraged in Human Resources for employee services. Additionally, consistent standards across the portfolio such as those that govern application monitoring and application access security will facilitate review and compliance by internal and external audit and compliance functions that cover the entire Company.

The addition of two full-time application architects will provide a means of implementing architectural principles that result in reuse, extensibility, maintainability, performance, scalability, integration and usability across the application portfolio beyond individual commodities or business shared services. The application architects are primarily responsible for developing or working with other infrastructure, solution and data architects to develop "reference architectures" to communicate Company standards and practices. A reference architecture includes tools (e.g. design and development tools, artifacts (e.g. documentation and intranet sites to store and retrieve the documentation) and resources (e.g. standards and guidelines based adapted from industry standards) that provide guidance to project teams. Examples of reference architectures include digital customer experience, field mobility, business process workflow and management, work scheduling and calendaring, document management, service center management, analytics, demand forecasting, outage management and distribution automation. Each of these reference architectures would prescribe the preferred vendor software suite, the key data sources in the company, the major capabilities that should be addressed, and the optimal hardware configurations.

For example, a Field Mobility reference architecture would prescribe the preferred vehicle modems, the GPS standard, the preferred tablets or other devices, mobile application development languages, and error handling conventions. An application architect, working with a data architect, would prescribe what and how data should be stored locally on a vehicle and how and when to replicate data to a centralized data repository.

Justification Summary:

Standardization

Application architects would be responsible for proposing the application technology standard components for the company. Architect recommendations are then approved by an Information Technology Application Technology Governance Committee and Information Technology leadership. There are 500 applications in the company's portfolio. Each of these applications use anywhere from a few to dozens of the 300 technology components used in the Company. These components, such as programming languages, database management systems, reporting tools and vendor applications need to be upgraded periodically. When similar components are used in the same company, there is added complexity, additional demands for various skills, and possibly more licensing costs. For example, both Google and Bing maps are suitable for basic location and navigation services. Google may be slightly better for one application while Bing may have slightly more benefits for another. The additional cost and expertise required to maintain both tools in the company may not be worth the slight benefits to the individual applications. With hundreds of thousands of choices in technology components, standardization for the company will help to manage both costs and risks.

Application Planning

Application architects work with infrastructure architects to monitor the currency of applications in the portfolio in order to avoid obsolescence. On-going oversight of the portfolio will help the company avoid repeated upgrades to the same applications such as upgrades of the programming language in one year followed the next by upgrades of the database management system. Information Technology is attempting to reduce these iterative upgrades by planning bundled component upgrades. This initiative has proven challenging due to volatile or unclear vendor roadmaps and unidentified dependencies of one component on another. Application architects can focus on communicating with the approved standard vendors to understand and in many cases influence the vendor support roadmaps and to investigate technology component interdependencies. This will be an ongoing activity to refresh the roadmaps approximately every six months. Once the vendor roadmaps that reflect upgrade or replacement dates are compared with the Company applications that use the components, then upgrade or replacement dates can be established as part of the regular application planning process performed by application owners.

Emerging Technologies

New technologies provide opportunities to the utility industry but also bring risk and cost, especially if decisions are made without sufficient attention to cybersecurity, maintainability and sustainability. For example, a substantial investment in development tools and applications specifically for Blackberry devices would have minimal value today. The digitization of field devices in the utility industry may be the next area where strong expertise and adherence to architectural principles are required to avoid stranded technology investments. An application architect would apply best practice architectural principles to standards development and technology acquisition decisions to leverage investments as broadly as possible.

Supplemental Information:

- Alternatives:
  - Continue the current practice of technology governance committees and ad hoc research. The Application Technology Governance Committee is currently comprised of 15 individuals representing various areas of expertise. It is expected that this committee will continue; however progress is impeded by lack of focused attention by an application architect as a leader. Mobility application framework, standards and templates have been under

development since early 2014 as spare-time assignments for several individuals. Work on connected devices such as sensors has not started. The committee approach is becoming less effective and will be unsustainable.

- Risk of No Action:
  - Costs for capital projects and on-going maintenance will be higher than necessary. Google versus Bing location services is an example for capital projects where one service could potentially be used for more than one application. In the area of on-going maintenance for example, the Company currently uses eight different production deployment processes. Applicable standards or procedures have to be reviewed every year. Policy changes must be replicated for each process. An application architect would move the portfolio toward common and therefore fewer processes and components.

- Non-financial Benefits:
  - Speed and Productivity: Application architecture tools help developers launch and conduct projects quickly. For example, applications built using reference architectures have half as many problems (defects) and are five times faster to repair than applications built without a reference architecture[3]. Half as many problems solved five times faster is a ten-fold improvement in productivity. There are approximately 7,000 applications logged in the Company in one year. Assuming each defect currently requires 8 hours of developer attention, Information Technology could avoid 50,400 hours of effort that would be spent on addressing defects that could instead be used for adding business value with functional enhancements.
  - Cooperation: Architectural principles, standard components and consistency facilitate early-stage cooperation rather than reliance on late-stage compliance (audit approach). Best practices support reference architectures that do not force but encourage alignment through templates and tools. The application architect is the anchor for a community of solution architects that share knowledge across business areas and supports the development of collaborative reference architectures.
  - Employee Development and Satisfaction: Today's application architects are more focused on knowledge dissemination, coaching and teaching resulting in a more satisfied workforce than late-stage review and enforcement approaches. Additionally, the architect role provides a career path for talented individuals that enjoy focus on technology direction.
  - Innovation: Digitization in the utility industry means that more devices used to deliver services will be programmable. Grid operations and information technology will converge. This convergence provides additional service opportunities for customers and stakeholders. An application architect can participate or facilitate participation in studies to determine ways to incorporate internet-enabled operating devices and other advanced technologies into the business.

- Summary of Financial Benefits (if applicable) and Costs:
  - Reduced license costs by eliminating similar products
  - Reduced IT capital costs through speed and productivity

- Technical Evaluation/Analysis:
  - Information Technology conducted research that included input from:

[3] Source: The Corporate Executive Board Company (CEB) Enterprise Architecture Leadership Council. CEB is a global best practice and research regarding major corporate functions including Finance, Financial Services, Government, Human Resources, Information Technology, Innovation and Strategy, Legal, Risk and Compliance, Marketing and Communications, Procurement and Operations, and Sales and Service.[

- Gartner: An information technology research and advisory firm providing technology related insight.
- Corporate Executive Board: A best practice insight and technology company.
- UNITE: A consortium of utility information technology department leads and subject matter experts.
- The Open Group: A vendor and technology neutral industry consortium
- Pacific Gas & Electric Company
- Southern California Edison
- Public Service Enterprise Group

- Key findings:
  - Overwhelming majority of companies, including utilities, utilize IT architect positions
  - Role/Responsibilities:
    - Architects are usually Individual Contributors that are leveraged during design phases
    - Ensures consistency & standardization across projects for area of expertise by continuously updating standards and periodically reviewing their utilization on projects. HOW?
    - Training, professional development, certification focused on technology domain (e.g., application, infrastructure, solution or data).
  - Qualifications:
    - Technology passion/skill, think broadly, good speakers, write well, interact and solve business problems, translate business problem into tech requirements for ultimate solution

- Project Relationships (if applicable):
  - This initiative supports the Configuration Management portion of capital project #21551714. The Application Architect ensures on-going success of configuration management.

- Basis for Estimate:
  - This initiative requires the addition of two positions for the Enterprise Application Architects as well as on-going licenses for architectural tools for knowledge sharing.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
	240	**240**	**240**	**240**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor		240	240	240	240
M&S					
A/P					
Other					
Overheads					
Total		**240**	**240**	**240**	**240**

	Capital
X	O&M

2016 – Shared Services / Information Technology

Project/Program Title	Telecommunications – Frame Relay Decommissioning
Project Manager	Terrence Walsh
Project Number	N/A
Status of Project	In progress
Estimated Start Date	1/1/2016
Estimated Completion Date	12/31/2020
Work Plan Category	O&M Telecomm Clearing

Work Description:
Verizon announced during the fourth quarter 2012 that frame relay service will be decommissioned on December 2015. CECONY utilizes frame relay service for numerous critical SCADA applications. Frame Relay is used by multiple organizations in the Company, and is critical in the operating areas providing communications from control centers to assets at substations and other field locations. Con Edison has 823 frame relay circuits which must be replaced with an alternative technology. MPLS (Multiprotocol Label Switching) is the alternative to frame relay, and is currently priced $77 per month higher. All conversions must be completed by the respective decommissioning dates.

Justification Summary:
Conversion to MPLS is required because the frame relay service, which is used for critical SCADA applications, is being decommissioned by Verizon. Multiple SCADA applications used in Electric, Gas, and Steam use frame relay service for critical communications, and will need to be converted to the MPLS solution.

Supplemental Information:

- Alternatives: Replacing frame relay with MPLS – layer 2 is the least costly option. Other options include replacing the communications and end equipment with a current Internet Protocol (IP) solution; this solution would require the replacement of both hardware and software at an estimated cost of over $2 million, and incur additional annual communications costs as well.

- Risk of No Action: Failure to replace the Frame Relay circuits would have resulted in the loss of connectivity to Electric, Gas, and Steam transmission and distribution RTUs and relays; these provide visibility, and control capability of the electric SCADA systems. Additionally, information about transformers and network protectors would be unavailable, and would seriously jeopardize the reliability of the energy delivery systems.

- Non-financial Benefits: Conversion to the modern MPLS network will result in better reliability of the circuits based on modern equipment and continued investment by the carrier.

- Summary of Financial Benefits (if applicable) and Costs: The cost for a 56kb circuit has increased from $98 per month to $175 per month. The conversion requires transferring 823 (56kb circuits only incurred the increase cost) frame relay circuits to Verizon MPLS, increasing our annual recurring cost by $675k.

- 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, 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

- Project Relationships (if applicable): Solution selected (MPLS) will be used for all electric SCADA expansion and potentially used for network segmentation communications. Each technology is used in the enterprise and failure to invest in maintenance will risk the continued use of the technology.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Overheads						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
675	**675**	**675**	**675**	**675**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor					
M&S					
A/P	675	675	675	675	675
Other					
Overheads					
Total	**675**	**675**	**675**	**675**	**675**

	Capital
X	O&M

2017 – Shared Services / Information Technology

Project/Program Title	Mainframe Software Maintenance
Project Manager	Terrence Walsh
Project Number	N/A
Status of Project	N/A
Estimated Start Date	1/1/2017
Estimated Completion Date	12/31/2020
Work Plan Category	O&M Computer Clearing

Work Description:

Con Edison maintains and operates a computing mainframe environment in a company data center, which supports critical business systems including the Customer Service System, Customer Billing System, Emergency Control System, and some financial and reporting systems. Con Edison protects the investment through a maintenance contract for software running on the platform. The maintenance support is used to keep the software up to date, patch cybersecurity vulnerabilities, 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 environment. The mainframe maintenance costs are based on the size of the processor.

In 2015, Con Edison increased the capacity of the mainframe to support requirements for increased demand for customer systems and other business requirements. As the compute capacity of the mainframe increases so in turn does the cost of the software maintenance. As a result of the increased capacity we will see increased costs of the following software maintenance.

- Increases in IBM software maintenance and license charge
- Increases in third party software licenses and maintenance

This request is to cover the incremental increased costs associated with the new mainframe and software costs as a result of the increased computing capacity.

Justification Summary:

Con Edison protects the value of its technology capital investments through maintenance contracts for the software. The maintenance support is used to keep the software up to date, patch cybersecurity vulnerabilities, 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 systems, servers, and PCs.

Supplemental Information:

- Alternatives: There is no alternative; the software cannot be licensed without maintenance.

- Risk of No Action: Required software will not be usable on the mainframe without valid keys assigned through the maintenance and license contracts.

- Non-financial Benefits: Benefits include: Instant and automatic access to the latest software and features; Automatic software versioning and patching; Improved performance of business systems running on Company mainframes.

- Summary of Financial Benefits (if applicable) and Costs: N/A

- 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, 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

- Project Relationships (if applicable): This project is related to the Customer Service System Life Extension project. This system is run on the mainframe computer.

- Basis for Estimate: Vendor proposals; bidding to resellers of the maintenance.

Total Funding Level ($000):

Historical Spend WRONG YEARS IN HISTORICAL SPEND

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Overheads						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
0	**459**	**607**	**925**	**1,322**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor					
M&S					
A/P	0	459	607	925	1,322
Other					
Overheads					
Total	**0**	**459**	**607**	**925**	**1,322**

	Capital
X	O&M

2016 – Shared Services / Information Technology

Project/Program Title	Software Maintenance
Project Manager	Terrence Walsh
Project Number	N/A
Status of Project	New
Estimated Start Date	1/1/2016
Estimated Completion Date	12/31/2020
Work Plan Category	O&M Computer Clearing

Work Description:

Information Technology makes many technology investments each year for the continued operation of the computing and network environment in place. These investments can take the form of productivity improvements, such as a new video conferencing solution or these investments are used to ensure the continued viability of the environment including network switches, servers, storage or PCs. In either case, Con Edison protects the investment through a maintenance contract for the hardware and/or software. The maintenance support is used to keep the 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 systems, servers, and PCs. The technology solutions are purchased through capital investments which include a negotiated maintenance period. Once that period has expired the contract becomes an expense to the Company. During the following 5 years, maintenance on the following products will expire and new expenses for maintenance will begin.

- Increases in PC hardware maintenance due to growth of PC inventory
- Cisco network equipment due to network growth
- FireEye Intrusion Prevention System
- Air Watch – mobile device manager for enabling Company email access from employee personal devices
- Fortinet Firewalls used to protect the Company perimeter
- Microsoft Enterprise Agreement to maintain server, PC and laptop software versions
- Net Back-up server backup solution
- Netmotion VPN client due to device mobility growth

Justification Summary:

Con Edison protects the value of its technology capital investments through maintenance contracts for the hardware and software. The maintenance support is used to keep the 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 systems, servers, and PCs.

Supplemental Information:

- Alternatives: Alternatives include making repetitive (as frequent as 1-2 years) capital purchases to keep the equipment functioning and supportable. This is not recommended as maintenance typically runs 20% of the initial cost per year making this option more expensive. It also delays the delivery time for introducing new functions and introduces possible cybersecurity risks by delaying software patch deployment. Fatal failures in the equipment will result in the technology being removed until a replacement can be budgeted and bid.

- Risk of No Action: Failure to purchase maintenance now may introduce significant risk to the availability of the technology solution and the business functions it provides. It also introduces a cybersecurity risk, and compromises the capability to interact with external stakeholders because current equipment will be unsupported.

- Non-financial Benefits: Benefits include instant and automatic access to the latest software and features. This also includes security software and firmware patches to keep the environment safe.

- Summary of Financial Benefits (if applicable) and Costs: Since maintenance typically runs 20 % per year on the original investment, it is a cost avoidance compared to the alternatives.

- 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, 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

- Project Relationships (if applicable): Each technology is used in the enterprise, and failure to invest in maintenance will risk the continued use of the technology.

- Basis for Estimate: Public websites; vendor proposals; bidding to resellers of the maintenance.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Overheads						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
1,492	**1,802**	**1,960**	**2,442**	**2,442**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor					
M&S					
A/P	1,492	1,802	1,960	2,442	2,442
Other					
Overheads					
Total	**1,492**	**1,802**	**1,960**	**2,442**	**2,442**

X	Capital
	O&M

2016 – Shared Services / Information Technology

Project/Program Title	CCTN Expansion - Fiber Projects
Project Manager	Jay Wilamowski
Hyperion Project Number	2XC9801
Organization's Project Number	10078595
Status of Project	Ongoing
Estimated Start Date	Jan 3, 2013
Estimated Completion Date	Dec. 31, 2020
Work Plan Category	Oper - Critical Repair

Work Description:

Con Edison owns and operates a private communications network called the Corporate Communications Transmission Network (CCTN). This network is the vehicle that enables secure communications circuits for SCADANet, voice, video, feeder 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. There are over 120 company locations hosting the fiber optic and ancillary equipment used by CCTN. Since the late 1980s, we have installed over 475 miles of fiber optic cable to provide our CCTN communications services. Wherever possible, we efficiently installed these fiber spans by combining them with electric distribution cable installations. 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 a new approach to maintain fiber optic cable by proactively identifying small sections prone to failure and replacing them in advance. This eliminates costly projects to replace entire spans wherever possible.

Additionally, in the next five years we are planning alternate technologies to complement and improve efficiencies of the CCTN network.

In 2014 we completed the planned span in the Bronx between McLean Avenue and Sedgwick Avenue. This new route provides an alternate path to our Westchester locations and provides dual fiber paths for these two previously dead-ended locations.

In 2015 new fiber spans planned include:

- Adding a new fiber run from 30 Flatbush Avenue to the Third Ave Yard. This run will replace one of the oldest and most heavily spliced cables in the CCTN network. This path is also critical for connectivity into Staten Island ($367k - target date Q4).

- Continuing the implementation of the fiber path from College Point to Astoria - Phase II. (We completed Phase I in 2013. Although we scheduled Phase II for 2014, it was necessary to postpone its installation due to priority fiber runs required for the Storm Hardening project in lower Manhattan. There was a limited amount of internal construction forces available to do these jobs.) The College Point to Astoria fiber run continues to be one of the oldest and most problematic spans in the network. The original span used a "direct burial" method of installation without protective conduit or inner duct, making it vulnerable to breakage. The current plan is to

replace the original runs within conduit and inner duct in sections where performance is compromised. Using this technique, rather than installing a single costly replacement of the entire span, will better utilize the limited resources available ($950k – target date Q4).

In 2016, the new fiber spans planned include:

- Continuing the implementation of the fiber run from College Point to Astoria - Phase II. (Phase I was completed in 2013. However, previously scheduled work in 2014 on Phase II was postponed due to fiber installations required for the Storm Hardening project in lower Manhattan.) The College Point to Astoria fiber run is one of the oldest and problematic spans in the network. The current plan is to replace sections where performance was compromised rather than installing a single costly replacement of the entire span.

- New fiber run between 4 Irving Place and the Murray Hill Substation on 30th Street. This span is one of the main fiber routes between 4 Irving Place and the West End Ave and is constantly subjected to punishing conditions of Manhattan streets (2016).

During the coming budget years 2016-2018, the fiber spans which are planned to be upgraded include new fiber runs between:

Dunwoodie and Sprainbrook	(2017)
Sprainbrook and Eastview	(2017)
Eastview and Pleasantville	(2018)
Pleasantville and Millwood	(2019)
Millwood and Buchanan	(2019)

The above fiber spans were installed more than 20 years ago and run on our electrical towers. They experience gradual degradation due to continual exposure to the elements and must be upgraded.

New fiber run between the Murray Hill Substation and West End Avenue to continue upgrading this critical yet old fiber span (2018).

New fiber span between East River Gen Station and the new Gold Street Communications Hut in Brooklyn. This fiber is operating at near capacity and does not have sufficient bandwidth for our ongoing communication requirements from Manhattan into Brooklyn, Queens, and Staten Island (2017).

Justification Summary:

CCTN continues to provide 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. Communication requirements for data, voice, 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 projects to improve diversity and capacity to those locations. CCTN has far surpassed the use of public carriers for high-speed reliable communications. It serves as the corporate backbone for all communication services for the foreseeable future. Wireless technology, considered for redundancy and diversity when installing new fiber, is not always feasible or justified.

The project identified in this white paper addresses departmental and corporate risks associated with:

- Failure of critical business applications
- Failure of the Email System
- Infrastructure constraints

- Safety
- Critical radio system infrastructure
- Physical damage of corporate server farm

Supplemental Information:

- Alternatives: 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.

- Risk of No Action: 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.

- Non-financial Benefits: 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

- Summary of Financial Benefits (if applicable) and Costs: N/A

- 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.

- Basis for Estimate: Cost estimates are based on years of direct 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 Con Ed's TeAM (Telecom App Management, who is responsible for assigning conduit routes).

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
549	**1,490**	**1,543**	**1,671**		**1,318**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor	145	366	423	203		160
M&S	7	8	19	71		56
A/P	114	917	728	1,208		953
Overheads	98	337	369	182		144
Other	185	-138	4	7		6
Total	**549**	**1,490**	**1,543**	**1,671**		**1,318**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
645	**750**	**1,397**	**1,397**	**1,397**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	300	277	360	64	64
M&S	128	220	754	1,182	1,185
A/P	0	53	0	0	0
Other	11	24	67	105	105
Overheads	206	176	216	46	43
Total	**645**	**750**	**1,397**	**1,397**	**1,397**

X	Capital
	O&M

2016 – Shared Services / Information Technology

Project/Program Title	CCTN Facilities Improvements
Project Manager	Wendell Little
Hyperion Project Number	1XC9805
Organization's Project Number	10025298
Status of Project	Ongoing
Estimated Start Date	Jan 1, 2016
Estimated Completion Date	Dec 31, 2020
Work Plan Category	Ongoing Program

Work Description:

Con Edison owns and operates a private communications network called Corporate Communications Transmission Network (CCTN). This network is the vehicle that enables secure communications circuits for voice, video, protection and the computing and storage environment. CCTN enables computing resource consolidation, disaster recovery, as well as the reduction of public carrier cost. There are over 120 Company locations which host the equipment used by CCTN. These locations, referred to as CCTN nodes, are 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 will these components will cause failures to critical communications circuits needed for energy delivery systems and computer networks.

This program performs upgrades on these facilities for 4-10 locations per year. The work includes:

1. Replacement of HVAC systems
2. Cable modernization
3. UPS & DC Power system upgrade commensurate with the criticality of the location
4. Grounding upgrades

The following work was completed YTD 2015:

- HVAC systems were upgraded at the following communications facilities locations: Cheesecote, North Castle1, Nyack, Vernon and Corona substations, Bedford, Empire State Building and Montefiore
- Fiber spans were completed at E14th St substation and Rye HQ fiber cable was replaced on the East River to Gold St route.
- 14 DC/UPS/battery systems were replaced at the following communications facilities: United Hospital, D269 tower, 3rd Ave Yard; Parkview, Pleasantville, E29th St, Buchanan, World Trade Center, Vernon, Grasslands and Brownsville substations, WEA Hut, Astoria136, and Van Nest-105.
- Grounding upgrades were completed at West End Ave and associated communications hut.

Work on all four CCTN 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.

The following work is planned for 2016 ($533K):

- HVAC system upgrades at ESB-8101 and Yorktown tower ($100K)

- New fiber spans on 3 CCTN segments from Greenwood to 3rd Ave. Yard; 30 and Flatbush Ave to 3rd Ave Yard routes 1 & 2 ($100K)
- DC/UPS/battery systems to be replaced in at least 10 communications facilities including North Castle 2, Irving Place Hub Switch room, MSO, Hudson River East, Van Nest Rm. 103 ($300K)
- Grounding upgrades at communications facilities to be determined during 2015 4th quarter inspections ($32K)

The following work is planned for 2017 ($532K):

- HVAC system upgrades at Parkchester and Dunwoodie substations ($100K)
- New fiber spans on 3 CCTN segments from Jamaica to Queen Blvd., Van Nest to Bruckner and College Point to Queens Blvd. ($100K)
- DC/UPS/battery systems to be replaced at 10 communications facilities to be determined ($300K)
- Grounding upgrades at 2 communications facilities at Fresh Kills & Arthur Kill ($32K)

Specific locations for similar work in 2018 through 2020 will be determined in 2017.

Justification Summary:

CCTN has far surpassed the use of public carriers for communications and provides a corporate backbone for all communication services for the foreseeable future. Con Edison's plan is to continue to use CCTN as a high-speed, reliable and cost effective alternative and compliment to public carriers. CCTN will continue to provide protection and data services to all critical substations necessitating capital projects to improve diversity and capacity to those locations. These communications requirements for data, voice, protection, SCADA and video circuits will result in the necessity to maintain the facilities associated with the network. Many major CCTN nodes possess diverse Points of Entry (POE) and redundant components including power sources to eliminate any single point of failure and provide redundancy and diversity. Substations are interconnected to the core CCTN network with fiber runs to support high speed services.

The following statistics have been generated which corroborate the reduction in service impairments as a result of the four CCTN facilities improvement projects. The program was initiated in 2010:

Year	Trouble Tickets Reported
2006	162
2007	213
2008	105
2009	89
2010	31
2011	55
2012	89
2013	56
2014	79
2015	46

Supplemental Information:

- Alternatives: The alternative to CCTN is to procure all communications from carrier services. This approach is not recommended due to failure rates associated with carrier circuits and the lead time associated with repair and new service delivery.

- Risk of No Action: Risks include 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.

- Non-financial Benefits: 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 to carrier circuits
    - Scales capacity over time through card replacements
    - Improves recovery time from communications failures
    - Provides services outside of the Telco carriers

- Summary of Financial Benefits and Costs: The financial benefits include cost avoidance to repair failed systems. The grounding program eliminated replacement of the microwave unit, saving $10K. 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. The costs are reflected in the tables below.

- 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.

- Technical Evaluation/Analysis: Information Technology performs planning and analysis on all technologies introduced. Solutions are investigated in conjunction with the IT planning process. Interaction with IT advisors, carriers, vendors and Company employees ensure the selection of the optimal solutions. Results of prior year's preventative maintenance programs are analyzed to determine the current year's priority work.

- Project Relationships (if applicable): Current applications & future IT projects require sufficient performance of the networks.

- Basis for Estimate: The basis for the estimates are vendor rates, accommodation billing rates for internal labor and cost estimates for equipment applied to the statements of work.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year	Forecast 2015
612	**614**	**560**	**418**		**528**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
462	**533**	**550**	**550**	**550**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	65	65	65	65	65
A/P	151	287	271	285	285
M&S	169	101	136	125	130
Other	28	34	36	38	37
Overheads	49	46	42	37	33
Total	**462**	**533**	**550**	**550**	**550**

X	Capital
	O&M

2016 – Shared Services / Information Technology

Project/Program Title	CCTN Modernization - SONET Conversion
Project Manager	Jay Wilamowski
Hyperion's Project Number	1XC9806
Organization's Project Number	10025299
Status of Project	Ongoing Program
Estimated Start Date	Jan 3, 2014
Estimated Completion Date	Dec. 31, 2020
Work Plan Category	Oper - Critical Repair

Work Description:

Con Edison owns and operates a private communications network called Corporate Communications Transmission Network (CCTN). This network is the vehicle that enables secure communications circuits for SCADANet, voice, video, 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 120 Company locations, which host the equipment used by CCTN. These locations, referred to as CCTN nodes, are equipped with communications equipment, which deliver communication circuits using standard protocols called Synchronous Optical Networks (SONET) & Dense Wave Division Multiplexing (DWDM). Information Technology has established Cisco as a new provider for this equipment, replacing Lucent which has supplied this equipment since CCTN's inception in the late 1980s. Lucent no longer supports this equipment and it is now maintained solely by accumulated spare parts. This multi-year project provides a plan to implement the new standard and move critical circuits to the new, more secure standard. The conversion process started when the Cisco solution was selected. Through 2014, 75% of the Lucent equipment has been replaced.

In 2015 we expect to complete the following:

- Complete the migration of the circuits from the legacy Lucent system to the newer Cisco equipment. We will also be increasing bandwidth availability where required using the DWDM capabilities of the Cisco equipment – ($126K – 4th Quarter completion.)
- Procure spare channel banks from third parties that are no longer sold by the manufacturer. Channel banks are critical components used in delivering telecomm circuits. They provide the means to deliver individual circuits for end devices at one location and merge with other circuits onto a higher speed backbone for delivery at the other end. ($70K – 2nd Quarter completion.)
- Establish a plan for the next generation of carrier network equipment, projected to be an MPLS solution

In 2016-2019, we will be:

- Upgrading the SONET environment to the latest technology called MPLS. This work will extend through multiple years; however, we do not expect service interruptions of any kind. MPLS is the solution used by most of the major communications carriers including Verizon and AT&T. It is a technology expected to replace many of the existing systems (Frame Relay, SONET, point-to-point) for the foreseeable future and position us to continue to deliver value to the business areas such as communicating with assets associated with AMI, REV and distribution automation.

Justification Summary:

CCTN continues to provide the Company with a high-speed, reliable, and cost effective alternative to complement public carriers. Communication requirements for data, voice, protection, SCADA and video circuits will result in the installation and deployment of modern communication technologies to many Company facilities. CCTN will provide protection circuits and data services to all critical substations necessitating capital projects to improve diversity and capacity to those locations. CCTN has far surpassed the use of public carriers for reliable communications and provides a corporate backbone for all communication services for the years to come.

As equipment in CCTN nears the end of supportability or life cycle, plans are being developed for multi-year projects to replace and modernize the network to ensure sustainability, performance, and capacity. The latest solutions provide the ability to maximize the value of existing fiber through multiplexing, increased capacity, added redundancy and implement the latest networking protocols.

The project 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

Supplemental Information:

- Alternatives: The alternative to CCTN 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: 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.

  Additionally, unsupported platforms introduce cybersecurity risks since the firmware and software is no longer maintained to correct flaws in the code.

- Non-financial Benefits: The proposed projects and use of CCTN at Con Edison offer the following other benefits:
  - Ability to provide carrier diversity to critical communication circuits
  - Offers the highest level of cyber and physical security

- Provide a higher reliability level than carrier circuits
- Scale capacity over time through card replacements
- Improved recovery time from communications failures
- Ability to provide services outside of the Telco carriers
- Avoid construction delays and costs needed for carrier services

- Summary of Financial Benefits (if applicable) and Costs: N/A

- 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. The Cisco solution was established after a technology evaluation of Lucent, Nortel and Cisco.

- Project Relationships (if applicable): IT projects for all lines of business, completed or future, require and expect sufficient performance of the network.

- Basis for Estimate: Historic purchases are used as well as vendor presentations, utility bench sources.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
261	**366**	**195**	**565**		**195**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
185	**196**	**215**	**215**	**215**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	25	25	30	30	30
M&S	129	141	152	155	156
A/P	0	0	0	0	0
Other	11	13	13	14	14
Overheads	20	17	20	16	15
Total	**185**	**196**	**215**	**215**	**215**

X	Capital
	O&M

2016 – Shared Services / Information Technology

Project/Program Title	CCTN Expansion - Wireless Mobile Access Network
Project Manager	Wendell Little
Hyperion Project Number	10025664
Organization's Project Number	2XC9719
Status of Project	Ongoing
Estimated Start Date	
Estimated Completion Date	Dec 31, 2020
Work Plan Category	Regulatory Mandated

Work Description:

Con Edison owns and operates a private communications network called Corporate Communications Transmission Network (CCTN). This network enables secure communications circuits for SCADANet, voice, video, protection and the computing and storage environment. CCTN enables computing resource consolidation, disaster recovery, as well as the reduction of public carrier cost savings.

CCTN also provides multiple radio systems to support voice to field crews and machine to machine smart grid and distribution automation applications. Con Edison owns multiple frequency assets in the 450MHz, 800MHz, 900MHz and higher microwave ranges that are used in these radio systems. A single 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 and other wireless technologies have demonstrated the promise to deliver high performance for these applications while not requiring direct line of sight between antennas.

CCTN also provides connectivity for the dispatch applications for the man-down radio system used for switching at substations and the voice radio system used by Electric, Gas & Steam crews for daily field work.

In 2013, a new backend radio console technology based on Voice over IP (VoIP) was piloted by Information Technology (IT) and deployed at the Gas Emergency Response Center (GERC) and alternate GERC control centers. The new dispatch technology allows multiple carrier and private radio systems to converge in a single console subsystem providing interoperability. This new technology is an important component of Con Ed's Wireless Mobile Access (WiMACs) 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.

In 2016 and 2017, this dispatch technology will continue to be deployed to two more electric control centers and in 2017 through 2020, new land mobile radio technology will be evaluated as a bridge technology for eventual broadband system implementation and additional in-building systems will be installed to improve coverage issues. Additionally, LTE, 802.11AC, WiMAX and OFDM will be evaluated at various locations to complement wireless networks. Con Edison will also undertake a review of the licensed spectrum capacity to meet future needs and explore spectrum acquisition and partnering opportunities in the 700MHz band and through initiatives like First Net. First Net is a federal plan that

provides this valuable 700 MHz spectrum to Public Safety. Public Safety, working closely with the state, will look for partners including utilities to build out the infrastructure and in turn share the capacity with the utility. The utilities will be required to maintain and support the system within their service territories, but will also have dedicated and guaranteed use of the spectrum. Other initiatives will be pursued through potential private partnerships where these parties can provide broadband spectrum sufficient to support all Con Edison's wireless needs. It is anticipated that requirements for Advanced Metering Infrastructure (AMI), Reforming the Energy Vision (REV) and Distribution Automation (DA) and other utility of the future applications will require a wireless plan and strategy. These investments are expected to increase spending in 2017.
The following work expected to be completed at the Staten Island and Brooklyn/Queens Electric Control Center in 2016:

- 1Q16 ($100K)
  - Design and specification of new radio dispatch system
  - Refurbishing of radio roof hut, including installation of HVAC, DC power and RF cabling and antennas.
- 2Q16 ($150K)
  - Installation of dedicated LAN, including Cat5 cabling to operator positions and fiber cable to roof hut
  - Installation of radio gateway appliances in existing telecom rooms
- 3Q16 ($1000K)
  - Installation of media appliances, radio console PCs and accessories in east & west control rooms
  - Installation of radio interface modules and radios in racks in roof hut
- 4Q16 ($750K)
  - Installation of software; system configuration and provisioning
  - Acceptance testing and optimization
  - User training

The following work will be completed at the Westchester Electric Control Center in 2017:

- 1Q17 ($200K)
  - Design and specification of new radio dispatch system
- 2Q17 ($1000K)
  - Installation of dedicated LAN, including Cat5 cabling to operator positions and fiber cable to existing radio room
  - Installation of radio gateway appliances in existing telecom rooms
- 3Q17 ($1000K)
  - Installation of media appliances, radio console PCs and accessories the control room
  - Installation of radio interface modules and radios in racks in existing radio room
- 4Q17 ($300K)
  - Installation of software; system configuration and provisioning
  - Acceptance testing and optimization
  - User training

Beginning in 2019, we expect to be fully engaged with the rollout of First Net.

The work to deploy these radio technologies will include:

- 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, multicouplers, 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.

Justification Summary:

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 project identified in this white paper addresses departmental and corporate risks identified as part of the Company's risk management plan and listed below:

- Failure of critical business application
- Failure of public carrier wireless services
- Critical radio system infrastructure
- Failure of critical business application
- Safety
- Physical damage of corporate server farm

Supplemental Information:

- Alternatives: 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.

- Risk of No Action: 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. Sprint decommissioned its national iDEN network at the end of June, 2013 and migrated their customers to CDMA network which is the interim step to a full LTE network. In Nov, 2013 Southern LINC, a regional iDEN carrier providing service to five southern states, announced LTE plans and later in the same month, ARINC also announced plans to end iDEN services at the airports they serve across the US. Con Edison has partnered with Ericsson to extend iDEN until 2020. But without a new land mobile radio technology like P25, Tetra or MotoTrbo, or the current broadband wireless strategy the Company would eventually become dependent on carriers for all field communications and smart grid applications.

- Non-financial Benefits: The proposed projects and use of CCTN at Con Edison offer the following other benefits:
    - Ability to provide carrier diversity to critical communication circuits
    - Provide reliable and diverse communications for REV, AMI, DSP and other utility of the future applications
    - Offers physical and cybersecurity best practices
    - Provide a higher reliability level to carrier circuits
    - Scale capacity over time through card replacements
    - Improved recovery time from communications failures
    - Ability to provide services outside of the Telco carriers
    - Ability to provide voice, video & data services on a single wireless infrastructure
    - Ability to provide dispatch communications interoperability

- Summary of Financial Benefits and Costs: N/A

- 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 are conducted to ensure the selection of the optimal solutions. All selected solutions are evaluated and competitively bid.

- Project Relationships (if applicable): IT projects for all lines of business, completed or future, require and expect sufficient performance of the network. 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.

- Basis for Estimate: The estimates are based on the typical cost of deploying these systems and actual cost of past interoperability systems and microwave access systems.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year	Forecast 2015
	940	**152**	**1,143**		**799**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor				109		76
M&S				23		16
A/P			146	901		630
Overheads				105		73
Other			6	5		3
Total			**152**	**1,143**		**799**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
1,705	**3,250**	**3,250**	**3,251**	**3,250**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	300	400	411	405	405
A/P	0	2,362	2,364	2,407	2,423
M&S	1,090	0	0	0	0
Other	96	210	210	214	215
Overheads	219	278	265	225	207
Total	**1,705**	**3,250**	**3,250**	**3,251**	**3,250**

X	Capital
	O&M

2016 – Shared Services / Information Technology

Project/Program Title	CCTN Modernization - Mapping System
Project Manager	Jay Wilamowski
Hyperion Project Number	2XC9720
Organization's Project Number	10025665
Status of Project	Ongoing Program
Estimated Start Date	January 1, 2014
Estimated Completion Date	December 31, 2020
Work Plan Category	Oper. - Critical Repair

Work Description:

Con Edison owns and operates a private communications network called the Corporate Communications Transmission Network (CCTN). This network is the highway that enables secure communications circuits for voice, video, feeder protection, and the computing and storage environment to ride on. CCTN enables computing resource consolidation, disaster recovery, as well as the reduction of public carrier cost savings. There are over 120 Company locations, which house the equipment used by CCTN. These locations, referred to as CCTN nodes, are equipped with communications equipment that delivers communications circuits using standard protocols called Synchronous Optical Network (SONET) and Dense Wave Division Multiplexor (DWDM). In addition to the electronic equipment, over 475 miles of fiber optic cable have been installed to provide CCTN communications services. The fiber is located in outside plant (OSP) and inside plant (ISP) and is used with SONET, DWDM, Fiber Optic multiplexers, Channel Banks, and other telecommunications equipment to provide services. This requires a sophisticated and unique mapping system to not only track the fiber routes and equipment, but also to permit instantaneous viewing of what circuits traverse what fiber optic cables and equipment. The current complexity of the CCTN network has expanded beyond the capabilities of the current static spreadsheet and Circuit Layout Record (CLR) formats, which are maintained by a staff augmentee. A more sophisticated dynamic platform is required to map all the components of the CCTN network as we continue to expand this important communications backbone for the company and depend less on manual record keeping. This map based graphical information systems (GIS) software will provide for the day-to-day design, planning, troubleshooting, and response and repair to the many elements of the CCTN network including SONET, DWDM, Ethernet, OSP/ISP Fiber, Copper, CAT5 and COAX network infrastructures.

In 2013, the mapping software solution was selected via a requirements analysis and through our RFP process.

In 2014, the new system was purchased, installed, and tested. The system architecture was implemented to handle CCTN network elements and our staff was trained on the system's operation.

In 2015, we estimated that 75% of the existing data will be manually input into the system. The extensive asset information, including the structures, conduits, equipment, fiber optic cables, geographic positions, and other relevant data represents a significant undertaking. Asset information will be loaded into the system in a prioritized fashion. We anticipate spending $250K in 2015 to have this accomplished. This

task will extend into 2016 due to the quantity of information that accumulated since the inception of the CCTN network more than 30 years ago.

In 2016 we are planning to complete loading asset information. In 2017 we plan to interface the mapping system in our monitoring and alerting systems located in the operations center. In future years, we anticipate costs related to system upgrades, enhancements, and expansion of the network to include new locations and assets that will be required.

Justification Summary:

We are planning to convert our CCTN network inventory, provisioning, and capacity management to a full-featured telecommunications oriented packaged software solution that will enhance the information flow by reporting data in a geographical view. This map based GIS software will also enable us to integrate and correlate data such as OSP/ISP Fiber Cables, Network Equipment, Network Facilities, and Circuit Layout Records, and ultimately lessen our dependence on a contractor to manually do this work. The system will be available on the corporate network to authorized users, and will allow staff to quickly determine fiber routes to assist with repairing fiber breaks or designing new paths improving recovery time.

The system will prepare for the elimination of a contractor who is currently responsible for maintaining paper records and producing reports as needed.

This project will be able to address departmental and corporate risks associated with:

- Failure of critical business applications
- Failure of the Distribution Automation and Smart Grid systems
- Critical radio system infrastructure
- Physical damage of corporate server farm

Supplemental Information:

- Alternatives: The alternative to this mapping system is to continue using the manual input and static Circuit Layout Records (CLRs) to track an expanding CCTN network. This approach is not recommended due to the increasing complexity of the CCTN network and need to rapidly repair, design, and determine complex communications circuit routings.

- Risk of No Action: Risks include the inability to accurately track and maintain the CCTN network on an automated and standardized basis; the increased time required to locate fiber breaks in the field; the productivity lost manually looking for circuit documentation; the potential of losing manual data gathered over the years; and incomplete issuance of change management documentation when all circuits on a particular fiber cannot be determined quickly

- Non-financial Benefits:
  The proposed Mapping project of CCTN will offer the following other benefits:
  - Provides a dynamic map view of the entire CCTN network's elements
  - Generates circuit layout records automatically
  - Indicates with greater precision fiber break locations and circuits effected
  - Improves recovery times from communication failures
  - Provides scalability to handle system expansion and replace other static mapping or diagrammatic systems used by Information Technology Planning (ITP)
  - Provides a dynamic tool for system design and testing

- Summary of Financial Benefits (if applicable) and Costs: Completion of the project will result in the elimination of a contractor ($100k per year) dedicated to CCTN record keeping under the legacy process, enabling the organization to fully staff in anticipation of CCTN expansion to support AMI, REV and Physical Security communications.

- Technical Evaluation/Analysis: Information Technology has reviewed and analyzed mapping system software packages offered by seven vendors. Vendors were individually evaluated for their ability to meet set criteria set forth by Communications Planning. Multiple criteria were established in order to rank the strengths and weaknesses of each platform and a technical ranking matrix that enabled the selection of the winning system was developed.

- Project Relationships (if applicable): IT projects, completed or future, require and expect sufficient performance of the network. CCTN provides the network with which all applications are delivered to employees.

- Basis for Estimate: Contracts are in place with pricing set at software system purchase.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
		218	**713**		**248**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
115	**125**	**125**	**125**	**125**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	25	25	25	25	25
M&S	66	76	77	80	81
A/P	0	0	0	0	0
Other	6	7	7	7	7
Overheads	18	17	16	13	12
Total	**115**	**125**	**125**	**125**	**125**

X	Capital
	O&M

2016 – Shared Services / Information Technology

Project/Program Title	SCADANet
Project Manager	Paul Rogers
Hyperion Project Number	0XC1900
Organization's Project Number	10025007
Status of Project	Ongoing Program
Estimated Start Date	Jan 2016
Estimated Completion Date	Dec 2020
Work Plan Category	Operations – Critical Repair

Work Description:

The increased use of microprocessors in the energy delivery environment has greatly increased the ability to collect important operating data and improve automation and control of assets from control centers. A new, physically diverse SCADANet operations communications network has been commissioned and is currently running multiple applications. The network provides access from control centers to energy assets in substations and in the field for Electric, Gas and Steam. The network was designed and implemented using the Internet Protocol (IP). A private high-speed core network links control centers and using a combination of Company owned private communication circuits and carrier services. This provides the means to run and secure multiple Supervisory, Control, and Data Acquisition (SCADA) applications across a single infrastructure. Substations and other locations will have multiple connections to the core. Public networks and carrier links enter the network at two core locations that have additional layers of security. The project utilizes existing fiber assets from the Company's private network and utilizes wireless where requirements dictate.

The following work was completed in 2015:

- Complete the Steam Control Center High Value Networks at two company locations (200K – 4th Quarter)
- Implement Security Event Manager (SEM) – SPLUNK for NOC alerting and monitoring (350K – Complete)

The following work is planned in 2016:

- Design and implement Advanced Metering Infrastructure (AMI) interface into SCADANet
- Begin multiyear technology upgrade to SCADANet firewalls protecting High Value Networks (HVN)
- Implement network monitoring for SCADANet in the NOC (400K – 4th Quarter)
- Expand network capacity for NY State Reforming the Energy Vision (REV) initiatives including distributed generation (2016 – 2018)

Projects planned for 2017 – 2020 include:

- Implement Software Defined Networks/Policy Based Routing (2017) for High Value Networks
- Complete multiyear technology upgrade to SCADANet firewalls protecting High Value Networks (HVN)

- Upgrade network switches and routers used in SCADANet
- Add capacity to service network at Spring Valley
- Complete backup Steam Control Center network
- Evaluate next generation firewalls for use in SCADANet

Justification:

The electric industry is undergoing a radical change in the use of technology. Field components now come equipped with microprocessors and the capability to collect power quality and load data. Con Edison has designed and piloted multiple new SCADA and Smart Grid applications. In recent years, the New York State Public Service Commission (PSC) expressed concern for protecting customer information including meter reads. SCADANet is designed to provide secure communications and address these concerns. Additionally, it is expected that SCADANet Assets play a major part as a transport network in support of pending NYS Reforming Energy Vision (REV) initiative.

Infrastructure has been built to support the following initiatives:

- Smart Meters and advanced metering infrastructure (AMI)
- Demand Response Management Systems
- Sectionalizing Switching
- Distributed Generation Control
- Secondary Model Validation
- Transformer Monitoring

The projects identified in this white paper address departmental and corporate risks associated with:

- Critical radio system infrastructure
- Failure of critical business applications
- Unauthorized access or loss of sensitive data
- Significant IT projects
- Rouge employees
- Safety

Supplemental Information:

- Alternatives: Alternative networks for providing Smart Grid solutions will require extended use of the Internet and other public networks. This will increase security and reliability risks associated with using public networks. A carrier-based network will also increase costs associated with providing scalability, redundancy and diversity. Installation and support costs increase due to duplication of network components.

- Risk of No Action: Without a strategic plan for providing for smart grid communications the risks include the inability to effectively implement new smart grid technologies due to security, reliability or regulatory requirements. The proliferation of multiple unsupportable and unreliable networks may cripple critical applications.

- Non-financial Benefits: SCADANet provides the Company with a secure and isolated network to run critical energy systems for the Electric, Gas, and Steam business areas. The network is segmented from the Internet and the corporate information network. It is built and managed with Company fiber and on Company property to improve physical security as well. Also when complimented with carrier services provides the best redundancy and diversity for these critical systems.

- Summary of Financial Benefits (if applicable) and Costs: The network includes designs to allow Smart Grid initiatives:
    - High speed network with redundancy and diversity
    - Leverage existing investment in Company private network
    - Grow as needed without large network expenditures. The network is designed to operate efficiently as is and invest only as needed by new systems.
    - Operate securely and within regulatory guidelines
    - Provide a private wireless solution to enable last mile connectivity with incremental costs with only incremental costs for field devices
    - Establish security layers for public network (Internet and carrier) interconnections

- Technical Evaluation/Analysis: Information Technology has designed and implemented a robust wide area network for the computing environment. Much of the infrastructure needed to build this network is present through the Corporate Communications Transmission Network (CCTN). Building on the design and technology which is used to support the information network allows for support and monitoring synergies. It also provides the optimal performance and central cyber security program required for grid and SCADA applications

- Project Relationships (if applicable): Multiple SCADA and stimulus smart grid projects require and rely on SCADANet communications to successfully implement according to cyber security plans and performance objectives. Projects listed below have all adopted SCADANet as a transport and future REV projects including AMI and DSP will benefit:
    - Smart Meters and advanced metering infrastructure (AMI) pilots
    - Demand Response Management System
    - Sectionalizing Switching in Electric
    - Secondary Model Validation
    - Transformer Monitoring

- Basis for Estimate: Historic purchases are used as well as vendor presentations and Internet sources.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
1,464	**1,591**	**1,678**	**1,560**		**1,233**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor	89	283	397	358		283
M&S	0	0	2			0
A/P	1,091	902	860	885		700
Overheads	176	323	397	306		242
Other	108	83	22	11		8
Total	**1,464**	**1,591**	**1,678**	**1,560**		**1,233**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
1,475	**750**	**750**	**750**	**750**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	480	120	120	160	160
M&S	606	504	510	466	473
A/P	0	0	0	0	0
Other	54	45	45	41	42
Overheads	335	81	75	83	75
Total	**1,475**	**750**	**750**	**750**	**750**

X	Capital
	O&M

2016 – Shared Services / Information Technology

Project/Program Title	Business Systems Sustainability – Server OS Plan
Project Manager	Margaret O'Donoghue
Hyperion Project Number	20756671
Status of Project	Ongoing Program
Estimated Start Date	Jan 1 2015
Estimated Completion Date	Dec 31 2020
Work Plan Category	Oper - Critical Repair

Work Description:

This program is part of an ongoing business systems sustainability initiative to ensure that Con Edison's in of over 2000 servers remains sustainable and secure. Con Edison's standard server platform configuration relies on Red Hat Linux or Microsoft's server operating system (OS). Microsoft and Red Hat typically release new OS's every 3 years to provide enhanced security and functionality for its serves. Server OS's must be maintained and kept current to keep the environment secure, protect customer information, and ensure it is protected from unauthorized users. Business systems or applications are comprised of software running on a server and software that runs on a PC. The software that runs on the server must be compatible with the operating system running on that server. In the event that the server application software is not compatible with the new server OS then it must be upgraded or replaced. Con Edison last completed a server OS upgrade to Server 2008 in 2015. Con Edison's standard server platform configuration relies on Microsoft's and Red Hat's operating system (OS). Microsoft typically releases a new OS every 3 years to provide enhanced security and functionality for its servers. Windows Server 2012 is the latest OS's released by Microsoft. This program is part of an ongoing business systems sustainability initiative to ensure that Con Edison's portfolio of over 500 applications remains sustainable in light of required changes to the server operating system.

The scope of work included in this program is to identify, test, and remediate Con Edison applications to ensure continued sustainability on the latest implementation of the Microsoft server operating system platform at Con Edison. In 2013, Con Edison began the significant change of its server OS implementation from the Microsoft Windows Server 2003 operating system to the Microsoft Windows Server 2008, R2 platform. This effort continued in 2014 and continued application remediation was completed in 2015. This change is in line with Microsoft's roadmap for its server operating systems and was necessitated by the end of Microsoft's support for the Windows Server 2003 operating system by July 2015.

Microsoft's latest version of its server operating system is Windows Server 2012, R2, which was released in 2012. Upgrading to the next version of the Microsoft operating system (Windows Server 2012) will be evaluated in 2015-2016 with a targeted remediation of applications to begin in 2016-2017. Additionally, evaluation of the latest release of the Windows Server OS platform will begin in preparation to migrate off of the Windows 2008 platform, which according to Microsoft's roadmap, is scheduled to expire in 2020.

In 2016 and preceding across the 5 year plan, business systems and infrastructure servers will all be upgraded to Windows Server 2012, R2, from Server 2008. The costs will include new third party software upgrades needed as well as new computer and storage hardware and new OS licenses to ensure performance and compliance.

Key efforts in managing the migration of applications to a new server operating system includes ensuring all configuration settings (folder paths, permissions, job schedules, services, user ID's, etc.) for the application are replicated in the new environment, conducting significant regression testing, managing and testing in parallel environments, and ensuring a seamless production cutover. In addition, remediation efforts to the application code can range from upgrading a 32 bit application and third party software components to its 64 bit counterpart to a full-scale rewrite of the application, as in the case of web applications being rewritten from classic ASP to ASP.Net technology.

Justification Summary:

The program is critical to ensuring the security of the environment and continued availability of the business system portfolio and protecting customer information. Remediating business applications to fully utilize the Windows Server 2008, R2 platform will ensure our applications remain functional and can be easily maintained or enhanced as needed in the future. Features provided by Windows Server 2008, R2 will enable performance and security improvements as well as allow applications to take advantage of the new features available with the Windows Server 2008 platform. Upgrading to next version of the Microsoft Windows Server operating system (Windows 2012) will begin 2016.

Supplemental Information:

- Alternatives: None. In order to remain current with Microsoft's Windows Server Operating System roadmaps, the only viable option is to ensure business applications continue to perform as expected and to implement a plan to migrate the applications to a fully supported technology platform.

- Risk of No Action: The risks of no action are:
    - Higher incremental support costs from Microsoft. The current extended support agreement from Microsoft calls for substantial increases to secure unsupported technologies, beginning at $200K annually and doubling the amount each subsequent year
    - Reduced availability of critical business applications
    - Key applications remain on an unsupported technology requiring separate support resources, technologies, and infrastructure

- Non-financial Benefits: Upgrading applications to the new server operating system platform will ensure critical corporate applications remain operational and secure. In addition, this effort will further ensure applications are developed according to the same standards which will ease the knowledge transfer between developers, and result in a more streamlined maintenance of corporate systems.

- Summary of Financial Benefits (if applicable) and Costs: N/A

- Technical Evaluation/Analysis: Each application is thoroughly analyzed and tested to determine the best approach to ensure compliance and maintainability with the targeted Windows Server operating system environment.

- Project Relationships (if applicable): Business Systems Sustainability – Desktop OS Plan and Business Systems Sustainability – Database Plan

- Basis for Estimate: IT uses historical spends for application remediation based on previous server OS upgrades for forecasting and then refines estimates based on specific applications that require remediation.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
					1,217

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						47
M&S						0
A/P						1,138
Other						32
Total						**1,217**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
1,106	**2,230**	**2,210**	**2,210**	**2,210**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	63	136	133	133	133
M&S	672	1,700	1,636	1,500	1,500
A/P	236	124	180	398	401
Other	81	162			
Overheads	54	108	261	179	176
Total	**1,106**	**2,230**	**2,210**	**2,210**	**2,210**

X	Capital
	O&M

2016 – Shared Services / Information Technology

Project/Program Title	Business Systems Sustainability – Database Plan
Project Manager	Margaret O'Donoghue
Hyperion Project Number	20756652
Organization's Project Number	2XC9721
Status of Project	Ongoing
Estimated Start Date	1/1/2012
Estimated Completion Date	12/31/2020
Work Plan Category	Oper - Critical Repair

Work Description:

This program is part of an ongoing business systems sustainability initiative to ensure that Con Edison's portfolio of over 500 applications remains sustainable in light of required changes to the version of the database supporting these applications. Con Edison's standard application architecture consists of three tiers, PC's, application servers, and a database. This program addresses the sustainability of the database tier. Microsoft and Oracle are Con Edison database standards and they typically release new database software versions every 3 years to provide enhanced security and functionality. Databases must be maintained and kept current to keep the environment secure, protect customer information, and ensure it is protected from unauthorized users.

The scope of work included in this program is to identify, test, and remediate Con Edison applications to ensure continued sustainability on the latest implementation of Microsoft's SQL Server and Oracle databases deployed at Con Edison. In 2014, Con Edison started to review business applications on the SQL Server 2005 database platform to prepare for a similar migration effort to SQL Server 2008/2012 by July 2016, the end date for Microsoft's support for SQL Server 2005 database.

Microsoft's latest version of its database is SQL Server 2014, which was released in June 2014. Upgrading to this next version of Microsoft SQL Server database will be evaluated in 2016 with a targeted remediation of applications to begin in 2016-2018.

Upgrading to the next version of Microsoft SQL Server database, SQL Server 2014, will begin in 2016 and continue through 2018. The work includes buying new computing and storage hardware and software licenses to maintain performance and compliance. It is expected that in 2019-2020 a new version of SQL server will be released and work will begin on implementing that version.

Justification Summary:

Maintaining supportable business systems is a critical role of IT. The inability to implement security fixes and upgrade applications are critical to operate the corporate and energy business. The inability to apply security patches will increase risk and expose customer data to unauthorized individuals.

Supplemental Information:

- Alternatives: None. The only viable option to reduce the risk of system downtime and the loss of customer information without incurring additional maintenance costs from Microsoft is to maintain these systems as presented in this project paper.

- Risk of No Action: The risk of no action may result in:
    - 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, beginning at $200K annually and doubling that amount each subsequent year
    - Reduced availability and security for critical business applications
    - Key applications remain on an unsupported technology

- Non-financial Benefits: The project allows Con Edison to avoid security risks from outdated and unsupported applications.

- Summary of Financial Benefits (if applicable) and Costs: N/A

- 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 through July 2019, sustaining our ability to implement timely security updates.

- Project Relationships (if applicable): Business Systems Sustainability – Desktop OS Plan

- Basis for Estimate: For forecasting, IT uses historical spends for application remediation based on previous database upgrades and then refines estimates based on specific applications that require remediation. Significant work is expected to be completed in 2016 as conversions to unsupported databases conclude. Costs are expected to rise again in 2018 as conversions to SQL 2014 will escalate.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
0	**700**	**824**	**825**		**935**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
1,061	**775**	**1,231**	**1,230**	**1,231**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	300	200	300	300	300
M&S	309	175	458	389	399
A/P	196	234	231	325	328
Other	45	36	61	63	65
Overheads	211	130	181	153	139
Total	**1,061**	**775**	**1,231**	**1,230**	**1,231**

X	Capital
	O&M

2016 – Shared Services / Information Technology

Project/Program Title	Business Systems Sustainability – Desktop OS Plan
Project Manager	Margaret O'Donoghue
Hyperion Project Number	20756670
Organization's Project Number	2XC9722
Status of Project	Ongoing
Estimated Start Date	1/1/2015
Estimated Completion Date	12/31/2020
Work Plan Category	Open - Critical Repair

Work Description:

This program is part of an ongoing business systems sustainability initiative to ensure that Con Edison's portfolio of over 500 applications remains sustainable in light of required changes to the desktop operating system. Con Edison's standard PC desktop platform configuration relies on Microsoft's desktop operating system (OS). Microsoft typically releases a new OS every 3 years to provide enhanced security and functionality for its desktop clients. Desktop OS's must be maintained and kept current to keep the environment secure, protect customer information, and ensure it is protected from unauthorized users. Business systems or applications are comprised of software running on a server and software that runs on a PC. The software that runs on the PC must be compatible with the operating system running on the PC. In the event that the PC software is not compatible with the new desktop OS then it must be upgraded or replaced. Con Edison last completed a desktop OS upgrade to Windows 7 in 2014. Windows 8.1 and Windows 10 are the latest OS's released by Microsoft.

The scope of work included in this program is to identify, test, and remediate all Con Edison applications to ensure continued sustainability on the latest implementation of the Microsoft operating system platform at Con Edison. Microsoft's latest version of its desktop operating system is Windows 8, which was released in 2012. Upgrading to Windows 8.1 operating system will be limited to tablet devices and was started in 2015. Windows 10 was released in 2015 and is the target enterprise PC OS for Con Edison. In 2016, we expect to begin the transition by remediating business application as identified below to allow a smooth transition to the OS. We expect the project to be a multiyear effort concluding in 2018. Upgrading to Windows 8.1 operating system will be limited to tablet devices and was started in 2015 and continue into 2016.

The first phase of the current effort will focus on the analysis of how the planned Windows 10 deployment will impact specific systems. Remediation plans included both temporary and permanent system solutions.

Wherever possible, permanent solutions were implemented to upgrade all components of our systems to corporate standards and vendor supported technologies compliant with the Windows 10 platform. The approach to remediate applications can include the redevelopment of some corporate applications to use the Visual Studio development environment and necessitates upgrades to the Visual Basic.Net (VB.Net) platform in order for these applications to execute and be maintained on the Windows 10 operating system.

From 2016 thru 2019, in order to remain aligned with Microsoft's support roadmap, major business system upgrades are required to comply with the planned implementation of the Windows 10 operating system. These systems are:

- CSS Call Central
- Consolidated Utility Billing System
- Retail Access Information System
- Transportation Customer Information System
- Data Warehousing Systems
- CSS Desktop
- Corporate Customer Group website
- Direct Payment (Online)
- Public Assistance Central
- Customer Data Interface
- My Account
- Agency Referral Tables
- IRIS View
- Journal Voucher Approval
- Control, Meter
- Clear Access Tracking
- Common Data System
- EDI Portal
- Retail Choice EDI Test Tool
- Installed Capacity
- ISO Reconciliation System

Justification Summary:

The efforts of the program will assist the Company to meet the Windows 10 deployment in 2018 and avoid the costs required to purchase Microsoft's Extended Support for Windows 7. In addition, remediating business applications to fully utilize the Windows 10 platform will ensure our applications remain functional and can be easily maintained or enhanced as needed in the future. Features provided by Windows 10 will enable performance and security improvements as well as allow applications to take advantage of the new features available with the Windows 10 platform.

Supplemental Information:

- Alternatives: None. Desktop software and OS's need to be maintained in order to protect company systems and information from unauthorized people as well as to protect customer information.
- Risk of No Action: The risk of no action may result in:
    - Higher incremental support costs from Microsoft. The current extended support agreement from Microsoft calls for substantial increases to secure unsupported technologies, beginning at $200K annually and doubling the amount each subsequent year
    - Reduced availability of critical business applications
    - Key applications remain on an unsupported technology requiring separate support resources, technologies, and infrastructure

- Non-financial Benefits: Upgrading applications to the new operating system will ensure critical corporate applications remain operational and secure. In addition, this effort will further ensure applications are developed according to the same standards which will ease the knowledge transfer between developers, and result in a more streamlined maintenance of corporate systems.

- Summary of Financial Benefits (if applicable) and Costs: N/A

- Technical Evaluation/Analysis: Each application is thoroughly analyzed and tested to determine the best approach to ensure compliance and maintainability with the targeted Windows operating system environment.

- Project Relationships (if applicable):
  - Business Systems Sustainability – Server OS Plan
  - Business Systems Sustainability – Database Plan

- Basis for Estimate: IT uses historical spend for application remediation based on previous OS upgrades for forecasting and then refines estimates based on specific applications that require remediation. IT has established a five year plan to ensure completion of this important effort.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
0	**625**	**941**	**857**		**149**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
1,107	**650**	**560**	**560**	**560**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	100	33	134	134	134
M&S	640	395	200	189	189
A/P	212	146	117	125	125
Other	76	48	0	0	0
Overheads	79	28	109	112	112
Total	**1,107**	**650**	**560**	**560**	**560**

X	Capital
	O&M

2016 – Shared Services / Information Technology

Project/Program Title	New Technology
Project Manager	Paul Rogers
Hyperion Project Number	1XC9802
Project Number	10025295
Status of Project	Ongoing
Estimated Start Date	1/1/2015
Estimated Completion Date	12/31/2020
Work Plan Category	Strategic - System and Component Upgrades

Work Description:

The purpose of this project is to introduce new technology to provide solutions for business requirements and improvements in productivity, efficiency, cost savings, performance and security. Information Technology (IT) technical staff interfaces with business areas and investigates trends and solutions in the IT arena for use at Con Edison. Each year new products and solutions are researched with industry experts and vendors before being evaluated, piloted and implemented in the Con Edison environment. Product selections are done in conjunction with IT strategy drivers and vision statement and in many cases, are selected for installation in the subsequent year. While technology changes are dynamic and move very quickly, it is difficult to project more than a few years out. The following work has been completed and is planned going forward:

In 2015 we expect to complete the following:

- Implement Active Directory Federated Services (ADFS) security scheme for cloud access ($150K) (Complete)
- Evaluate Windows 10 devices ($100K) (in progress)
- Evaluate and implement 2 Factor Authentication for server administrators ($175K) (Q4 2015)
- Evaluate and begin implementation of PC End Point Security ($250k) (Q4 2015)

In 2016 the following projects were planned but were not funded during the capital optimization process:

- Implement 2 Factor Authentication for remote access ($250K target date Q1)
- Complete additional work associated with Mobil Device Management / Mobil Application Management tool ($200K target date Q2)
- Evaluate new devices ($106K target date Q4)

In 2017 we plan to:

- Evaluate Data Loss Prevention (DLP) to the desktop ($125k)
- Evaluate latest biometric authentication ($100k)
- Evaluate and implement cloud gateway technology (Cisco Intercloud Technology) ($350k)
- Evaluate new devices ($138K target date Q4)

In 2018 we plan to:

- Refresh Remote Access technology ($600K target date Q4)
- Evaluate new devices ($156K target date Q4)

Justification Summary:

Technology changes continue at a rapid clip in today's business world. In order to stay competitive and operate in an efficient manner, new technology must be evaluated and implemented into the enterprise to solve business problems and maintain improvements in productivity.

New Technology projects identified in this white paper address departmental and corporate risks associated with:

- Cyber attack
- Rogue Employees
- Unauthorized access or loss of sensitive data
- Unsupported technology in computer systems

Supplemental Information:

- Alternatives: The alternative is to remain at current technology level and wait until the business processes begin to erode or fail to the point that a quick and less analytical technical decision is implemented. This would reduce the likelihood that the best selection will be made and will seamlessly operate in the environment or is sustainable going forward. If not positioned with a direction in advance static technology levels can also introduce a cybersecurity risk when products become unsupportable.

- Risk of No Action: The risk of no action will result in the current environment becoming unsupportable, unreliable and/or insecure. This occurs if technology upgrades are not introduced when necessary or when functionality becomes mainstream, resulting in opportunities for cost savings or productivity improvements potentially being lost. Internal systems that operate with less functionality or fail to interoperate with outside or new business systems prevent benefits associated with other technology projects to be realized. As other industries adopt newer technologies, Con Edison's ability to interact and collaborate also becomes a challenge. Business system rollouts, testing, monitoring and capacity planning may become problematic without investing in the latest technology.

- Non-financial Benefits: Financial savings, in many cases, are dependent on the introduction of new technology resulting from employee productivity and the ability to introduce business efficiency implements. 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. The ability to provide reliable and state of the art voice communications to employees in the office and field is another example.

- Summary of Financial Benefits (if applicable) and Costs: Financial benefits can be realized through the introduction of productivity improvements and operational efficiencies introduced by new technology. Additionally, new technology provides better remote access to resources and eliminates unnecessary travel for meetings and training. Technology associated with mobile app development will enhance field force productivity.

- 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, 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.

- Project Relationships (if applicable): Current and future business applications require infrastructure platforms and the necessary technology to develop field applications and find new devices for field crews. This project indirectly supports other IT projects with solutions to optimize investment value and ensure reliability, security and accessibility.

- Basis for Estimate: Historic purchases and Internet research are used as well as planning sessions with key vendors and internal SMEs.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
1,212	**524**	**575**	**656**		**697**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor	264	155	128	128		136
M&S	0	20	0	129		137
A/P	528	222	332	250		266
Overheads	196	130	113	101		107
Other	224	(3)	2	48		51
Total	**1,212**	**524**	**575**	**656**		**697**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
0	**750**	**900**	**900**	**900**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	0	100	98	100	100
M&S	0	535	676	683	687
A/P	0	0	0	0	0
Other	0	47	60	61	61
Overheads	0	68	66	56	52
Total	**0**	**750**	**900**	**900**	**900**

X	Capital
	O&M

2016 – Shared Services / Information Technology

Project/Program Title	Enterprise Applications
Project Manager	Terrence Walsh
Hyperion Project Number	1XC9801
Organization's Project Number	10007721
Status of Project	Ongoing
Estimated Start Date	1/1/2016
Estimated Completion Date	12/31/2020
Work Plan Category	Strat - System and Component Upgrades

Work Description:

Con Edison deploys a standard architecture for business systems and PC network access. This infrastructure operates behind the scenes but provides essential services such as how computers are named and addressed and located by other computers. This project provides upgrades to existing infrastructure applications that support the enterprise in a variety of functions such as maintaining the Intranet infrastructure, maintaining secure file exchange, electronic faxing, security for user accounts, infrastructure management, automatic call direction, and enterprise operations management. Enterprise applications such as these enable core business and information technology functions.

Work planned for 2016:

- Enterprise level monitoring tool for secure data exchanges with external stakeholders ($182K)
- Upgrade Web Services architecture ($132k)

Work planned for 2017:

- Upgrade Corporate web servers ($125k)
- Upgrade secure file transmission system (Sterling File Transfer System) ($400k)

Work planned for 2018:

- Upgrade Corporate Windows Name Services architecture ($125k)
- Upgrade Corporate Dynamic Host Control Protocol (DHCP) architecture ($200k)

Work planned for 2019:

- Replace Corporate Fax architecture ($90k)
- Increase capacity in secure file transmission system ($235k)

Work planned for 2020:

- Netscaler and Domain Name Services infrastructure upgrades ($325K)

Justification Summary:

The enterprise applications covered under this project enable many core business functions. Justification for the projects described above is as follows:

- Secure file exchange system – this system, known as Sterling File Transfer System, requires enhancement to handle a projected increase in demand for secure file transfers with trading partners. This system is used to exchange encrypted data files with partners such as banks, benefit providers, and energy service companies. Planned enhancements will increase the system's capacity and reliability and will position it to better handle new requirements such as daily file exchange requirements with the company's bill print outsourcing vendor
- Electronic faxing – this project will upgrade our electronic fax infrastructure to run on the latest server operating system. This project is required to allow migration from software that will become end of life at the end of 2015 and will allow for security patch updates
- Maintain the Corporate web site for Intranet and Internet environments. These environments host hundreds of servers used by customers and employees. It is critical that these components are sustained to allow for current browsers and other applications
- Implement new web services environment to allow for secure exchange of information from internal systems to apps developed for tablets and smart phones

Supplemental Information:

- Alternatives: An alternate option is to add load to the Sterling File Transfer System without increasing capacity, which would compromise performance and reliability for important functions such as bill printing.

  Alternatives for the remaining enterprise application projects are to allow these critical services to age past their technological and capacity life resulting in failures. This approach would increase risk due to the inability to receive security patches.

- Risk of No Action: For Sterling File Transfer System, the risk of no action is that important file exchanges may not be processed in a timely fashion as demand increases on the system. Over the past two years requirements for external file transfers have more than doubled. This also decreases the likelihood of a timely recovery from any operational events. The planned projects call for investments to increase capacity and reliability by bolstering the environment. Consequences may be significant if critical files such as those used for bill printing are delayed. Risks for the other projects involve increased exposure to cybersecurity threats due to not upgrading these environments.

  Generally these enterprise applications must be maintained to allow the continued use of business systems, the corporate network, and access to information from smart phones and tablets.

- Non-financial Benefits: The benefits of these projects are that enterprise systems continue to function in a secure and operationally reliable environment. These systems support many important business functions and the planned investments allow them to continue to meet demand in the coming years.

- Summary of Financial Benefits (if applicable) and Costs: N/A

- 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, 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.

- Project Relationships (if applicable): Current and future business applications require infrastructure platforms and IT to be available and supportable to ensure reliability, security and accessibility. This project also supports the new development of smart phone applications for customers and employees.

- Basis for Estimate: Historic purchases are used as well as vendor presentations and additional cost research. All procurements and technology selections use a formal RFP process with competitive bidding.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
977	**31**	**(5)**	**0**		**0**

Historical Elements of Expense

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
415	**525**	**325**	**326**	**326**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	65	85	40	50	50
M&S	282	356	242	232	234
A/P	0	0	0	0	0
Other	25	32	21	21	21
Overheads	43	52	22	23	21
Total	**415**	**525**	**325**	**326**	**326**

X	Capital
	O&M

2016 – Shared Services / Information Technology

Project/Program Title	IT Asset Management
Project Manager	Terrence Walsh
Hyperion Project Number	5XC9703
Organization's Project Number	10026482
Status of Project	Planned
Estimated Start Date	1/1/2016
Estimated Completion Date	12/31/2020
Work Plan Category	Strat - System and Component Upgrades

Work Description:

There are several systems included in this program and continued investment in these areas is necessary as the IT footprint increases. As the IT environment becomes more complex and business systems continue to further integrate with other systems, it is critical to keep track of asset relationships and interdependencies. In previous years the following work was completed:

- Upgrade to the Information Resources Inventory System (IRIS) to provide a full inventory of the company's LAN Rooms, LAN Cabinets, Server Rooms, Server Farms, and Telecommunication Rooms with the equipment they contain. This equipment includes batteries, battery racks, and uninterruptible power supplies (UPS'). The application also provides reporting functions for regulatory compliance regarding battery acid levels and room inspection features.

  The application was enhanced to support physical and virtual servers, routers, and switches through a full integration with the Network Operations Center (NOC) Universal Configuration Management Database (UCMDB) software as well as support completion of the annual SARA Title reports.

- Information Resources Contractor Management System (IRCMS) was developed and installed as a web-based system for managing contractors that work in IT. The system interfaces with managers, vendors, contractors, and other Con Edison employees involved in the request, selection and administration of contractors. The functions the system performs include a) acquiring a contractor b) time reporting and c) data repository. IRCMS is a central repository for bids, resumes, and contractor information which includes start/end dates, rates, Order Release numbers, hiring managers, projects assignments, etc.

  IRCMS provides a single, expeditious manner for engagement of staffing resources and related time reporting and record keeping. The latter point has proven effective in reducing costs and improving productivity as billed hours are more readily available for review and contractual analysis.

In 2016 the following work is planned:

- The development of a new system linking server and facility assets with applications to enable disaster recovery from the loss of a server farm in an efficient and prioritized fashion ($250k)

In 2017 work planned includes:

- The development of a system to track server and network assets to business systems and by extension the impact to nested business systems. ($281k)

In 2018 work planned includes:

- The development of a Software Asset Management system integrated with supply chain to track license compliance across the environment. ($225k)

Justification Summary:

IRIS currently manages over 500 network and communication rooms and 3000 pieces of physical network equipment. This equipment occasionally gets moved around or replaced and new equipment gets added to existing rooms. Updating the location of this equipment is currently a manual process. As a result of including servers and network switches, the number of individual devices that need to be managed could easily double.

The company has deployed over 550 business applications running on over 3000 servers to enable the business areas to perform essential energy delivery and corporate functions. The loss of a significant amount of those resources would impair the continued operation. This project will improve disaster recovery from an event affecting one or more server farms.

Integration with the NOC UCMDB software will automate most of the process by allowing the UCMDB software to do network discovery of devices while IRIS keeps track of their actual physical location. Through an updated Dynamic Host Configuration Protocol (DHCP) naming scheme, IRIS will be able to automatically detect when a device on the network is moved or a new one gets installed and will also be able determine its physical location. This not only reduces the manual effort involved in keeping the inventory accurate, but also eliminates most causes for user error.

IRCMS is a web-based system for managing the contractors that work in IT. The system interfaces with the Hiring Manager, vendors, contractors, and other Con Ed employees involved with contractor administration. The functions that it performs are as follows:

1. Acquiring a Contractor: When a hiring manager has a need for a contractor, they can create the scope of work on IRCMS. When they submit the scope, it will be emailed to the approved vendors. The vendors can then logon, review the bid, and submit candidates. Once the candidates are submitted, the hiring manager reviews submittals and selects the candidates. Once selected, the hiring manager submits a request for an Order Release that will automatically be forwarded to their manager for approval. Upon approval, the request is forwarded to Operations Support to issue the Order Release and the hiring manager is notified when completed.

2. Time Reporting: IRCMS is used for contractors to submit their estimated time for the upcoming month as well as their actual time sheets for the hiring manager to approve. The estimated hours submitted is used by Operations Support for the accruals for the month.

3. Data Repository: IRCMS is a central repository for the all bids, resumes, and contractor information. The contractor information includes, start/end dates, rates, Order Release, hiring manager, projects worked on, etc. Reporting can be run to see all contractors that are in IT (Staff Augmentees, Service Contractors, and Independent Assessors). The system also provides current (2015), 2016, and future year budget information.

Supplemental Information:

- Alternatives: Continue to operate disaster recovery with limited information about how assets are linked to business systems and delays in recovering from an entire server farm outage.

  IRIS: Maintaining and updating the hardware equipment inventory could be kept a manual process as in its current state. However, this has proven to be both time consuming and error prone with the current number of devices. With the addition of more device classes such as servers, routers, and switches, the efforts required to maintain the inventory could increase by an order of magnitude. This would ultimately lead to inaccurate inventory tracking.

  IRCMS: All reporting, validations, and analysis would continue to be done manually to ensure compliance with order release terms. Detailed historical information would not be available to assess vendor performance in this competitive area.

- Risk of No Action: IRIS: No action would lead to a time consuming process to obtain accurate and timely information regarding the physical location of a device. Compliance reporting for a location will be less inaccurate. Up-to-date inventorying will require every person install new equipment or perform maintenance on equipment. Updating the inventory to reflect changes will be done manually, which is time-consuming.

  IRCMS: No action will lead to an inability to provide up to date and accurate staffing contractor information for monthly financial reports and contract related administrative actions (awards, performance analysis, etc.).

- Non-financial Benefits: Allow for an efficient and timely recovery of critical business systems in the event of a server farm failure. IRCMS allows productivity improvements that would be realized through the mechanization of several steps that are currently performed manually.

- Summary of Financial Benefits (if applicable) and Costs: N/A

- Technical Evaluation/Analysis: Information Technology has inventoried assets and business systems. This information can be merged into a new disaster recovery system to accomplish the goal in a multi-year project and maintain sustainability as the assets and systems continue to grow and become more essential to operations.

  IRIS - There are currently on-going talks with members of the NOC team to find the most seamless and effective way to accomplish this integration with the UCMDB software.

  IRCMS – modifications have been identified, and estimates being evaluated.

- Project Relationships (if applicable): IRIS Full integration will only be possible once the UCMDB software is live. IRCMS Project One interfaces must be analyzed for impact.

- Basis for Estimate: Contractors used for IRIS development are hired at a fixed rate. Historic purchases and activity are considered with vendor presentations and additional cost research.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
433	**14**	**0**	**0**		**0**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
231	**281**	**225**	**225**	**225**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	55	55	55	55	55
M&S	24	32	128	133	136
A/P	103	145	0	0	0
Other	11	16	10	11	11
Overheads	37	33	32	26	23
Total	**231**	**281**	**225**	**225**	**225**

X	Capital
	O&M

2016 – Shared Services / Information Technology

Project/Program Title	Advanced Application Monitoring and Configuration Management
Project Manager	Steve Marcotrigiano / Stephanie Bailey
Hyperion Project Number	21551714
Status of Project	Planning
Estimated Start Date	1/1/2016
Estimated Completion Date	12/31/2018
Work Plan Category	Strategic

Work Description:

This program will implement tools to improve management of the application technology portfolio. Two essential categories of management tools for business applications are:

1. Monitoring and Alerting Tools: Similar to SCADA, monitoring and alerting tools identify technologies that are operating normally and abnormally. The Network Operating Center (NOC) uses monitoring and alerting tools that provide visibility into the operation of the infrastructure such as the communications network, servers and the operating system. However, the applications and databases still require significant manual problem diagnostics that are employed only after a problem is reported. Since the monitoring tools have become more sophisticated, they can now provide visibility into the performance of applications and databases.
2. Configuration Management Tools: The application portfolio continues to grow (approximately 500 business applications supported by IT) to respond to business demands. The complexity increases as a result of approximately 300 vendor components that make up any given application. The task of managing the combinations of applications and technology components exceeds the capabilities of the current inventory of tools.

Monitoring and Alerting

Monitoring and alerting are comprised of commercially available tools developed for the monitoring of hardware, network or software. Existing tools produce disparate outputs and alerts. Advanced monitoring and alerting tools will help IT anticipate applications that are reaching upper limit capacities such as available disk space or increases in processing time. These issues are often undetected until a storage space or time-out error occurs, or customers complain of long processing times for routine functions. Most application failures are reported by end users rather than receiving any warnings or predictions of problems. Advanced monitoring enables more precise problem diagnostics (i.e. specific application or database with a problem) while configuration management facilitates impact assessment by identifying all applications impacted by a particular failing component.

In order to manage the challenges described above, Microsoft's System Center Operations Manager (SCOM) will continue to be used to consolidate and manage the information. The work required for advanced application monitoring and alerting is:

1. Conduct Phase 0 analysis. This task involves defining and prioritizing the additional required capabilities, evaluating additional vendor tools and tool procurement. In addition to the

monitoring tools, SCOM Management Packs must be procured for integration between the vendor monitors and SCOM. During this phase, applications will be bundled together into manageable groups also known as releases. The subsequent design, configuration, testing and training steps will be performed for each release.

2. Design processes and configurations. This task defines rules and workflows to be configured in acquired tools and within SCOM. These rules describe the technology environment to the tools and configure the alerts. Alert configurations include tolerances and corrective actions.
3. Configure and test configurations. The solutions will likely be installed in an iterative manner to measure and control impact on the overall computing environment.
4. Revise processes and conduct training. Effective use of the tool requires changes in practices for IT staff to utilize the capabilities of the new technologies for more efficient problem diagnostics and resolution. Additional capabilities such as capacity planning and forecasting will be made possible through the advanced trending and reporting features. Training will be provided to increase employee skills in capacity planning and forecasting.

Phase 0 is expected to be completed by 4th quarter 2016 while the subsequent releases will occur throughout 2017 and 2018.

Configuration Management

In 2015 IT launched the Proactive Obsolescence Management (POM) initiative to (a) identify the list of technology components used in the application portfolio, (b) map those components to the applications that use them and (c) develop roadmaps to most efficiently upgrade applications based on the vendors' roadmaps of support for each of the technology components. While the benefits of the POM initiative are anticipated to reduce the number of application upgrades (and risks associated with them), support problem diagnostic and resolution and potentially consolidate technologies, the initiative has stretched the limits of the current Application Portfolio System (APS). In addition to providing the inventory functions of APS, commercially available configuration management systems are able to "discover" software assets and include services that regularly track vendor roadmaps of support, substantially reducing the current time and effort currently underway to manually find the vendor roadmaps. Some tools also provide for support of technology planning functions. The steps for implementation of Configuration Management are:

1. Conduct Phase 0 analysis. This task involves defining and prioritizing requirements, evaluating vendor tools and tool procurement. This task also assesses the requirements that can be satisfied by currently employed portfolio investment planning tools
2. Design data requirements and profiling. Data quality from APS will be assessed, mapped and converted to the new tool.
3. Discover software and other configuration items. The tool will be used to discover software and other components in the environment and compare to the known inventory of applications and components. Discrepancies, such as business-managed technologies, will be investigated and resolved.

Justification Summary:

This initiative supports several of the corporate strategic drivers:

- Improve reliable service: The forecasting capabilities of the monitoring and alerting tools will help IT anticipate applications that are reaching upper limit capacities such as available disk space or increases in processing time. These issues are often undetected until a storage space or time-out error occurs, or customers complain of long processing times for routine functions. For example, in spring of 2014, customers began complaining about time-outs in MyAccount, the internet, customer self-service application. There was no trend information

available to determine whether a condition changed in MyAccount or one of its interfacing applications, whether the response times had been deteriorating over time or whether other applications were experiencing similar issues. Monitoring would have provided trend information for all of the critical applications and would have alerted IT before the problem began resulting in time-outs. Instead, a team from database administration, application services, server/storage and others worked from June until October and brought in a consultant to try to diagnose and resolve the issue(s). The team and consultant emphasized that there were no adequate tools on site for the diagnostics and were forced to build custom monitors on a very limited set of applications. Most application failures are reported by end users rather than receiving any warnings or predictions of problems. Monitoring enables more precise problem diagnostics (i.e. specific application or database with a problem) while configuration management facilitates impact assessment by identifying all applications impacted by a particular failing component.

- Reduce and manage risk: Applications used to plan and manage work including Electric Work Management, Maximo, COMPASS, SOMIS, as well as other critical applications will be able to be managed against performance criteria, decreasing the likelihood of productivity loss due to application outages.
- Reduce cost to customers: In 2013, the company expended approximately $2.2 million upgrading IT supported applications using Microsoft's .Net framework product, which reached end-of-life. In 2014 and 2015, the company expended approximately $470,000 upgrading applications for the expiring WinServer 2003 operating system. The introduction of POM in 2015 and the configuration management tools will help avoid these redundant upgrades that prevent both IT and business resources from addressing the backlog of more value-added work.
- Enhance external relations: The tools will be used with internet-facing applications providing a better experience for customers and suppliers. As mentioned previously, MyAccount is a customer-facing internet application; Oracle EBS has a vendor-facing module as does TeamCenter.
- Strengthen and Develop Employees: This proposal includes training in capacity planning and forecasting which would be available to application services developers, database administrators, and server/operating system/NOC technicians.
- Strengthen company processes: 60% to 70% of the time of Application Services staff is spent on maintaining and supporting existing applications. Alerting and monitoring will reduce the diagnostic effort while configuration management reduces impact analysis. As a result of its discovery capabilities, configuration management will also identify business-managed technologies on the company infrastructure that are currently omitted from the application portfolio inventory. Advanced monitoring and configuration management will allow IT to better manage the inventory of applications and increase the efficiency and effectiveness of its operations. It should reduce unscheduled business disruptions while eliminating duplication of effort in application functionality and providing a means to plan and coordinate upgrades more effectively.

Supplemental Information:

- Alternatives:
  - Continue to use existing vendor monitoring tools. This model is limited because it continues a decentralized, reactive approach to application monitoring. It does not provide a means to identify impact to applications caused by computing resources problems.
  - Build monitoring capabilities as new applications are added. This alternative has been used on a case by case basis as new applications have been introduced. The turnover of the application portfolio is very slow and the failure of a single application can impact a large part of the environment.

- Redevelop custom applications. The APS system can be redeveloped but would exclude vital functionality including software discovery and technology lifecycle and support roadmaps.

- Risk of No Action:
  - As the application portfolio continues to increase so will the problem diagnostic and resolution time. With the growing number of complex integrations with vendor/third party components, a system outage could impact multiple applications.
    - Limited monitoring and alerting capability at the application level
    - Limited capability to centralize collection of alerts from multiple sources
    - Continue with a more reactive approach to problem identification
    - Unable to measure how changes to applications and computing resources impact application performance

- Non-financial Benefits:
  - Better planning of technology capacity
    - Centralizing collection of alerts from multiple sources facilitates problem resolution.
    - Capturing of historical data enables better planning for future growth of computing resources.
    - Creating baseline performance metrics allows application changes to be measured against the baseline.
  - Better strategic planning through matching of technology capabilities to future business needs.

- Summary of Financial Benefits (if applicable) and Costs:
  - Cost avoidance resulting from reduced problem diagnostic and resolution and redundant upgrades to be determined.

- Technical Evaluation/Analysis:
  - Benchmarks with UNITE (utility IT benchmarking organization) reveal that the company scores at a moderate and declining level of maturity with respect to impact analysis and at a low level of maturity with respect to knowledge management (information about our assets).
  - Research through Gartner, the CIO CEB and various vendor presentations provided insight into well-established, commercially available tools.

- Project Relationships (if applicable):
  - Capital project and portfolio investment management tools may potentially be leveraged for part of the solution and/or may require interfacing.

- Basis for Estimate:
  - The monitoring and alerting estimates are based on experience with newer applications that were built with monitoring and alerting as part of their specifications. There are over 80 production applications identified as highly critical that were placed in service over five years ago, prior to the maturation of the recent and more sophisticated application monitoring tools. This project will provide funding to implement monitoring into these applications based on their relative complexities.
  - The configuration management tool funding would support the acquisition of the tool and the setup and conversion of legacy portfolio data. These estimates are based on high level cost ranges provided by various toolset vendors.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Actual 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Actual 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
922	**1,490**	**1,490**		

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor	120	120	124		
M&S	151	446	446		
A/P	409	500	500		
Other	152	334	334		
Overheads	90	90	86		
Total	**922**	**1,490**	**1,490**		

X	Capital
	O&M

2016 – Shared Services / Information Technology

Project/Program Title	Desktop Infrastructure
Project Manager	Paul Rogers
Hyperion Project Number	1XC9803
Organization's Project Number	2XC2300
Status of Project	Ongoing Program
Estimated Start Date	Jan 1 2016
Estimated Completion Date	Dec 31 2020
Work Plan Category	Strat - System and Component Upgrades

Work Summary:

Introduce and maintain a standard desktop set of tools that incorporate the latest technology to improve productivity, efficiency and collaboration while providing ease of use and access from any device. The standard operating system (OS) is the cornerstone to the business systems and data we use at Con Edison. Windows 7 deployment is the current desktop standard. This project will streamline the delivery and maintenance of third party tools such as Office, Visio and Project and client server business applications from any computer through the use of virtualization. A library of virtual applications will be available for immediate downloads from any PC internally or externally through a virtual desktop. User content (home directories, My Documents, search engine) will be available from anywhere to notify users of what content they own and where to easily find what they need.

The following projects were targeted for completion in 2015:

- Deploy Microsoft Windows 8.1 to new tablets ($100K Q2) Complete
- Expand Yammer to selected business organizations ($50K Q3) Complete
- Target Virtual Desktop Infrastructure (VDI) deployment ($300K Q4)
- Implement Active Directory Federated Services ($206K) Complete
- Pilot SaaS cloud office products ($156K Q2) Complete
- Implement cloud storage for employees ($400K target date Q2) Complete
- Evaluate and implement Tanium host protection on PCs ($150K target date Q4)

The 2016 plan includes:

- Pilot Windows 10 ($121K target date 2016Q4)
- Implement latest Citrix remote access solution to support additional users ($571K target date 2016Q4)

The 2017 plan includes:

- Implement Scripting management application ($332K target date 2017Q4)
- Windows 10 desktop remediation ($200k)
- Implement Active Directory Password Management Tool ($250K target date 2017Q4)

The 2018 plan includes:

- Implement Non Windows Patch Management System ($353K target date 2018Q4)
- Begin desktop conversion to Windows 10 ($350k)

The 2019 plan includes:

- Evaluate total native access to corporate applications via any device anywhere

Justification:

This program will provide the latest productivity and collaborative desktop tools for employees to access and process information and more efficiently perform business functions in a secure fashion. It enables secure desktop environment to share information with external partners as well as provide collaborative sites for internal files sharing and team activities. In addition, it makes all third party applications and business applications available without being resident on every device and efficiently manage license use while improving operational processes by enabling a single version of software to be maintained and streamed to users as needed. The program also has the potential to reduce requirements to patch 15,000 PCs and disrupt the operation in doing so, enable employees to work anywhere from any device and provide the capability to display and search user content to avoid recreating work and preventing versioning inefficiencies.

Desktop Infrastructure projects identified in this white paper address departmental and corporate risks associated with:

- Cyber attack
- Significant IT projects
- Failure of critical business application
- Unsupported Technology in Computer Systems
- Unauthorized Access or Loss of Sensitive data

Supplemental Information:

- Alternatives: The alternative is to remain on the current desktop environment with limited options for software deployment. This has the potential to introduce severe cybersecurity risks as a result of running older, unsupported software.

- Risk of No Action: The risk includes allowing current environment to become unsupportable and introducing performance concerns, reliability problems, and certain cyber security risks. As other industries adopt newer technologies, Con Edison's ability to interact and collaborate with these organizations will become a challenge. Business system rollouts will become problematic without investing in modern desktop environments and remote desktop capability.

- Summary of Financial Benefits and Costs: Beginning in 2014, the efforts in this project have enabled the Company to delay computer replacements due to obsolescence from 5 years to 6 years. This has resulted in savings of $850k per year in the XM10 computer equipment budget item. This is accomplished by virtualizing desktops and applications to offload processing on the local PC.

- Non-Financial Benefit Explanation: This program provides the latest productivity and collaborative tools for employees to perform business functions in a secure fashion. It provides the capability to display and search user content to avoid recreating work and preventing versioning problems. It enables secure desktop environment to share information with external partners as well as provide collaborative sites for internal file sharing and team activities. In addition it makes all third party applications and business applications available without downloading to each device and efficiently manages license use. Improved operational processes can be realized by enabling a single version of software to be maintained and streamed to users as needed and in certain cases, helps avoid a requirement to patch 15,000 PCs and disrupt the operation in doing so.

- Technical Evaluation and 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, 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

- Project Relationships: 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

- Basis for Estimate: Historic purchases are used as well as vendor presentations and Internet sources.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
1,554	**1,023**	**983**	**1,183**		**1,362**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor	86	116	90	342		387
M&S	0	0	0	334		378
A/P	1,290	1,352	813	226		279
Overheads	114	174	79	274		310
Other	64	-619	1	7		8
Total	**1,554**	**1,023**	**983**	**1,183**		**1,362**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
692	**782**	**703**	**703**	**704**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	264	188	180	175	175
M&S	231	440	388	410	418
A/P	0	0	0	0	0
Other	21	39	34	36	37
Overheads	176	115	101	82	74
Total	**692**	**782**	**703**	**703**	**704**

X	Capital
	O&M

2016 – Shared Services / Information Technology

Project/Program Title	Collaboration Tools
Project Manager	Terrence Walsh
Hyperion Project Number	1XC9800
Organization's Project Number	10025293
Status of Project	In Progress
Estimated Start Date	1/1/2016
Estimated Completion Date	12/31/2020
Work Plan Category	Strat - System and Component Upgrades

Work Description:

This project provides an environment for employees to collaborate and communicate using the latest desktop and office tools by:

- Enabling employees and teams to collaborate and share information in an efficient and organized fashion
- Improving productivity through efficient workflow tools
- Minimizing duplication and dated files through efficient use of computing hardware and network assets
- Improving communications among employees by providing other alternatives to email and traditional telephone

Beginning in 2018 we expect the expansion of mobile applications increase as traditional work offices evolve into less formal office settings, enhancing mobility, and more into team collaboration environments.

Work planned in 2016:

- Upgrade Help Desk Portal ($400K)
- Additional Licenses for Polycom ($100K)

Work planned in 2017:

- Upgrade Corporate SharePoint environment ($250k)

Work planned in 2018:

- Introduce enterprise level social network software to enable new office processes and improve office efficiency ($400k)
- Develop and implement new smart phone applications to provide access to the latest employee and customer devices ($500)

Work planned in 2019:

- Continue plan to develop and implement new smart phone applications to provide access to the latest employee and customer devices ($900)

Work planned in 2020:

- Continue plan to develop and implement new smart phone applications to provide access to the latest employee and customer devices ($900)

Justification Summary:

Implementation of these technologies will maximize employee productivity through collaboration and workflows. It will provide trusted outside entities with a secure method to access limited but required information without requiring a Con Edison network ID and provide improved methods of communications among mobile employees.

In addition, the following risks will be addressed:

- Unauthorized access or loss of sensitive data
- Unsupported technology in computer systems
- Development, attraction and retention of employees

Planned projects include:

- PDA Video Streaming
- Video conferencing
- Video presentation solution
- External SharePoint sites
- New personal device applications
- Enterprise Instant Messaging architecture
- Web Conferencing
- Electronic Whiteboarding and file collaboration

Supplemental Information:

- Alternatives: The alternative is to continue operating through the current process with centralized offices supplemented with travel to and from meetings as required, the costly use of paper, and inefficient workflows used for approvals and record keeping.

- Risk of No Action: No action would likely result in the loss of important paper records, delays in getting correct information and project deliveries because of scheduling conflicts, loss of productivity from the dated office toolset, resulting in an inefficient workforce and office processes. No action would ultimately lead to the loss of savings associated with improved access to personnel resources and information.

- Non-financial Benefits: The proposed projects will provide the following benefits:
    - Faster access to the real-time video and information
    - Improved office workflows and access to SMEs
    - Improved employee skill sets
    - Enabled flexible labor sourcing options through the latest office toolset

- Summary of Financial Benefits (if applicable) and Costs: N/A

- 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, 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.

- Project Relationships (if applicable): Projects selected are used by all employees to improve the ability to deliver business value on selected projects during planning, design, and implementation phases. These projects support the "Way we Work" principles by enabling teams and open communication.

- Basis for Estimate: Historic purchases are used as well as vendor presentations and additional cost research.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
637	**493**	**0**	**0**		**0**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
461	**251**	**901**	**901**	**901**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	27	11	51	158	158
M&S	307	166	685	615	622
A/P	76	48	70	0	0
Other	34	19	67	55	55
Overheads	17	7	28	73	66
Total	**461**	**251**	**901**	**901**	**901**

X	Capital
	O&M

2016 – Shared Services / Information Technology

Project/Program Title	Computer and Communications Accounting System
Project Manager	Terrence Walsh
Hyperion Project Number	6XC9817
Organization's Project Number	10026728
Status of Project	In Progress
Estimated Start Date	1/1/2015
Estimated Completion Date	12/31/2017
Work Plan Category	Strat - System and Component Upgrades

Work Description:

The Telecom Central intranet application is used to manage the workflow of service requests for CECONY and O&R for all wireless and landline telecommunication devices including cell phones, smart phones (current standard is iPhones), Voice over IP (VoIP) phones, pagers, radios, air cards, and ancillary features and services. Telecom Central is also the centralized repository to manage the inventory of Orange & Rockland wireless devices. Telecom Central provides wireless device inventory data to the TEMS system for cost allocation to O&R accounts.

The Computer Cost Central (CCC) intranet application provides a comprehensive repository of computer hardware and software inventory. CCC has the capability to track usage of software licenses for software licensed on an installed copy basis. CCC also provides computer and software use information to TEMS for hardware maintenance and software license cost allocation to organizations based on inventory and usage information.

Telecom Central and Computer Cost Central will be enhanced to provide published report dashboards for cost control. Reports will be developed to manage billing and inventory exceptions for CECONY and O&R. This new functionality is the key to maintaining accurate inventories for cost control and allocation to the proper sections and the foundation for cost control. Other elements of work planned are described below:

Work expected to be completed in 2015:

- SCCM 2012 data source upgrade (Completed)
- New cost control information reporting dashboards (Completed)
- Additional cost allocation mechanisms (Completed)
- Capabilities to manage computers using Unix/Linux operating systems extension (Q4 2015)
- Software license management using Active Directory data expansion (Completed)

Work planned in 2016:

- Active software use tracking with SCCM
- Data storage cost repositories for servers, Exchange and SharePoint
- Storage use reporting
- Simple equipment disposal tracking process

Work planned in 2017:

- Disk wiping system for cyber security integration
- Budget planning module
- Telephone landline inventory control

Justification Summary:

The objective of the Telecom Central and Computer Cost Central applications is to provide Company operations personnel and management with better transparency and insight into costs across operational groups and systems, specifically in the areas of IT and Telecommunication asset and cost management.

Supplemental Information:

- Alternatives: Maintain inventory in off-line databases (Excel, Access, etc.). This is not a recommended solution as it does not provide the built in security and research capabilities that the Telecom Central and Computer Cost Central systems currently offer.

- Risk of No Action: The risk of no action includes the inability to provide operating organizations with information related to telephony and wireless usage and costs. This would also affect the Company's ability to track leases assets and investigate misuse of the assets.

- Non-financial Benefits: Accurate inventories will provide information related to technical end-of-life and maintenance and disposal requirements.

- Summary of Financial Benefits (if applicable) and Costs: N/A

- Technical Evaluation/Analysis: As enhancements are identified, each is analyzed for productivity, cost, and schedule impact and prioritized accordingly.

- Project Relationships (if applicable): SCCM 2012 – Computer Cost Central will be modified to interface with SCCM 2012 (in progress) to the new computer and software data collection structure. Computer Cost Central will be integrated with computer disk wiping system.

  Blancco – Computer Cost Central will be modified to interface with Blancco to verify destruction of sensitive and confidential data prior to equipment disposal.

- Basis for Estimate: Project scoping and historical efforts are used as well as vendor presentations and additional cost research.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
129	92	100	38		112

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
92	**113**			

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor					
M&S					
A/P	83	103			
Other	7	9			
Overheads	2	1			
Total	**92**	**113**			

X	Capital
	O&M

2016 – Shared Services / Facilities and Field Services

Project/Program Title	4 Irving Place - Re-Stacking (Local Law 26)
Project Manager	Jenny Brito
Hyperion Project Number	PR.21511284
Organization's Project Number	PR.6XB8300
Status of Project	Planning and Engineering
Estimated Start Date	01/2016
Estimated Completion Date	12/2018
Work Plan Category	Regulatory – Agency Mandated

Work Description:

In terms of expenditures and time, the largest and most complicated regulatory requirement project involves compliance with NYC Department of Buildings Local Law 26 (LL26). LL26 requires full sprinklering, which is a water-based fire suppression system, of office buildings 100 feet or more in height no later than July 1, 2019. Under this law, water-based sprinkler systems are required in all office areas and other areas such as electrical closets, mechanical/fan rooms, computer/LAN/UPS rooms, and tower stages of buildings. Note that LL26 is based on recommendations made by the World Trade Center Building Code Task Force in February 2003 and signed into law by Mayor Bloomberg on June 24, 2004. LL26 implements this requirement through amendments to the NYC Building Code and Fire Prevention Code.

At the present time, the Company has determined that the most efficient means for meeting the LL26 requirement is to continue to install the required sprinkler systems for a certain number of floors each year between now and 2019. The Company is undertaking its plan to install the required sprinkler systems in conjunction with the Company's conversion of floors at 4 Irving Place to open-office plan arrangements (which, in and of itself, would require sprinkler systems). Note that as floors are de-compartmentalized from discrete square footage spaces to larger open spaces, the NYC Building Code requires that sprinkler systems be installed, regardless of the requirements of LL26, which calls for sprinklering of all buildings greater than 100 feet in height.

The Commission has approved the Company's proposed compliance plans with LL26 in the Company's recent electric, steam and gas cases.

The Company has developed a plan to install required sprinkler systems in conjunction with the conversion of floors at 4 Irving Place to restack the building (realign adjacencies) to improve synergies, and renovate to provide more flexibility. At the present time, office renovation and associated sprinklering projects have been mostly completed on most floors: Basement, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 15th, portions of the 17th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, and 27th floors and the stages. Other projects considered part of restacking are Flatbush 4th, 6th and 7th floor renovations and the Van Nest Server Farm that were completed in 2011.

The remaining schedule through 2018 is:

2016 - Complete the 16th, 17th and 19th floors
2017 - Complete the 14h and 18th floors
2018 - Complete all remaining miscellaneous electrical and mechanical equipment rooms and closeout.

Justification Summary:

Restacking - Currently, when the Company renovates a floor, it temporarily relocates the affected employees to another part of 4 Irving Place and also possibly outside Company facilities. This is because it is logistically difficult or practically impossible to maintain employees in their current work area during the renovation process. This is due to the physical arrangements of ceilings and other building infrastructure and the presence of environmentally sensitive materials (such as lead and asbestos) that need to be addressed during the renovation process.

Note that it would be neither safe nor practical or efficient to perform the required renovation and sprinkler installation during off-shifts, when personnel have vacated the space, and allow the affected personnel to return to work during their normal work hours (thereby requiring a set-up and take-down of the work area on a daily basis). Most importantly, the safe removal of environmentally sensitive materials while the area is occupied is logistically extremely difficult. Having personnel completely vacate the space until the renovation (and any required abatement) is finished enables the Company to completely abate the environmentally sensitive materials in a safe and efficient manner.

Supplemental Information:

- Alternatives: There are no realistic alternatives. Other implementation methods such as installing exposed pipe on un-renovated floors were evaluated but these options were not chosen; exposed pipe installed below a hung ceiling is unsightly in a commercial building, while installing such pipe above a ceiling would be disruptive to tenants and require that ceilings/lighting be taken down and then reinstalled, requiring abatement of environmental materials such as asbestos in the spaces above hung ceilings. In addition, furniture would need to be stored and tenants relocated during this abatement process and new carpeting would need to be installed as it would become contaminated.

- Risk of No Action: This project addresses a NYC DOB local law that the company continues to be compliant with. Failure to comply with Local Law 26 will subject the Company to penalties and fines.

- Non-financial Benefits: Complying with LL26 in an efficient manner is one of the advantages of the open plan renovations that the Company has been doing for the last ten years or so. Con Edison's policies emphasize open communication and working in teams, and the open plan concept reflects and supports this management approach. The renovations that are undertaken are complete slab-to-slab projects that look to bring the floors to the energy efficiency and space use standards for new office buildings. The focus is on providing a productive work environment that is easy to maintain and that will require minimal additional investment for many years into the future.

  We would note that much of the Facilities infrastructure at Irving Place is outdated and not energy efficient. The air conditioning system is essentially unchanged since it was installed in the 1950's and, as such, has inefficient temperature controls. As part of the renovations, all the distribution ductwork back to the source at the fan room and all the controls, including a Variable Air Volume ("VAV") system that varies the air flow depending on need, are installed. The controls installed on all the new floors are the latest technology and are tied in with a building management system that monitors and controls performance. Similarly, lighting is completely

replaced with an energy-efficient system that responds to a central controller and dims at the perimeter to respond to available daylight. All data lines are replaced and now we use VoIP ("Voice over Internet Protocol") technology that would be difficult to install retroactively on an existing floor. All renovated floors have wireless access.

During the years that the open office furniture systems have been in use, there have been changes to the employee population, including additions and deletions to departments and moves of whole groups of people. All changes that are necessary to reflect these alterations and changes to department sizes are accomplished simply by moving employees among workstations. Occasionally, the furniture layout has to be reconfigured, which is done also very easily. There is absolutely no need for physical reconstruction. Because the furniture system selected uses only two types of workstations, these changes can be achieved quickly and seamlessly, and at a minimum cost.

Another important benefit is environmental. The floors are designed to use energy efficient products. In addition, renovated floors are completely abated as part of the demolition process, and all asbestos and lead-containing paint are removed. Because there are no interior walls separating groups and defining offices, use of metal stud and drywall is minimal. Because the design provides for clear open spaces, there are no offices and thus, any painting is only required of perimeter walls and the building core walls. This minimizes the amount of paints used and thus VOC's ("Volatile Organic Compounds") emitted to the atmosphere. As we have standardized on colors and finishes, the vendor has agreed to maintain our selections in the line for the duration of the contract and subsequent contracts; this minimizes paint storage and waste.

- Summary of Financial Benefits (if applicable) and Costs: See above.

- Technical Evaluation/Analysis: The sprinklering work is critical to the implementation of the plan to remain compliant to Local Law 26. The law explicitly mandates the installation of a fire suppression system using water discharged from a sprinkler system. The Facilities Engineering team has conducted studies and field visits to various buildings in NYC, including the Empire State Building, and everyone interprets the Law that sprinklering is a must. There is no alternative to this type of implementation.

- Project Relationships (if applicable): None

- Basis for Estimate: The current costs per square foot that are being used in estimates going forward are higher than that of previously renovated floors. The increase can primarily be attributed to the change in market conditions, which increased the costs associated with the construction trades. There was also a change in the original scope of the project, which now includes replacing the perimeter HVAC units, mechanical systems and fan rooms during renovation. The engineering designs for the floors are now more detailed, incorporating lessons learned.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
31,935	**20,924**	**17,261**	**33,685**		**20,066**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor	2,024	1,695	655	1,241		1,034
M&S	3	1,713	1,460	2,459		1,422
A/P	20,586	11,885	10,232	20,145		11,740
Other	9,322	5,631	4,914	9,840		5,870
Total	**31,935**	**20,924**	**17,261**	**33,685**		**20,066**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
39,000	**39,000**	**19,000**	**0**	**0**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor	1,893	1,893	583		
M&S	3,053	3,053	940		
A/P	24,685	22,650	10,075		
Other	33	33	11		
Overheads	9,336	11,371	7,391		
Total	**39,000**	**39,000**	**19,000**	**0**	**0**

X	Capital
	O&M

2016 – Shared Services / Facilities and Field Services

Project/Program Title	Facilities Buildings and Yards - (Safety Environmental Regulatory)
Project Manager	Leo Palmer
Hyperion Project Number	PR.21384630
Organization's Project Number	PR.6XBVarious
Status of Project	Planning and Engineering
Estimated Start Date	Ongoing
Estimated Completion Date	Ongoing
Work Plan Category	Regulatory – Agency Mandated

Work Description:

The capital exhibit lists all projects planned in the category. These projects address potentially unsafe conditions and environmental issues as well as local, state and federal regulatory requirements, and are generally required for compliance with OSHA, the NYSDEC and other regulatory agencies. They include:

- Installation of Fall Protection/Guardrails on the Roofs of Various Regional Buildings of Facilities, estimated to be approximately $1.5 million in 2017 and $587 thousand in 2018.

- Fire Alarm/Sprinkler Alarm Improvement Program is based on the FDNY Technical Management Bulletin 03/2012, which discusses the process for obtaining letters of approval ("LOA") for fire alarm/sprinkler systems in New York City. The program will upgrade systems at Astoria, Irving Place, and at Bruckner Blvd, Van Nest and College Point Blvd Service Centers and add smoke detectors, horns/strobe audible/visual notification devices, tamper and flow switches and will bring the locations in compliance with the appropriate fire codes. The cost of the program is estimated to be approximately $1.0 million in 2017, $1.9 million in 2018 and 1.0 million in 2019.

- Replacement of an oil-filled Pad Mounted Transformer at Van Nest to prevent potential oil spills to the sewer at a capital cost of $0.7 million in 2019. This project installs a new 480V dry type transformer to feed equipment that is currently connected to the oil-filled transformer. The project will not only reduce the size of the existing transformer but also relocate it to the inside of the building. The new 480V distribution system will include new disconnect switches, new 800A distribution switch, local disconnect switches and wiring.

The three projects mentioned above are examples of larger type jobs in this category. There are smaller cost projects, such as a such as upgrading the room 165 tech lab ventilation at Van Nest at a cost of $75,000 and bracing an office ceiling at Cleveland Street at a cost of $35,000.

Justification Summary:

This category of projects addresses safety, environmental, and regulatory compliance concerns for the Company. They are required to address potentially unsafe conditions and environmental issues and to ensure that Facilities systems comply with the latest local, state, or federal regulatory requirements and building codes. These projects may also be needed to respond to various Company audits, Independent Monitor recommendations or, Ombudsman commitments. It is the intent of the Facilities Capital Improvement Program to address and mitigate issues and concerns associated with projects identified as "Safety Environmental Regulatory" as early as possible and reasonable.

Supplemental Information:

- Alternatives: None; as not correcting such issues may lead to potentially unsafe conditions, environmental concerns, fines, violation orders, and regulator non-compliance.
- Risk of No Action: Potentially unsafe conditions will continue, as will environmental issues and potentially lead to fines and violation orders and regulator non-compliance.
- Non-financial Benefits: These projects address safety, environmental and regulatory issues.
- Summary of Financial Benefits (if applicable) and Costs: The modest jump in budgeted costs in 2019 and 2020 is attributed to the wind-down of the Irving Place LL26 Restacking program, which allows funds and capital expenditures to be directed to this program, whose projects list continues to grow.
- Technical Evaluation/Analysis: See above and projects in capital exhibit.
- Project Relationships (if applicable): See above.
- Basis for Estimate: Engineering estimates/Engineering Support Requests.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
3,340	**7,465**	**5,569**	**2,837**		**2,000**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor	209	605	211	353		419
M&S	277	611	471	33		85
A/P	1932	4240	3302	1547		483
Other	922	2009	1585	904		1013
Total	**3,340**	**7,465**	**5,569**	**2,837**		**2,000**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
2,500	**2,500**	**2,500**	**5,000**	**5,000**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor	591	591	591	1182	1182
M&S	129	129	129	257	257
A/P	912	904	955	1839	1944
Other	51	51	51	102	102
Overheads	817	825	774	1620	1515
Total	**2,500**	**2,500**	**2,500**	**5,000**	**5,000**

X	Capital
	O&M

2016 – Shared Services / Facilities and Field Services

Project/Program Title	Facilities Critical Infrastructure Short Term Priority/Programs
Project Manager	Leo Palmer
Hyperion Project Number	PR.21381032
Organization's Project Number	PR.6XB8900
Status of Project	Planning and Engineering
Estimated Start Date	Ongoing
Estimated Completion Date	Ongoing
Work Plan Category	Operational – Critical Repair

Work Description:

These capital projects are intended to maintain and improve on overall conditions at the buildings and yards and are intended to upkeep the facilities. The program addresses efficiency improvements and/or equipment modernization or upgrades and projects that are evaluated/prioritized based on facility assessments. These projects generally involve yard paving/resurfacing, HVAC systems nearing the end of their expected useful life, bathroom/locker room renovations, emergency generator replacements, lighting upgrades, and elevator upgrades. Projects are listed in Critical Infrastructure either as a result of a completed ESR or program assessment or as a placeholder based on engineering or historical knowledge of the systems and equipment (e.g., since the expected life of a Freon-based HVAC system is approximately 20 years, units that are 15 years or older will be listed in the five year plan). A completed Engineering Service Request (ESR) provides a scope of work and budgetary order of magnitude cost estimate required to address a particular system problem.

Note that there are currently over two hundred projects currently identified in this category. These include:

- Cleveland Street - Men's Bathrooms/Locker rooms renovation - $0.55 million.
- Flatbush Ave – Sidewalk Replacement - $1,063 million.
- Van Nest Building 1 – Air Handler Replacement - $2.50 million.
- Irving Place – Primary Air Handler Replacement (PA – 4) - $0.5 million.
- Irving Place – Building Management System Upgrade - $1.0 million.
- Astoria - Transportation Building 2nd Floor Renovation/HVAC upgrade - $1,285 million.
- College Point - Gates 2 & 3 & Main Gate - Guard Booth Replacements - $0.2 million.
- Cleveland Street – Yazaki Absorption Unit Replacement - $1.5 million.
- Irving Place - Load Bank for EDG Testing- $1.5 million.

Projects address critical infrastructure, business continuity and infrastructure issues in the Company headquarter buildings, work-out centers and yards, and customer service centers that require almost an immediate response.

Justification Summary:

Most of the building structures of Facilities are fifteen to twenty years old with certain locations, such as Cleveland Street and Rye Service Centers, constructed over sixty years ago. Equipment associated with

operating these facilities, along with its infrastructures, has aged and reached a point where it is no longer economical or practical to continue to repair. Heating, ventilating and air-conditioning (HVAC) equipment, in most cases, is close to twenty years old and has outlived it useful life. This equipment should be gradually replaced with more efficient systems that utilize more environmentally friendly refrigerants. Interior offices, in certain cases, do not meet current space-use, NYC or Westchester Building Code or present day industry life-safety standards.

Supplemental Information:

- Alternatives: Other than to address Safety, Environmental or Regulatory issues, Facilities projects are initiated because they are deemed necessary to maintain the structural integrity of the Facilities' buildings, to allow them to operate as designed, or to protect critical equipment (e.g. corroded/thin-walled chilled water piping, as indicated during ultrasonic testing ("UT"), high maintenance HVAC systems; LAN Room AC Installations). These projects are added to the Facilities Capital List and are selected and undertaken as Engineering Service Request ESRs are completed and programmatic assessments, such as the roof inspection program, Engineering Service Request EDG/electrical assessment program, bathroom assessment program, HVAC assessment program and facade assessment program, are performed and provide their recommendation. During the ESR process and with each assessment program, problems are thoroughly evaluated and the most cost effective means of proceeding is undertaken.

- Risk of No Action: Some projects, despite planning, and preventative maintenance, may be identified when systems, equipment, and components are at or close to failure. These projects that address replacement of critical infrastructure may then need to be completed in a quick time frame or the associated building integrity will be affected (e.g. Van Nest Building 1 Air Handler Unit, West End Avenue Cooling Water Piping Replacement Projects, Flatbush Sidewalk Replacement, etc.)

- Non-financial Benefits: These projects are generally associated with correcting critical infrastructure issues in the various buildings of Facilities and are intended to be addressed prior to equipment failure or on a programmatic basis. They may in some instances be associated with Business Continuity.

- Summary of Financial Benefits (if applicable) and Costs: Not applicable. By studying, evaluating and assessing the condition of its equipment and systems, and developing work scopes and cost estimates, categorizing and prioritizing its projects accordingly, Facilities develops an understanding of where and when to most efficiently allocate its funding and personnel resources. The short and long term/five year program established by Facilities ensures that the project are done at the best time to avoid further equipment/system deterioration, which will eventually/potentially lead to higher capital replacement costs. Facilities meets on a weekly and monthly basis to review its portfolio of projects which helps the Department best allocate resources to keep projects on track and costs under tight control.

- Technical Evaluation/Analysis: These projects are intended to be performed each year in order to maintain and improve on overall conditions at the Facilities buildings and yards and may be required on a critical short term priority basis or as a programmatic improvement. The program may also address efficiency improvements and/or equipment modernization or upgrades and projects are evaluated/ prioritized based on facility assessments, along with Hurricane Hardening projects. These projects generally have to do with Yard Paving/Resurfacing, HVAC systems nearing the end of their normally useful life, general office renovations, EDG and electrical upgrades, elevator upgrades, window replacements, security improvements, fire alarm systems, etc.

- Project Relationships (if applicable): None.

- Basis for Estimate: Engineering estimates/Engineering Support Requests.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
15,962	**9,775**	**11,775**	**14,981**		**12,962**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor	1,012	792	447	552		2,019
M&S	2	800	996	1,094		290
A/P	10,288	5,553	6,980	8,959		4,997
Other	4,660	2,630	3,352	4,376		5,656
Total	**15,962**	**9,775**	**11,775**	**14,981**		**12,962**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
13400	**12,000**	**15,000**	**17,500**	**18,000**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor	1,792	1,873	2,274	2,608	2,673
M&S	192	200	243	279	286
A/P	6,939	5,551	7,348	8,270	8,853
Other	836	873	1,060	1,216	1,248
Overheads	3,641	3,503	4,075	5,127	4,940
Total	**13,400**	**12,000**	**15,000**	**17,500**	**18,000**

X	Capital
	O&M

2016 – Shared Services / Facilities and Field Services

Project/Program Title	Facilities Buildings and Yards - (Roof Replacement Program)
Project Manager	Leo Palmer
Hyperion Project Number	PR.21384633
Organization's Project Number	PR.6XB9200
Status of Project	Planning and Engineering
Estimated Start Date	Ongoing
Estimated Completion Date	Ongoing
Work Plan Category	Operational – Critical Repair

Work Description:

These roof projects are intended to be performed annually in order to maintain and improve on overall conditions at Company facilities. Roof projects are intended to be addressed prior to failure/water leakage into the building. In most cases, aging black roofs will be replaced by white roofs and may also be replaced by green roofs.

The large increase in budgeted costs in 2018, 2019 and 2020 is attributed to the wind-down of LL26 Restacking, which allows funds and capital expenditures to be directed to the roof program, for which the projects list continues to grow from Engineering Service Requests i.e. ESR's, customer needs and programmatic assessments.

Justification Summary:

Most of the buildings of Facilities are fifteen to twenty years old with certain locations such as Cleveland Street and Rye Service Centers constructed over sixty years ago. Facilities Engineering inspects each roof on a periodic basis and recommends critical repairs or roof replacements as required. The roofs for the Facilities listed in the capital exhibit are scheduled to be completed in their respective years as a result of the Facilities Engineering comprehensive annual roof inspection program and resulting prioritization. See the capital exhibit and work paper for this detailed program

Supplemental Information:

- Alternatives: Continue to repair roofs as they move beyond their normal lifespan. In certain situations, the roof insulation has become so saturated and roofing waterproof membrane so compromised that repairs are no longer effective. Once this happens, it becomes extremely difficult to identify the source of the leak and excessive amounts of money are expended "chasing" the leak, usually with poor results, leading to water infiltration into the building and the formation of mold, whose mitigation requires immediate attention.

- Risk of No Action: If leaks are not addressed and water infiltrates a building, health issues will arise as a result of the formation of mold. In addition, personal space becomes increasingly more

difficult to work in as catch basins and drums are needed to capture and cart water away (i.e. Bruckner Building 3, College Point Blvd).

- Non-financial Benefits: See Risks above Summary of Financial Benefits below.

- Summary of Financial Benefits (if applicable) and Costs: See "alternatives" above and the repair issues associated with roof leaks. There are costs associated with repairing/replacing interior office components which can become saturated by roof leaks (carpeting, ceiling tiles, lighting, sheetrock walls, etc.) and productivity issues associated with angry workers who may have had their work destroyed and must be displaced when repairs take place.

- Technical Evaluation/Analysis: The installation of both white and green roof types will help prevent energy losses and provide important environmental benefits compared to traditional dark roofs, according to researchers from Columbia University. For one, green roofs keeps heat in the building during the winter, reducing the need for heating, and keeps heat out during the summer, reducing the need for air conditioning. The energy saving benefits of the white roof occur mainly in the summer, when the roof absorbs less heat than a dark roof, cutting down on air conditioning needs. According to a study led by Stuart Gaffin, a research scientist at Columbia's Center for Climate Systems Research, the green and white roofs perform equally well in preventing a phenomenon scientists call "heat island effect." The effect states that conventional dark roofs absorb sunlight during the day and radiate heat back into the atmosphere at night, contributing to warmer urban temperatures.

  The green roofs provide the added benefit of retaining through plant absorption approximately 30 percent of the rainwater that falls on it, thus reducing the amount that would otherwise flows to the city sewer system which often overflows during heavy rains allowing raw sewage to spill into New York Harbor, the Hudson River, the East River and other waterways.

- Project Relationships (if applicable): None.

- Basis for Estimate: Engineering estimates and Engineering Support Requests.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
3,314	**3,772**	**9,113**	**2,508**		**1,800**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor	210	306	346	234		167
M&S	0	309	771	0		0
A/P	2,137	2,142	5,402	1,593		948
Other	967	1,015	2,594	681		685
Total	**3,314**	**3,772**	**9,113**	**2,508**		**1,800**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
3,000	**3,000**	**10,000**	**11,000**	**11,000**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor	299	300	997	1,096	1,096
M&S					
A/P	1,898	1,745	6,131	6,080	5,853
Other	7	7	24	26	26
Overheads	796	948	2,848	3,798	4,025
Total	**3,000**	**3,000**	**10,000**	**11,000**	**11,000**

X	Capital
	O&M

2018 – Shared Services / Facilities and Field Services

Project/Program Title	4 Irving Place - Windows Replacement Program
Project Manager	Leo Palmer
Hyperion Project Number	PR.21506806
Organization's Project Number	PR.6XB8900
Status of Project	Planning and Engineering
Estimated Start Date	01/2018
Estimated Completion Date	12/2020
Work Plan Category	Strategic Efficiency and Process Improvements

Work Description:

The project is to remove and replace approximately 2,100 windows assemblies throughout the building envelope, with the exception of the courtyard and tower stage area facades and the decorative and storefront windows along the first three floors on the street elevations. No existing window framing will be removed. All windows will be AAMA designated and approved tilt-in thermal aluminum and glass architectural window models.

Each window assembly frame depth will vary between 3-1/4 to 4-1/4 inches consisting of extruded aluminum profiles with integrated thermal barrier system. Windows will meet all test protocols for typical commercial window assembles including air infiltration, water resistance, uniform load deflection and structural adequacy tests. The project will be executed by establishing a hard wall air-tight "critical barrier" inside the building; abating the window's exterior caulking, removing the window glass; abating the window's interior caulking; receiving air clearance and then having the window manufacturer install the newly fabricated window, all under the GC's contract.

All asbestos abatement work will be conducted as per the provisions of NYC DEP Title 15 subchapter § 1-109 Abatement from Vertical Exterior Surfaces. Air and water-tight hard barriers are to be installed at all locations with interior ACM to be abated, and a rigorous air monitoring program will be deployed to ensure test results meet DEP standards for clean air. This work will be done individually for each window and accomplished by scaffold drops.

Justification Summary:

The existing single pane windows assemblies at Con Edison's Corporate Headquarters range from 85 to 100 years of age and lack the energy saving and noise attenuation features found in modern systems. Thermal imaging of the building facade conducted during the recent Irving Place Investment Grade Energy Audit identified the window penetrations as a major source of heat loss. This, in addition to high ambient noise from street and vehicular traffic below, affect employee productivity and comfort. The baseline performance study conducted as an integral part of the above audit revealed that air infiltration, high thermal transmittance, solar heat gain coefficient and emissivity are the causes of the windows' poor thermal performance.

The energy study identified three performance parameters to characterize the existing windows: standard U-values – a measure of the window's ability to transmit heat via conduction through the window framing – ranged from 0.839 to a staggering 1.40 (the design value is below 0.40), the Solar Heat Gain Coefficient (SHGC) – measure of the window to absorb radiant heat through the glazing – ranged from 0.4 to 0.75 (the design value is around 0.3), and Visible light Transmission (VT), and the visible light transmission ranged from 0.2 to 0.65 (the design value is around 0.6). The low visible light transmission values were attributed to dirt accumulation on the window panes from deferred maintenance.

Supplemental Information:

- Alternatives: This project will provide energy efficient double pane window system that will improve interior comfort levels as well as reduce the building's carbon footprint: 80% reduction in heat conduction and air infiltration, 60% reduction in solar heat gain coefficient, and overall reduction in steam usage. This cannot be achieved by the repairing the existing windows.

- Risk of No Action: If this project is not performed the Company will continue to operate the Irving Place Corporate Headquarters Building with single pane, energy inefficient, 80 to 100 year old windows. This is not good for the Company's image as a leader in energy conservation.

- Non-financial Benefits: "Corporate Goodwill" and demonstrated leadership in energy conservation.

- Summary of Financial Benefits (if applicable) and Costs:

. Reduce heat conduction (U-value) by 60%
Reduce Solar Heat Gain Coefficient (SHGC) by 50%
Reduce air infiltration by 80%
Estimated annual electrical savings (2010): 250,000 kWh
Estimated annual electrical usage (2010): 27,500,000 kWh
Steam savings (2010): 9,200 M-pounds
Estimated steam usage (2010): 65,000 M-pounds
Improve the interior comfort levels
* ASHRAE Level III Investment Grade Energy Audit by EME Consulting Engineering Group May 20, 2011

- Technical Evaluation/Analysis: See above.

- Project Relationships (if applicable): None.

- Basis for Estimate: Engineering estimates.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
		5,000	**7,750**	**7,750**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor			374	749	749
M&S			279	558	558
A/P			3,011	3,856	3,699
Other			72	144	144
Overheads			1,264	2,443	2,600
Total			**5,000**	**7,750**	**7,750**

X	Capital
	O&M

2016 – Shared Services / Facilities and Field Services

Project/Program Title	Facilities Flood Mitigation Program
Project Manager	Leo Palmer
Hyperion Project Number	PR.21506939
Organization's Project Number	PR.6XB8900
Status of Project	Planning and Engineering
Estimated Start Date	01/2017
Estimated Completion Date	12/2017
Work Plan Category	Operationally Required - Storm Hardening

Work Description:

Facilities plans to harden its six most vulnerable sites during 2015 and 2016 at a cost of $5 million per year, as follows: 2015 - 16th St. and 28th St. Service Centers and portions of The Learning Center. 2016 - 110th St., College Point and Neptune Ave Service Centers. In 2017, Facilities plans to harden Eastview Service Center, which is prone to flooding from the adjacent Saw Mill River; and the remaining interior portions of The Learning Center as part of a separate effort to be funded by the Company's Common Capital Budget (i.e., Facilities Flood Mitigation Program). The most vulnerable areas of The Learning Center will be protected by hardening the facilities' perimeter and preventing storm surge from entering the building's lower level, as part of the 2015 Storm Hardening program described above.

Justification Summary:

Storm hardening studies have established the design criteria needed to generate detailed design packages. According to the Eastview study flooding would result in inundation of the transportation area with over 1 ½ feet of water, the Blue Tent area with over 2 ½ feet of water, and the fuel dispensers' area with almost three feet of water. Note that the Eastview Service Center's Main Facility experienced its most severe flooding event during Hurricane Irene.

The Learning Center experienced very significant damage due to flooding in its basement and first floors, which house equipment such as its fire pump, fire alarm panel, roof tank fill and domestic water pumps, sewer ejector pumps, air compressors, elevators, and roll-up doors, along with classroom facilities (e.g., damage to sheet rock walls, cabinets, training equipment). After Sandy, this equipment was repaired/replaced and the Lower Lever was completely renovated. We now need to protect this area and equipment from future storm surges.

Supplemental Information:

- Alternatives: Various permanent, deployable and administrative measures (such as relocating equipment/materials) are being considered to best address the unique situation at each location. More deployable and administrative (versus permanent) measures can be taken but those will require manpower to implement at a time when personnel are already busy preparing for the impending event. A mix of all three measures is therefore the best alternative.

- Risk of No Action: In the event of a storm surge there can be damage and significant disruption to Company services leading to power outages that may last several days to weeks. This program is aimed at protecting critical infrastructure in the event of such disasters.

- Non-financial Benefits: See above.

- Summary of Financial Benefits (if applicable) and Costs: See above.

- Technical Evaluation/Analysis: Storm hardening studies have established the design criteria for the RFP's, which will be prepared to generate the detailed design packages.

- Project Relationships (if applicable): None.

- Basis for Estimate: Engineering estimates as indicated in the capital exhibit and work papers.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
0	**0**	**0**	**0**		**0**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
	5,000			

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor		374			
M&S		279			
A/P		3,074			
Other		72			
Overheads		1,201			
Total		**5,000**			

X	Capital
	O&M

2016 – Shared Services / Facilities and Field Services

Project/Program Title	Facilities Service Center Renovations
Project Manager	Leo Palmer
Hyperion Project Number	PR.21506897
Organization's Project Number	PR.6XB8900
Status of Project	Planning and Engineering
Estimated Start Date	01/2018
Estimated Completion Date	12/2020
Work Plan Category	Strategic Efficiency and Process Improvements

Work Description:

The capital exhibit lists all projects planned in this category. Renovation projects are performed each year in order to maintain and improve on overall conditions at the Facilities buildings and yards. This program will renovate various office spaces throughout the Facilities Headquarter Buildings (such as Irving Place, Flatbush Ave, Rye HQ and Davis Ave) and Service Centers. Many locations have not been renovated since the building's original construction.

Justification Summary:

Most of the buildings of Facilities are fifteen to twenty years old with certain locations such as Cleveland Street and Rye Service Centers constructed over sixty years ago. Interior offices, in certain cases, do not meet current space-use or present day industry life-safety standards.

Con Edison's policies emphasize open communication and working in teams, and the open plan concept reflects and supports this management approach. The renovations that are planned to be undertaken will bring the floors at least to, and in many ways above, standards for new office buildings. While providing an attractive work environment is important, the focus is on providing a productive work environment that is easy to maintain and will require no additional investment for many years.

Much of the infrastructure at our buildings and yards is outdated. The air conditioning is essentially unchanged since it was installed and as such has inefficient controls and comfort levels in the buildings are unsatisfactory. As part of the renovations, all the distribution ductwork back to the source and the controls, including Variable Air Volume (VAV) systems that varies the air flow depending on need, will be replaced. Similarly, lighting will be completely replaced with an energy-efficient system that responds to a central controller and dims at the perimeter to respond to available daylight.

All renovated floors will have wireless access.

Supplemental Information:

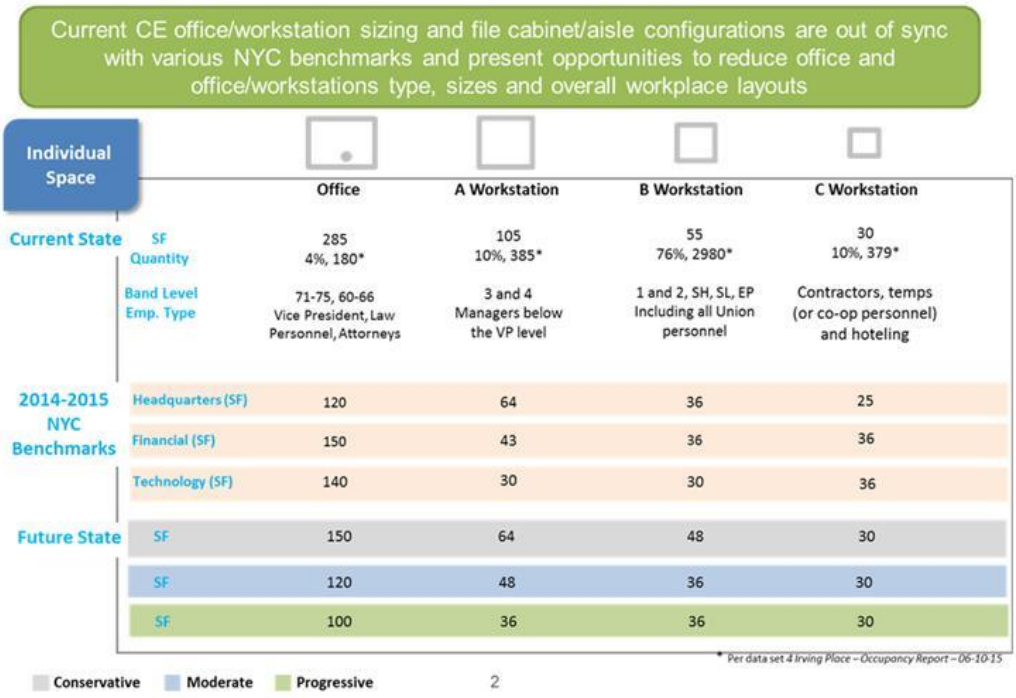
- Alternatives: These spaces can be repainted and cleaned in order to make slight improvements to the office environment and employee comfort, but few of the benefits described above can reasonably be achieved.

- Risk of No Action: See above.

- Non-financial Benefits: Switching to an open floor plan will support a productive team-working environment and will enable the Company to more efficiently utilize its office space. By benchmarking with other Companies, we have determined that additional employees can fit into the same spaces.

- Summary of Financial Benefits (if applicable) and Costs: See above.

- Technical Evaluation/Analysis: Most of the buildings of Facilities are fifteen to twenty years old with certain locations such as Cleveland Street and Rye Service Centers constructed over sixty years ago. Interior offices, in certain cases, do not meet current space-use or present day industry life-safety standards. These projects will not only improve office conditions for employees but also enable the Company to fit more workers into existing spaces. By benchmarking with other Companies it was determined that our employees typically have 50% to 100% more space of those office workers in the NYC area.



- Project Relationships (if applicable): None.

- Basis for Estimate: Engineering estimates/Engineering Support Requests.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
		5,000	**5,000**	**5,000**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor			375	375	375
M&S			279	279	279
A/P			3,012	2,673	2,567
Other			73	72	72
Overheads			1,261	1,601	1,707
Total			**5,000**	**5,000**	**5,000**

X	Capital
	O&M

2017 – Shared Services / Facilities and Field Services

Project/Program Title	Sherman Creek Service Center
Project Manager	Leo Palmer
Hyperion Project Number	21656717
Organization's Project Number	2664115
Status of Project	Planning
Estimated Start Date	10/2017
Estimated Completion Date	12/2019
Work Plan Category	Operational Required

Work Description:

Con Edison has identified the need to develop a new service center in Northern Manhattan to primarily address the growth of Gas Operations that is anticipated over the next two decades with the onset of additional leak prone pipe replacements, gas leak repair, oil-to-gas conversion and new business projects. The new service center will also address the increased congestion at the existing Manhattan and Bronx service centers, which is causing safety concerns with pedestrian and vehicular traffic and impeding various Con Edison field operations organizations. The existing 28th Street service center is of particular concern as continued development in the surrounding area and construction of the Gateway tunnel over the next decade or more is expected to exacerbate the congestion and related safety and productivity issues. While detailed engineering plans have not yet been developed, at this point, it is anticipated that the new service center would entail the development of two buildings at the Con Edison property in the Inwood section of Northern Manhattan along 9th Avenue to house office and field support space as well as warehouse, storage and vehicular parking for Company passenger and heavy duty trucks and other equipment. Engineering studies are underway to refine and finalize the sizing and layout for the proposed service center.

Justification Summary:

There is insufficient space in the existing Manhattan and Bronx service centers to accommodate the growth of Gas Operations personnel. The existing Manhattan service centers are currently operating at approximately 17% over capacity, and regularly experiencing congestion in getting in and out of the yards, which is impacting pedestrian and vehicular safety, while also affecting crew response times and productivity. In the last three years, there have been 5 personnel accidents and 45 vehicular incidents at Bronx and Manhattan workout centers, primarily attributed to vehicle and material storage and the resulting yard congestion. This situation is expected to worsen as the workload in Gas Operations is anticipated to grow over the next five years, with related staffing increasing by fifty percent or over 450 people in additional headcount as compared to 2014. Of the 450 new hires, 225 employees will be using the proposed Sherman Creek service center to support Manhattan and Bronx service areas.

This Gas Operations workload increase is driven by a commitment to public safety through two major work categories:

- Doubling of the main replacement work: Gas Operations is accelerating the rate of leak prone pipe replacement from 50 to 100 miles per year, as a proactive measure to enhance public safety and improve system reliability. This will allow the Company to complete the leak prone pipe replacement program in 20 years as opposed to the 40 years originally contemplated.
- Doubling of the leak call volume: Leak response and public safety is a top priority for Gas Operations. Leak calls have increased by over 100% since 2013 (43,565 calls YTD in 2015 vs. 21,760 calls YTD in 2013). Gas Operations will continue with the enhanced gas system scanning and customer outreach efforts, which to date has led to double the number of leak calls and leak repair work as compared to prior years.

The new service center will support the additional 225 Gas Operations employees and 150 Gas Operations vehicles serving Manhattan and the Bronx, along with related equipment and materials needed to address the increasing gas main replacement and gas leak repair work in Manhattan and the Bronx over the next decade and beyond.

In addition, the new service center will allow for a redeployment of approximately 100 Manhattan Electric personnel amongst the Manhattan service centers to Sherman Creek. Such redeployment will include electric construction field personnel that currently operate out of trailers located in Inwood and the Bronx because there is not sufficient capacity in existing service centers to house such crews. Redeployment, coupled with space and resource optimization at the existing service centers will alleviate congestion, which is anticipated to worsen over time, particularly at the West 28th Street location as Hudson Yards construction continues and the Amtrak Gateway tunnel project moves forward over the course of the coming decade.

Supplemental Information:

- Alternatives: The Company evaluated CECONY's owned properties in Manhattan and elsewhere as part of an effort to address the need to accommodate the additional personnel and vehicles related to Gas Operations expansion and to de-load and optimize operations at the existing Manhattan service centers.. The existing service centers, Sherman Creek, 59th Street Generating Station, 74th Street Generating Station, East River Generating Station and various substation sites were considered. In addition, real estate personnel worked with commercial brokers to identify whether there were any suitable privately owned properties available for purchase or leasing. Given the robust residential and commercial development market in New York City, particularly Manhattan, few industrial zones sites were identified as available either for purchase or lease and all were cost prohibitive, particularly when development costs are taken into consideration. Of all the sites reviewed, the Sherman Creek parcels hold the most promise because of their size and lack of building structures.
- The only other alternative is to take no action and to continue to serve northern Manhattan and the Bronx from existing locations in Manhattan and the Bronx. Gas Operations would house new employees in satellite yards and temporary construction trailers. Electric construction crews would continue to operate out of trailers as well. This is not recommended because trailers are meant for temporary housing of personnel, not permanent

housing. Temporary permits are approved by the NYC DOB on an as-needed basis and then renewed every three to six months. The NYC DOB can decide to not renew a permit at any time, which could place a trailer arrangement in jeopardy if it became a long terms solution.

- Note that cost estimates were derived based on the anticipated square foot (SF) size of the building discussed below, user needs, DOB code required setbacks and the available lots at Sherman Creek (i.e. Lot 1 – 40,000SF and Lot 20 – 33,800 SF). We estimated for EPC (Engineering Procure Construct) and Standard methods of design/construction. In a Standard Contract approach the Company engineers the design and then oversees the construction of the building using its Construction Management Department. The four costs were calculated as follows:
  - Lot 1 only, six story building 165ft X 160ft (156,000SF), using a Standard Contract - $109,730,000
  - Lot 1 only, six story building 165ft X 160ft (156,000SF), using an EPC Contract - $98,840,000
  - Lot 1, three story building 165ft X 160ft and Lot 20 three story building 165ft X 135ft (146,400SF), using a Standard Contract - $126,200,000
  - Lot 1, three story building 165ft X 160ft and Lot 20 three story building 165ft X 135ft (146,400SF), using an EPC Contract - $113,600,000

  We have chosen the last option as it will require no re-zoning, thus reducing the project schedule, and at this time offers the most practical alternative for a vertical service center (i.e., three stories vs. six stories, which seems impractical for large vehicle operation and storage. Note however, that further studies to refine the sizing and layout of the proposed service center are underway and expected to be completed over the next several months.

- Risk of No Action: The risk of no action limits the acceleration of gas main replacement in northern Manhattan, Bronx and Westchester; loss of productivity and response time for both Electric and Gas Operations in Manhattan and the Bronx.

- Non-financial Benefits: Improvement of gas main replacement performance metrics – the ability to accelerate gas main replacement from 50 miles per year to 100 miles per year. Locating the Gas Operations crews closer to the service territory will reduce travel time and allow us to meet our PSC-reported gas main replacement and leak response goals. For Electric, creation of a fourth district will decrease transit times to work locations and increase productivity. This project will thus help enhance worker and public safety and improve customer service.

- Summary of Financial Benefits (if applicable) and Costs: Electric and Gas Operations savings from reduced yard time/increased productivity: Significant congestion has been identified as a major component increasing the yard exit time of Con Edison crews at the start and end of the work day. Current overflows at Manhattan workout locations have been benchmarked at 112% for East16th St, 118% for West 110th St, and 130% for West 28th St.

- Technical Evaluation/Analysis: Further studies to refine and optimize, reducing where possible, the overall size and layout of the proposed service center are underway and expected to be completed over the next several months. The current Manhattan Sherman Creek space requirements are as indicated below. Future capacity growth will also be taken into consideration as we study and finalize the sizing and layout of the proposed service center:

Office & Staff Support Space	16,441 SF
Warehouse/Transportation	17,525 SF
Parking & Yard Storage	111,934 SF
Total SF	**146,100 SF**

- Project Relationships (if applicable): None.

- Basis for Estimate: Con Edison Central Engineering conceptual estimate.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
0	**0**	**0**	**0**		**0**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
	11,291	**68,328**	**33,983**	

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor			2,225	2,225	
M&S					
A/P		11,000	61,122	25,820	
Other			732		
Overheads		291	4,249	5,938	
Total		**11,291**	**68,328**	**33,983**	

	Capital
X	O&M

2018 – Shared Services / Facilities & Field Services

Project/Program Title	Incremental Regional O&M for New Facility at Sherman Creek
Project Manager	Leo Palmer
Hyperion Project Number	N/A
Organization's Project Number	N/A
Status of Project	Planning
Estimated Start Date	2018
Estimated Completion Date	On going
Work Plan Category	Operationally Required

Work Description:

Con Edison has identified the need to develop a new service center in Northern Manhattan. The facility will address the growth of Gas Operations that is anticipated over the next two decades resulting from the onset of additional leak prone pipe replacements, gas leak repair, oil-to-gas conversion and new business project and is described more further in the capital white paper entitled Sherman Creek Service Center and the testimony of the Gas and Electric Operations panels. Once this new facility at Sherman Creek becomes operational, it will require on-going costs for building maintenance.

General O&M Program
This program will cover the associated ongoing fees pertaining to base building systems maintenance, refuse removal, permits, security guards, snow removal, fire/security system maintenance, miscellaneous repairs, exterminating, landscaping, and utilities and company labor for supervision of associated vendors.

Maintenance Associated with Capital (MAC)
There will be Maintenance Associated with Capital (MAC) costs that will be incurred **in the final** phase and post construction in 2018-2020. These expenses include: swing space rental to accommodate ongoing recruitment to support the Gas expansion, associated setup cost, and relocation costs for employees and equipment that will be moved into the new building. The program change is expected to go into effect in 2018, prior to and when this new service center is ready for occupancy (2020).

Justification Summary:

As noted in the capital white paper, there is insufficient space in the existing Manhattan and Bronx service centers to accommodate the growth of Gas Operations personnel. The existing Manhattan service centers are currently operating at approximately 17% over capacity, and regularly experiencing congestion in getting in and out of the yards, which is impacting

pedestrian and vehicular safety, while also affecting crew response times and productivity. In the last three years, there have been 5 personnel accidents and 45 vehicular incidents at Bronx and Manhattan workout centers, primarily attributed to vehicle and material storage and the resulting yard congestion. This situation is expected to worsen as the workload in Gas Operations is anticipated to grow over the next five years, with related staffing increasing by fifty percent or over 450 people in additional headcount as compared to 2014. Of the 450 new hires, 225 employees will be using the proposed Sherman Creek service center to support Manhattan and Bronx service areas.

This Gas Operations workload increase is driven by a commitment to public safety through two major work categories:

- Doubling of the main replacement work: Gas Operations is accelerating the rate of leak prone pipe replacement from 50 to 100 miles per year, as a proactive measure to enhance public safety and improve system reliability. This will allow the Company to complete the leak prone pipe replacement program in 20 years as opposed to the 40 years originally contemplated.
- Doubling of the leak call volume: Leak response and public safety is a top priority for Gas Operations. Leak calls have increased by over 100% since 2013 (43,565 calls YTD in 2015 vs. 21,760 calls YTD in 2013). Gas Operations will continue with the enhanced gas system scanning and customer outreach efforts, which to date has led to double the number of leak calls and leak repair work as compared to prior years.

The new service center will support the additional 225 Gas Operations employees and 150 Gas Operations vehicles serving Manhattan and the Bronx, along with related equipment and materials needed to address the increasing gas main replacement and gas leak repair work in Manhattan and the Bronx over the next decade and beyond.

In addition, the new service center will allow for a redeployment of approximately 100 Manhattan Electric personnel amongst the Manhattan service centers to Sherman Creek. Such redeployment will include electric construction field personnel that currently operate out of trailers located in Inwood and the Bronx because there is not sufficient capacity in existing service centers to house such crews. Redeployment, coupled with space and resource optimization at the existing service centers will alleviate congestion, which is anticipated to worsen over time, particularly at the West 28th Street location as Hudson Yards construction continues and the Amtrak Gateway tunnel project moves forward over the course of the coming decade.

Supplemental Information:

- Alternatives: An alternative could be to not perform these O&M functions. However this is not feasible due to the risk to employee safety if the premises are not properly maintained.

- Risk of No Action: Increased risk to employee safety and decreased operational efficiency due to lack of facilities operational support for the facility occupants.

- Non-financial Benefits: Improved operational efficiency and time response reduction. Maintain comfortable working environment according to local building code and OSHA requirements.

- Summary of Financial Benefits (if applicable) and Costs: (N/A)

- Technical Evaluation/Analysis: Corporate Real Estate consultant, "Newmark Grubb Knight Frank", study.

- Project Relationships (if applicable): This program will cover the associated ongoing fees pertaining to the maintenance of the new "Sherman Creek Service Center"

- Basis for Estimate: The O&M estimate for Sherman Creek is determined according to the average annual baseline expenditures of similar facilities Service Center buildings within Con Edison.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
0	0	0	0	0	0

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total	**0**	**0**	**0**	**0**	**0**	**0**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
		1,100	**1,100**	**1,500**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor			300	300	230
M&S			100	100	150
A/P			700	700	1,010
Other					110
Overheads					
Total			**1,100**	**1,100**	**1,500**

	Capital
X	O&M

2017 – Shared Services / Facilities & Field Services

Project/Program Title	Irving Place Exterior Landmarks Preservation Metal Component Restoration
Project Manager	Jenny Brito
Hyperion Project Number	N/A
Organization's Project Number	50726-13
Status of Project	Planning and Engineering
Estimated Start Date	01/2017
Estimated Completion Date	12/2018
Work Plan Category	Regulatory Mandated

Work Description:

The exterior Landmarks Preservation metal components along the Irving Place street elevations and associated store front windows have undergone severe deterioration from aging and exposure to the elements. The major defects are characterized by flaking paint, open seams, bowed window sashes and disintegrated metal components. Specifically, the street level cast iron aprons are severely corroded from contact with de-icing salts; the storefronts sub-roofs (canopies) are delaminated from standing water over long periods of time; the decorative metal columns and storefront windows have open seams, missing screws and failed welds, and the copper-clad wood window frames are deformed from moisture movement causing stress concentrations Restoration work is necessary to ensure water-tightness of the building envelope by extending the life of metals & structural components. Failure to act on these issues has the potential of causing severe structural damage to the building and basement. The following metal elements will be restored as described below.

Cast iron Restoration

- Scrape, prime and paint all elements.
- Carefully restore each dissembled element.
- Seal all non-structural cracks, holes and minor surfaces.
- Remove and replace all defective fasteners with stainless steel screws.

Cast iron Fabrication

- Because these are Landmark Preservation metal component we must identify and catalog all elements, followed by careful dismantling and packaging of each piece requiring replication which will be shipped offsite and returned for re-installation. Work shall include temporarily sealing all openings along the building envelope to prevent water infiltration. All new castings shall be ductile iron.
- Replace in kind all missing elements as well as those that are damaged beyond repairs.
- Assemble and install all replicated elements on site including octagonal/round column bases, base skirts, cast grilles, horizontal cast moldings, etc.

- Remove and replace all defective fasteners with stainless steel screws.
- Scrape, prime and paint all remaining surfaces.

"Kalamein" (the Original Window Suppler) Window Repair

- Cut out and replace damaged caulking along the window seams.
- Insert new stainless screws along deformed sashes and open seams, followed by application of sealant.
- Apply approved filler over all holes and openings.
- Scrape, prime and paint the remaining decorative.

Sealants/Paints

- Remove defective sealants and flaking paints on all decorative metal surfaces (cast iron, bronze, elements, window frames, etc.).
- Apply new paints and sealants to match existing in color and texture.

Justification Summary:

The justification for this type of restoration work will ensure water-tightness of the building envelope by extending the life of the metal components. The presence of de-icing salts has corroded the cast-iron aprons along the street elevation making it possible for water to flow directly into the sub-basement resulting in heat loss from the building. Failure to act on these issues has the potential of causing severe structural damage to the basement structure as the surrounding environment is highly corrosive from de-icing salts, which combine with moisture to create a weak electrolytes allowing current to flow.

Supplemental Information:

- Alternatives: The work is complementary to the LL11 inspections to ensure water-tightness and structural safety of the building envelope. An alternative is complete replacement of the Landmark Preservation metal components. The cost is prohibitive and therefore not recommended.

- Risk of No Action: Failure to perform this work has the potential of undermining the LL11 repairs by causing water infiltration into the building envelope, which may lead to severe damage and weakening of the underlying structural support system.

- Non-financial Benefits: Increased water-tightness offers a comfortable and secured environment for employees thus creating the potential for increased productivity.

- Summary of Financial Benefits (if applicable) and Costs: Failure to perform this work has the potential of undermining the LL11 repairs (i.e. over $8 million in repair costs over the last two LL11 Cycle 6 & 7) by causing water infiltration into the building envelope, which may lead to severe damage and weakening of the underlying structural support system.

- Technical Evaluation/Analysis: Scraping, priming and painting the Landmark Preservation represents a sustainable method to increase their service life as well as removal and replacement of asbestos-containing sealants with clean alternatives. Replicating severely damaged cast iron segments will be limited to the worst cases as they require removal,

identification, and cataloging as well as sealing the penetrations during the fabrication process. Further, stainless steel replacement screws, soldering and using approved fillers will be used to seal opening and open seams throughout.

- Project Relationships (if applicable): This project is an integral part of the ongoing Local Law 11 Repairs.

- Basis for Estimate: Detailed design drawings have been prepared.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
0	**0**	**0**	**0**	**0**	**0**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total	**0**	**0**	**0**	**0**	**0**	**0**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
	1,500	**1,500**		

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor		100	100		
M&S					
A/P		1,300	1,300		
Other		100	100		
Overheads					
Total		**1,500**	**1,500**		

X	Capital
	O&M

2016 – Shared Services / Facilities & Field Services

Project/Program Title	Fuel Station Upgrades
Project Manager	Fortunato Gulino
Hyperion Project Number	10079272
Organization's Project Number	1XC9720
Status of Project	In Progress
Estimated Start Date	June 2014
Estimated Completion Date	December 2017
Work Plan Category	Operationally Required

Work Description:

Transportation Operations operates and maintains the Company's twelve in-house vehicle fueling stations at a cost of approximately $580,000 per year. However, as the equipment degrades and becomes obsolete, we have seen an increase in maintenance to these stations. These components are reaching the end of their life cycle and need to be replaced. This project funds the replacement of aging equipment at the Company's twelve fueling stations.

The scope of the project for nine out of twelve stations listed below, includes the replacement of the fueling islands, gas and diesel dispensing equipment, new GasBoy card reader systems and associated electrical hardware and conduits:

Manhattan:	Brooklyn:	Bronx:
E16th Street	3rd Avenue	Van Nest
W28th Street	Neptune Avenue	
E110th Street		

Queens:	Staten Island:
College Point	Victory Blvd
Astoria	

The scope of the project for three out of twelve stations listed below, includes the replacement of the fueling islands, gas and diesel dispensing equipment, several single wall tanks, new GasBoy card reader systems and associated electrical hardware and conduits:

Westchester:
Rye
Eastview
Yonkers

The equipment at these locations are over 20 years old and these upgrades will extend the life of the capital assets and lower operating and maintenance costs associated with outdated equipment that is at the end of its useful life.

Project Update: By the end of 2015, CECONY will have completed various above ground upgrades to the other nine fueling stations (islands, dispensers, card readers and associated equipment). However, due to the priority rescheduling of the related CNG station project and an environmental issue at the site, the replacement of the Eastview Station was pushed back to 2016. As a result, the remaining two station replacements: Rye and Yonkers will be completed in 2016 through 2018 respectively.

Justification Summary:

The fuel stations provide fuel for the daily operation of the Company's fleet of cars, trucks and equipment. Replacement parts are becoming obsolete and difficult to obtain. If a major failure were to occur at a station, it is possible the station would be out of service for a considerable amount of time until repairs could be made. This would impact the ability to fuel Company vehicles at the site, resulting in the use of potentially more costly fueling sites. In addition, there are environmental concerns because of the potential for system leaks, which may be higher due to the age of the equipment; one example is Spring Valley Fueling Station.

Some of the fuel stations were installed in the late 1970's, and were designed to fuel our gas and diesel fleet vehicles. An engineering study recommended that the single wall tanks in Rye, Eastview and Yonkers be replaced with new double-wall fiberglass underground storage tanks that meet current fuel station regulations. This will also reduce the potential for an environmental incident resulting from a tank/component failure.

Supplemental Information:

- Alternatives: Utilize vendor fueling sites at a volatile fuel price. Vendor fuel cost (per gallon) can typically fluctuate more than internal costs.
- Risk of No Action: If the upgrade to the fueling stations does not occur, the Company would maintain the existing stations at an increased cost, recognizing that the potential for system and component failure increases. In the event of a failure, redirecting fleet fueling to outside fueling stations decreases control of fuel tracking and reconciliation, and reduces the ability to utilize Bio-Diesel (B-20). The Company has a regulatory commitment to use alternate fuels, such as bio-diesel, in its medium/heavy duty fleet in accordance with the Department of Energy (DOE) Energy Policy Act (EPAct) of 1992. The use of Bio-Diesel (B-20) ensures the Company's ability to meet and maintain the EPAct alternative compliance. Failure to comply with this EPAct mandate could result in penalties being imposed on the Company. Furthermore, the potential for an environmental incident also increases due to fuel leaking from aged equipment.

- Non-financial Benefits: The upgrade to these stations will continue to help reduce petroleum consumption by using Bio-Diesel fuel to maintain the EPAct compliance. It provides 50% of CECONY's long range strategy.
  Continued use of bio-diesel will help to enhance and promote the Company's commitment to environmental excellence.

- Summary of Financial Benefits (if applicable) and Costs: The estimated total cost of the project is $15.8 million.
- Technical Evaluation/Analysis: An engineering study was performed to evaluate the existing Con Edison fueling stations and determine what upgrades and/or replacements would be required to

improve reliability and reduce environmental risk. The recommendations were based on existing conditions of the tanks and equipment as well as historical maintenance costs.

- Project Relationships (if applicable): This project will be in conjunction with the "CNG Station Upgrades" to minimize the outages to the fuel stations and reduce yard interruptions.

- Basis for Estimate: The estimates for the complete station replacements are based on a recently completed station replacement at ORU incorporating the same scope of work and similar components. The remaining station upgrade work estimates are based on an engineering estimate that incorporates component pricing estimates and vendor labor cost estimates derived from the scope of work of the project.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
		733	**3,998**		**296**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of 500 thousand or more and, for all other organizations, projects/programs of 1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor			54	524		39
M&S			233	1,438		106
A/P			225	1,265		94
Other			221	771		57
Total			**733**	**3,998**		**296**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
6,400	**4,300**			

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor	544	544			
M&S	2,250	1,300			
A/P	1,143	551			
Other	800	376			
Overheads	1,663	1,538			
Total	**6,400**	**4,309**			

X	Capital
	O&M

2016 – Shared Services / Facilities & Field Services

Project/Program Title	CNG Fuel Station Upgrades
Project Manager	Fortunato Gulino
Hyperion Project Number	10079271
Organization's Project Number	1XC9719
Status of Project	In Progress
Estimated Start Date	June 2014
Estimated Completion Date	December 2017
Work Plan Category	Operationally Required

Work Description:

In order to align with current standards for the operation and fueling of natural gas vehicles (NGVs), station operating pressures at the Company's compressed natural gas (CNG) fueling stations must be increased from a 3,000 psi to 3,600 psi output. This project will increase the operating pressure and replace aging equipment at the Company's eight CNG stations (listed below). In order to accomplish this, the five CNG fueling stations listed below will receive new dispensers, storage vessels, compressor skid, piping and associated valves, control panels, electronic control units (ECUs), and card reader systems designed to operate at the higher pressure.

Queens:
College Point
Astoria

Westchester:
Eastview
Rye

Bronx:
Van Nest

The other three CNG stations will receive upgrades to their piping, dispensers, associated valves and controls, electrical and a card reader system that can operate under the newer pressure.

Manhattan:
W28th Street
E16th Street

Brooklyn:
3rd Avenue

The stations are 20 years old, and the upgrades will extend the life of the capital assets, provide increased capacity, and lower operating and maintenance costs associated with outdated equipment that is at the end of its useful life.

Project Update: In January of 2014, CECONY completed the upgrades to the Manhattan CNG stations and to achieve the standard 3600 psi output. By the end 2015, the Brooklyn station upgrade will have been completed. However, due to an environmental issue and the rescheduling of the related Fueling Station Project at Eastview, both the Rye and Eastview stations will now be completed 2016. In addition, during the engineering design phase, CECONY discovered issues in upgrading four stations (Astoria, Eastview, College Point, and Van Nest). The original build design of these units will not allow for the

output pressure to be increased without replacing the entire unit. Therefore, these stations required a plan re-evaluation which extended the timeline of the project through 2016.

Justification Summary:

Current NGV technology requires 3,600 psi to effectively achieve the manufacturer's mileage ratings. Currently, the CECONY CNG stations operate at 3,000 psi. This project will provide the Company and outside customers with additional vehicle range and increased throughput at these stations. In addition, the higher pressure and current technology will allow for continued expansion of NGVs within the CECONY fleet. The Company currently has 310 NGVs in the fleet, and has plans to continue purchasing NGVs over the next several years. The NGV purchases will help maintain the Company's Sustainability Strategy in the future by:

- Reducing petroleum consumption of the fleet, to meet compliance with the Department of Energy (DOE) Energy Policy Act (EPAct) of 1992
- Reducing the Company's Greenhouse Gas Emission
- Realizing a fuel cost savings of an estimated $1.56 per equivalent gallon of gasoline compared to non-Con Edison CNG stations

In addition, the DOE (in accordance with the EPAct), requires the Company to utilize alternate fuel vehicles (AFVs) for 90% of the replacement vehicles purchased annually. NGVs provide 10% of CECONY's long range EPAct strategy.

Furthermore, all of the stations have been in service for over 20 years and replacement parts are becoming obsolete and difficult to obtain, and should a major failure occur at a station, it is possible the station would be out of service for a considerable amount of time until repairs could be made. This would impact the ability to refuel Company vehicles at the site as well as providing fueling capability for outside customers.

Supplemental Information:

- Alternatives: Using non-Con Edison CNG stations at a premium of $1.56/Gasoline Gallon Equivalent (GGE) for the Company's 310 NGVs, the Company would incur additional fuel cost.

- Risk of No Action: The Company can continue to operate the facilities at 3,000 psi, which reduces the range of the NGVs in the fleet, and is below manufacturer's mileage specifications. Also, due to the age of the equipment, the parts will become obsolete and difficult to obtain and causing a potential for stations to be out of service for extended periods of time. This will impact the ability to fuel the Company's fleet vehicles, requiring the Company to redirect its NGVs to non-Con Edison CNG stations at a premium of $1.56 per equivalent gallon. The non-Con Edison CNG stations have limited fueling locations scattered throughout the Con Edison service territory, with limited fueling times. In addition, this would severely impact the ability of outside customers to access CNG fuel, which would negatively affect gas revenues. Some external account holders are:

    - US Postal Service
    - New York City Agencies
    - City College of New York
    - Verizon
    - NYC Taxis
    - United Parcel Services
    - New York State Agencies

- Port Authority of NY & NJ

In addition, the Company needs to meet the DOE EPAct Regulation to use alternate fuels, such as CNG in its fleet. The use of CNG enhances our ability to meet this regulation. Failure to comply with the EPAct could result in penalties being imposed on the Company.

- Non-financial Benefits: Clean AFVs produce lower emissions and fewer toxic contaminants than gasoline and diesel powered vehicles. Evaporative and start-up emissions are also significantly lower. As a result, clean AFVs reduce impacts on the environment, air quality, global warming and public health. The use of clean AFVs in the fleet also reduces the Company's carbon footprint, which supports one of Con Edison's Sustainability Initiatives.

  The upgrade to these stations will continue to help reduce petroleum consumption of the fleet while meeting the DOE EPAct compliance. Purchasing and operating AFVs result in lower emissions and fewer toxic contaminants than gasoline and diesel powered vehicles. Expanding the Company's clean AFV fleet will reduce negative impacts on the environment, air quality, global warming and public health.
  By marketing the Company's CNG stations and CNG fleet vehicles, and by providing outside fleets and private owners access to CNG stations, Con Edison will continue to enhance and promote its commitment to environmental excellence within its service territory.

- Summary of Financial Benefits (if applicable) and Costs: The estimated total cost of the project is $7.48 million.
  Con Edison currently has 310 NGVs in its fleet with a mix of cars, cargo vans, and trucks and the Company's plan to purchase additional NGVs to replace gasoline and diesel powered vehicles over the next several years. By subtracting the Company's internal CNG cost per GGE ($0.89/GGE) from the assumed estimate price per gallon of diesel fuel ($2.80/gallon) and gasoline ($2.50/gallon), Con Edison will save per gallon approximately $1.61 compared to gasoline and $1.91 compared to diesel.

- Technical Evaluation/Analysis: An engineering study was performed to evaluate the existing Con Edison CNG stations and determine what upgrades are required to improve fueling times and fill pressures.

  A majority of the stations were built in the early 1990's, and were designed to fuel light duty and medium duty vehicles to a minimum onboard storage pressure of 3,000 PSIG. Current CNG vehicles store fuel onboard at a pressure of 3,600 PSIG.

  Four of the stations: Astoria, College Point, Eastview, and Van Nest use identical natural gas engine driven compressor packages, and all but the Astoria station utilize storage cascades. The balance of the stations use a variety of compressor designs based upon available gas pressure, flow rates, etc.

- Project Relationships (if applicable): This project will be in conjunction with the "Fuel Station Upgrades" to minimize the outages to the fuel stations and reduce yard interruptions for the tenants.

- Basis for Estimate: The estimate is based on an engineering estimate that incorporates component pricing estimates and vendor labor cost estimates derived from the scope of work of the project.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
			699		**677**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of 500 thousand or more and, for all other organizations, projects/programs of 1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor				80		78
M&S				301		292
A/P				238		230
Other				80		77
Total				**699**		**677**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
	3,300	**2,800**		

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor	84	84			
M&S	1,310	1,000			
A/P	930	614			
Other	222	283			
Overheads	754	853			
Total	**3,300**	**2,834**			

X	Capital
	O&M

2017 – Shared Services / Facilities & Field Services

Project/Program Title	CNG Fuel Station New Installation
Project Manager	Fortunato Gulino
Hyperion Project Number	21173070
Organization's Project Number	N/A
Status of Project	Planning
Estimated Start Date	January 2017
Estimated Completion Date	December 2019
Work Plan Category	Operationally Required

Work Description:

In order to continue the use of compressed natural gas (CNG) for CECONY's natural gas vehicles (NGVs), stations are required at additional Company locations. This project funds the design and construction of a new CNG station located in the Bronx. In order to accomplish this, the CNG fueling station will be built to accommodate a compressor unit, dispensers, storage vessels, piping and associated valves, control panels, electronic control units (ECUs), and card reader system. In addition to the work scope, the station will also have the ability to fuel outside customers.

Justification Summary:

CECONY's current Alternative Fuel Vehicle Strategy assists in meeting the Department of Energy's (DOE) – Energy Policy Act (EPAct) for offsetting gasoline and diesel usage every year. This project will provide the Company and outside customers with an additional fueling station and the ability to expand our strategy into other areas. The Company currently has 310 NGVs in the fleet, and has plans to continue purchasing l NGV over the next several years. Furthermore, the NGV purchases will help maintain the Company's Sustainability Strategy in the future by:

- Reducing the Company's Greenhouse Gas Emissions;
- Realizing a fuel cost savings of an estimated $1.56 per equivalent gallon of gasoline compared to non-Con Edison CNG stations.

In addition, the DOE (in accordance with EPAct), requires the Company to utilize alternate fuel vehicles (AFVs) for 90% of the replacement vehicles purchased annually. NGVs provide 10% of CECONY's long range EPAct strategy.

Supplemental Information:

- Alternatives: Using non-Con Edison CNG stations at a premium of $1.56 / Gasoline Gallon Equivalent (GGE) for the Company's 310 NGVs, the Company would incur additional fuel cost.

Risk of No Action: The Company can continue to operate the current facilities, which reduce the assignment locations of the NGVs in the fleet. The Company will saturate the current locations of the existing CNG stations. This will impact the ability to replace the Company's fleet vehicles with NGVs or requiring the Company to redirect its NGVs to a non-Con Edison CNG station at a premium of $1.56 per equivalent gallon. Outside fueling of vehicles will also impact crew productivity, since there are only four non-Con Edison fueling stations, all not located near the Con Edison locations.

- Non-financial Benefits: Clean AFVs produce lower emissions and fewer toxic contaminants than gasoline and diesel powered vehicles. Evaporative and start-up emissions are also significantly lower. As a result, clean AFVs reduce impacts on the environment, air quality, global warming and public health. The use of clean AFVs in the fleet also reduces the Company's carbon footprint which supports one of CECONY's Sustainability Initiatives.

  The new station will continue to meet the DOE's EPAct regulation by reducing gasoline and diesel consumption. Purchasing and operating AFVs result in lower emissions and fewer toxic contaminants than gasoline and diesel powered vehicles. Expanding the Company's clean AFV fleet will reduce negative impacts on the environment, air quality, global warming and public health.

  By marketing the Company's CNG stations and CNG fleet vehicles, and by providing outside fleets and private owners access to CNG stations, CECONY will continue to enhance and promote its commitment to environmental excellence within its service territory.

- Summary of Financial Benefits (if applicable) and Costs: The estimated total cost of the project is $5 million.

  Con Edison currently has 310 NGVs in its fleet with a mix of cars, cargo vans, and trucks and the Company's plan to purchase additional NGVs to replace gasoline and diesel powered vehicles over the next several years. By subtracting the Company's internal CNG cost per GGE ($0.89/GGE) from the assumed estimated price per gallon of diesel fuel ($2.80/gallon) and gasoline ($2.50/gallon), Con Edison will save per gallon approximately $1.61 compared to gasoline and $1.91 compared to diesel.

- Technical Evaluation/Analysis: An engineering study was performed to evaluate the CECONY location to determine the required equipment needed to fuel fleet vehicles and outside customers.

  The Bronx location will be designed to allow outside customers (primarily large truck fleets) and CECONY's fleet to fuel. This will entail a public station design to minimize the interruptions between our fleet and public vehicles, while providing fuel to both parties.

- Project Relationships (if applicable): This project will be in conjunction with the "Fuel Station Upgrades" and the "Electric Charging Infrastructure" projects to minimize the outages to the fuel stations and reduce yard interruptions for the tenants.

- Basis for Estimate: Research of component pricing and vendor labor costs factored into an order of magnitude capital estimating template.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
	1,000	**1,500**	**2,500**	

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor					
M&S		770	500	417	
A/P			472	833	
Other		68	272	818	
Overheads		162	256	432	
Total		**1,000**	**1,500**	**2,500**	

X	Capital
	O&M

2016 – Shared Services / Facilities and Field Services

Project/Program Title	Electric Vehicle Charging Infrastructure
Project Manager	Fortunato Gulino
Hyperion Project Number	21173081
Organization's Project Number	21173081
Status of Project	Planning
Estimated Start Date	January 2016
Estimated Completion Date	December 2018
Work Plan Category	Operationally Required

Work Description:

In order to continue to expand our alternative fuel vehicle strategy and to reduce petroleum usage, Transportation Operations will replace 15 to 20 vehicles with a plug-in electric option. This vehicle electrification project funds the design and construction of new charging infrastructure required to charge these plug-in vehicles. Vehicle charging stations will be constructed in nine locations. The design of these stations will have three levels of charging:
Level 1 – (> 8 hrs.); Level 2 – (4 – 6 hrs.); and DC Fast Charger (< 1 hr.).

The vehicle charging stations will be installed at the following CECONY locations (schedule of completion):

Manhattan:
E. 16th Street (2016)
W. 28th Street (2016)
E. 110th Street (2016)

Queens:
College Point (2018)
Astoria (2018)

Westchester:
Eastview (2018)

Brooklyn:
3rd Avenue (2017)

Bronx:
Van Nest (2018)

Staten Island
Victory Blvd (2017)

Justification Summary:

Transportation Operations' Alternative Fuel Vehicle Strategy and Sustainability Plan goals are to: 1) use alternative fuels in the fleet, where applicable, 2) achieve lower greenhouse gas emissions, 3) reduce petroleum usage, and 4) meet the Department of Energy's regulations (EPAct). The electric vehicle charging infrastructure project will provide the Company with the means to achieve these goals. The Company currently has 1 Battery Electric Vehicles (BEV), 8 Plug-in Hybrid Electric Vehicles (PHEV), and 2 Electric Auxiliary Power Units (e-APU). We have plans to purchase approximately 15 to 20 plug-in electric technologies each year. The EV purchases will also help meet Transportation's Alternative Fuel Vehicle Strategy and Sustainability Plan mentioned above.

In conjunction with electrifying our fleet, CECONY ancillary initiative is to evaluate a Workplace Charging program that will allow employees to use the proposed charging infrastructure during hours that would otherwise lay idle.

Supplemental Information:

- Alternatives: There are few electric vehicle charging stations near CECONY locations. Travel to the nearest charging stations would compromise productivity. The use of external charging stations would require the fleet to charge either in public parking garages (additional fee to park) or locations with limited space, availability and chargers.

- Risk of No Action: The Company has a regulation to use alternate fuels, such as electric, in its fleet. The use of electric vehicles enhances our ability to meet EPAct regulation. Failure to comply with this EPAct regulation could result in penalties being imposed on the Company.

- Non-financial Benefits: Clean AFVs produce lower to no air emissions and fewer toxic contaminants than gasoline and diesel powered vehicles. Evaporative and start-up emissions are also significantly lower. As a result, clean AFVs reduce impacts on the environment, air quality, climate change and public health. The use of AFVs in the fleet also reduces the Company's carbon footprint by approximately 4 metric tons per vehicle yearly, which supports one of CECONY's Sustainability Initiatives.

  By sharing the Company's charging stations with its employees, Con Edison will continue to enhance and promote its commitment to environmental excellence.

- Summary of Financial Benefits (if applicable) and Costs: The estimated total cost of the project is $10.0 million.
  Con Edison currently has 11 plug-in EVs in its fleet with a mix of 1 BEV, 8 PHEV, and 2 e-APU. The Company's plan for the future is to replace approximately 15 to 20 gasoline/diesel powered vehicles per year with plug-in electric technology over the next five years. CECONY will realize an annual fuel savings of approximately 5,800 gallons of gasoline/diesel compounded per year over the next five years (based on a 390 gallons of gasoline/diesel consumed per vehicle replaced – 15 vehicles/yr.).

- Technical Evaluation/Analysis: An engineering study was performed to investigate the necessary technical requirements and associated budgetary construction costs to install EV charging stations at 9 locations throughout CECONY's territory. The study looked at the installation of one (1) DC Fast Charger; four (4) Level 2 Chargers; and in six locations, the installation of five (5) Level 1 Chargers. In addition, we included the necessary electrical power infrastructure to support five (5) additional Level 2 charging stations that may be considered for future installation and the interface hardware/software for communication between the charging stations and the vehicle management system.

  The methodology used in the study was to collect all documentation and drawings for each site and identify potential location for the proposed EV charging stations. These proposed locations took into account numerous factors such as available parking spaces

on site, location of existing electrical services, location of fleet vehicles, and routing of necessary cable and conduit. In addition, specific details pertaining to the existing electrical service was collected to determine availability of power to make a determination if an upgrade or additional service was required for the site.

The proposed planning, engineering, and construction will take place over three years (2016 to 2018). The construction will be in two phases: Southern Sites (Manhattan, Staten Island, and Brooklyn) and Northern Sites (Queens, Bronx, and Westchester).

- Project Relationships (if applicable): This project will be in conjunction with the "Fuel Station Upgrades" and "CNG Station Upgrades" to minimize the outages to the fuel stations and reduce yard interruptions for the tenants.

- Basis for Estimate:
  The use of an engineering vendor report factored into an order of magnitude capital estimating template was used to provide a basis for this estimate.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
3,000	**3,000**	**4,000**		

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor	150	150	198		
M&S	850	850	1,118		
A/P	364	364	494		
Other	937	768	1,010		
Overheads	700	868	1,180		
Total	**3,000**	**3,000**	**4,000**		

X Capital

☐ O&M

2017 – Shared Services / Facilities and Field Services

Project/Program Title	Fleet Management Solution
Project Manager	William Tesi
Hyperion Project Number	21173060
Organization's Project Number	N/A
Status of Project	Planning
Estimated Start Date	January 2017
Estimated Completion Date	December 2018
Work Plan Category	Strategic

Work Description:

This request is to conduct a full analysis and implementation of a single fleet management system for the vehicles operated and maintained for CECONY (approx. 4,950 vehicles) and O&R (approx. 750 vehicles). The request includes analysis through implementation, with the assistance of a fleet management vendor, of a fleet management solution to be integrated with the Company's Oracle Enterprise Resource Planning (ERP) System. Functionality that will be targeted to be included in the solution include:

- Fleet inventory management, which will cover the lifecycle of a vehicle from its purchase, assignment, registration/permitting and retirement
- Maintenance management that will include all vehicle maintenance covering preventative, emergency, repairs, recalls and parts usage
- Fuel information functionality from the Company's fueling stations including fuel orders, deliveries, dispensing and usage as well as vehicle fuel management
- Vehicle pooling functionality will include reservation and scheduling functionality to support the Company's pooled vehicles that can be used by various employees
- Future technology functionality would include vehicle telematics integration, including GPS, into the fleet management system

The fleet management vendor will be engaged to supplement a cross functional project team. The vendor will be expected to bring experience in driving business requirements, conducting workshops, identifying interfaces, assessing data conversion effort, defining integration with Oracle ERP, and implementing the solution according to requirements and recommendations.

Justification Summary:

Currently CECONY and O&R have differing vehicle management processes that involve the use of five distinct applications that are built across multiple technology platforms (mainframe, web, & client/server). These systems provide limited integration and do not align with the Company's direction towards standardized processes and systems. A comprehensive vehicle management solution will consolidate existing systems, functionality, and support activities into one system allowing improved integration with corporate systems such as the Oracle ERP system as well as standardization of business processes. Currently the core system at CECONY is VMS (Vehicle Management System) a COBOL

mainframe based system implemented in 1981. In 1997 the Company implemented a "front end" EZVMS, which has been supported by a small company, although it is not a commercially offered product. Approximately $300,000 is spent annually to maintain the existing system. In addition to working from a common system across both CECONY and O&R, the desire is to integrate a fleet management packaged system that would provide ongoing vendor upgrades and support.

Supplemental Information:

- Alternatives: Maintain the current processes and systems that are in place and continue to support them separately using multiple resources both internal and vendor based. The ongoing support includes separate hardware and software upgrades.

- Risk of No Action: Continued use of disparate processes, increased support staffing (due to diverse business processes), and limited integration with ERP systems will negatively impact the Company's fleet management capabilities. In particular, limited ERP integration involves the continued use of manual workarounds to gather data, for example fleet utilization. Additionally there is a risk associated with future support of the existing systems due to fewer resources with working knowledge to modify and upgrade the systems in the future.

- Non-financial Benefits: A comprehensive vehicle management solution will reduce ongoing support risks, standardize business processes and replace the support requirements from multiple, disparate systems with a single, integrated system.

- Summary of Financial Benefits (if applicable) and Costs: Costs primarily consist of acquisition of software licenses and hardware, in addition to internal labor and vendor professional services required to install, configure, and customize the solution according to the approved specifications.

- Technical Evaluation/Analysis: Many fleet management vendor solutions exist. An internal analysis will be conducted by both the Business and IT in order to better understand our needs and create a comprehensive request for proposal. The analysis included in this proposal will provide a more detailed, structured, and documented requirements as well as a more accurate assessment of scope and effort.

- Project Relationships (if applicable): None.

- Basis for Estimate: Assuming 2 year effort and using similar prior projects as a baseline. Additionally the estimate was compiled using vendor quotes and information analysis conducted with an outside consulting company.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Actual 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1 million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Actual 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
	4,000	**4,000**		

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor		825	825		
M&S		1,175	1,175		
A/P		340	340		
Other		1,115	1,115		
Overheads		545	545		
Total		**4,000**	**4,000**		

FACILITIES CAPITAL BUDGET PLAN

DESCRIPTION	Eng Comp	2011 Actuals	2012 Actuals	2013 Actuals	2014 Actuals	2015 Planned	2016 Request	2017 Request	2018 Request	2019 Request	2020 Request	
MULTI-YEAR PROJECTS												
Irv Pl - Emergency Generator Upgrade (Central Eng)		114		320								
3rd Ave Yard - Main Building	Y			-								
		114	-									
Safety; Environmental; Regulatory; Audit/Independent Monitor/Ombudsman Commitment												
Irv Pl - LL 26 Fire Prot Tnk/25th, 27th fl & all Stages Sprinkler/Salvage Tnk/Crossover Pipe for Standpipe System ($5,200)	Y	113	-									
Irv Pl - 15th, Basement & 23rd fl Renovations	Y	-	145									
Irv Pl - 5th, 22nd fl Renovations (LL26)	Y	2,169										
Irv Pl - 11th fl Renovations (LL26) $21,000,000	Y	16,556	2,402	468								
Irv Pl - 24th fl Renovations (LL26)/Office of BEC - 2015	Y	5	2,675	(625)		1,000						
Irv Pl - 26th fl Renovations (LL26)	Y	1,851	(91)	29								
Irv Pl - 3rd fl Renovations (LL26) $12,960,000	Y	-	9,226	704								
Irv Pl - 8th fl Renovations (LL26) $14,125,000	Y		6,183	7,693								
Irv Pl - 7th fl Renovations (LL26) (Sprinkler Areas & ~50 of floor)	Y			1,776	7,723	62						
Irv Pl - 13th fl Renovations (LL26) & Irv Pl - East Penthouse Tank Controls and Valve Modification/Tank Repair	Y			7,747	9,119	1,328						
Irv Pl - 20th fl Renovations (LL26)	Y					600						
Irv Pl - 21st fl Renovations (LL26)	Y					600						
Irv Pl - 4th & 12th Renovations and 4th fl Data Center (LL26)	Y				13,564	11,213			10,400			
Irv Pl - DC4 Renovations (LL26)	Y					6,000						
Irv Pl - 1st fl Mail Operations Renovation/Lobby (LL26)	Y					521		-	5,000			
Irv Pl - 16th & 17th Renovations (LL26)	Y					1,000	33,000					Comp 1
Irv Pl - 19th fl Sprinkler (LL26)	N						6,000					
Irv Pl - 18th fl Renovations (LL26)	N						-	20,000				
Irv Pl - 14th fl Renovations (LL26)	N							19,000	-	-		
Irv Pl - Miscellaneous and Close-out	N					(125)			3,600			
Flatbush Ave - 4th & 7th Fl Renovation (LL26)	Y	914										
Flatbush Ave - 6th Fl Renovation (LL26)	Y	5,862	384	32								
Van Nest - Server Farm (LL 26 related)	Y	4,465		47								
Astoria Bill Printing/Mail Operations Relocation - wp cancelled	N			-	-							
Various Locations - Backflow Preventor Devices	Y	726		1								
Flatbush Ave - 3rd Fl Carpet		74										
Irv Pl - 19th fl Cornice Repair near Aud/Caf Roof & Cornice Roof - wp	Y	161	824	(6)								
ESR 2010 - 68 sm/hy (Irv Place - FO Leak Detection System Replacement)	Y	203	-									
Victory Blvd - 1st fl Ladies Bathroom/Locker Room Expansion*	Y	345										
ESR 2008 - 71 ds (Van Nest - Welding School Exhaust System)	Y			1								
Bruckner Bldg 3 - 1st & 2nd fl Ladies Bathroom Expansion & Renovation*	Y	36	347									
Van Nest Bldg 1610 - 2nd fl Ladies BR/Locker Room Renovation*	Y	562	-	1								
Astoria Bldg Garage - 2nd fl Ladies BR/LR Expansion and Renovation*	Y	384	-	-								
Astoria - B Outfal Drain Pipe - wp	Y	535	401	6,542	7,040	1,900						
ESR 2011 - 81 fc (ATS - Relocate Roof Drains to Downstream of MH 8/9).....Ties in w/Wet Weather Treatment Sys - $4,250,000 (on hold)	N											
Astoria - East Yard Restoration, Refurbishment and Drainage (deferred)	N					-	-	-	-	-		
Astoria - Septic System Connect to City Sewer - wp	Y	837	3,628	5								
ESR 2010 - 43 vk (Ast - Haz Waste Storage Area Ops Office) - wp	Y	-	1,610	23								
ESR 2008 - 119 im (TLC – Repl Fire Alrm Sys Contr Pnl & Area/Duct Smoke D	Y		-	1,925	382							
Irv Pl - Guardrails/Fall Protection Upgrade	Y	3	614	40								

FACILITIES CAPITAL BUDGET PLAN

DESCRIPTION	Eng Comp	2011 Actuals	2012 Actuals	2013 Actuals	2014 Actuals	2015 Planned	2016 Request	2017 Request	2018 Request	2019 Request	2020 Request	
Regions - Guardrails/Fall Protection Package 1 (Manhattan), Package 2 (Bronx Westchester), Package 3 (Queens)	Y			81	2,628	1,160	1,630					Comp 2
Regions - Guardrails/Fall Protection Package 4 (Brooklyn/SI), Package 5 (Van Dam, Van Nest Crane Life Line)	Y						800	1,500	587	2,000		
Fire Alarm/Sprinkler Alarm Improvement Program Based on FDNY LOA Technical Guidelines - (Astoria - $1,008,000; Irv Pl - $523,000; Van Nest, Bruckner - $173,000, CPB - $258,000)	N						70	1,000	1,913	1,000		Comp 3
Regions - LED Weather & Safety Notification Signs (3rd Ave Yd, Van Nest, Eastview)	N					75						
Irv Pl - Tower Camera	Y		3									
ESR 2010 - 73 vm (Irv Pl - Fire Alarm Notification Devices Basement)	Y		-	550	-	-						
Rye S/C - 3rd fl Ladies Bathroom Renovation* $385,000	Y		198	(54)	-							
ESR 2013 - 11 sm (Eastview - Garage Oil Water Separator Replacement)	Y				-	287						
ESR 2011 - 37 er (Irv Pl - Bicycle Cover Shelter in 3rd Ave Parking Lot)	N			-	-	-	-		-	90		
ESR 2009 - 42 sm/ds (Van Nest - Rm 165 Tech Lab Ventilation/Fresh Air)	N	-	-	-	-	-	-		-	75		
ESR 2010 - 10 er (Cleveland St - Office Ceiling Overhang Bracing)	N	-	-	-	-	-	-		-	35		
ESR 2008 - 32 as (Irv Pl - Stairway E Exit Basement)	N	-	-	-	-	-	-		-	80		
ESR 2007 - 157 hy (Van Nest - Pad Mounted Transformer mod SPCC Plan)	N	-	-	-	-	-	-	-	-	735		
ESR 2014 - 18 fc (124th St - N. Stairwell Diamond Plate Steps at Pay Center)	N					-						
ESR 2009 - 17 vm (Cleve St - 2nd Fl Electric Closet Code Issue Corrections) - covered as part of electric upgrade	N	-	-	-	-	-	-					
Flatbush Ave - Garage Stair Upgrade	Y					32						
Flatbush Ave - Fire Alarm Upgrades to Address Smoke Purge Sys VO	Y		-	1,999								
Victory Blvd - EDG Upgrade (Relocated/Flatbush Ave) - $900,000	Y	9	-	316	31							
ESR 2011 - 88 hy (Victory Blvd - 250 kw EDG ATS Upgrade) - see above	Y			-	-	-						
Miscellaneous Carryover	Y		241	32	(204)	544						
Emerging Safety, Environmental and Regulatory - tbd	N	-	-	-	-	-	-	-	-	985	5,000	
		35,810	28,790	29,327	40,283	26,197	41,500	41,500	21,500	5,000	5,000	
LL26		31,935	20,924	17,216	30,406	22,199	39,000	39,000	19,000	-	-	
Concent Order			401	6,542	7,040	-	-	-				
Safety; Environ; Reg; Audit/Independent Monitor/Ombudsman Commitment ($1.5 M - 2013; includes 2012 Carryover)		3,340	1,403	5,569	2,837	2,098	2,500	2,500	2,500	5,000	5,000	
Other Cat A (Stand Alone Projects & Astoria East Yard - deferred)			6,062	-		-	-	-	-	-		
				29,327	40,283	24,297	41,500	41,500	21,500	5,000	5,000	

Critical Infrastructure - Short Term Priority

WEA - E. Cont Rm Reno/AC ($4,800) + Smoke Purge ($500)	Y	-	-									
3rd Ave Yd - Building 2,3,4 Demo/Wall Preservation ($3,300)	Y	1,912	-	5								
Eastview - Yazaki Chiller # 4	Y	203										
ESR 2008 - 84 im (Irv Pl - Scales Air Compressor Replacement) - wp	Y	40		(60)								
WEA - CT Condenser Replacement (see cat C - HVAC for Chillers)	Y	1,009										
Irv Pl - Condenser or Chiller Piping Replacement - wp	Y	1,801	731	15								
Irv Pl- Penthouse Stucco & Cornice Replacement (Misc.) and 19th floor Roof/Cornice Structural Beam (from inspection program) - wp	Y	799	1,930	13								
Irv Pl - 5th Fl Tranformer Noise Attenuation (Walls/Doors)	Y	3	70									
Flatbush Ave - Payment Center Demo, Demising Wall & Front Entance			387	177								
Irv Pl - Basement Chiller Turbine Steam/Drain/Trap System Upgrade	Y			267	245							
Irv Pl - Parking Lot Sewer Pipe Replacement	Y			28	256							
CPB - 1st Fl & Transportation 2nd Fl HVAC Roof Replacement	Y			-	262							
ESR 2010 - 61 ds (Van Nest Air Comp Clng Fan Sound Barriers) - cancelled	Y	-	-									
Van Nest - Paving Upgrades based on Traffic Study Project	N						200					
ESR 2008 - 96 ds (Irv Pl - LAN Rm 1650-S Cooling) - cancelled part of LL26	N	-	-	-	-							
Irv Pl - Cascade Chemical Feed System Upgrade - cancelled	N	-	-	-	-							

FACILITIES CAPITAL BUDGET PLAN

DESCRIPTION	Eng Comp	2011 Actuals	2012 Actuals	2013 Actuals	2014 Actuals	2015 Planned	2016 Request	2017 Request	2018 Request	2019 Request	2020 Request	
ESR 2010 - 13 im (Irv Pl - Noisy Duct in 1428/Lack of air in 10NE) - cancelled part of LL26	N	-	-	-	-							
ESR 2009 - 69 sm (Irv Pl - EDG Exhaust Fumes Mitigation & Stairwell Pressurization Fan Louvers)	Y	-	-	2	97	-						
Irv Pl - Sports Club Spin Room Leaks/Sidewalk & Waterproofing Replacement	N						100					
ESR 2014 - 07 fc (Yonkers Building #1 - Loading Dock Upgrades)	N				-	200	-					
ESR 2010 - 41 sm (Davis Ave - SI Electric Control Center AC)	N	-	-	-	-	-	307					CI - 1
ESR 2009 - 57 ds (3rd Ave Yd - Elec Dist Rm Ventilation)	Y	-	-	3	197							
28th St - Flush WWT Shed Replacement (deferred pending DOB)	Y		-									
		5,767	3,118	450	1,057	200	607					

Critical Infrastructure - Programs

PAVING/RESURFACING/DRAINS/PARKING/LOADING PLATFORMS												
ESR 2008 - 82 vk (3rd Ave - Transportation Garage Fl Refinishing)	EHS											
ESR 2009 - 54 mm (3rd Avenue – North Garage Drains)	Y	-	267	174								
ESR 2012 - 37 mm (Davis Ave - Sinking Zipper Drains)	Y				134		-					
3rd Ave Yard - Parking Lot Redesign	Y		-	23	2,000	2,000						
ESR 2786 - 3rd Ave Yard - Expanded Cable Yard Area	N							320				Prog - 1
Victory Blvd - Main Bldg Exit ramp Rebuild	N	-	-	-		-		-	-	-	200	
ESR 2849 - Victory Blvd - OverHead Department Partking Lot Flooding											1,039	
Van Nest - Traffic Study Improvments	Y				1,622	200						
ESR 2008 - 135 er/co (Van Nest - Resurfacing/Paving)	N	-	-	-	-	-	-	-	-	500	500	
ESR 2013 - 09 mm (Victory Blvd - Exterior Rack Installation & Interior Steel Platform Storage) - $95,000 cancelled	Y				-							
Bruckner Ramp - Concrete Deck Restoration - place holder for 2015	N											
ESR 2008 - 16 il (Bruckner - Sinking Floor Repairs)	Y	-	318	398								
Bronx Garage - Flooring Resurfacing	N	-	-	-			-	-	-	246		
Bruckner Ramp - Concrete Deck Restoration	Y					72						
cancelled	Y			(1)								
CPB - Paving/Resurfacing	N	-	-	-	-	-	-		778	-	-	
ESR 2012 - 14 er (College Point - Transportation Bay Floor Surface Preparation and Coating)	N						-	-	-	900		
Astoria - Paving/Resurfacing (Continued)	Y	-	-		-	-	-	-	-	-	1,000	
ESR 2012 - 07 er (Astoria Warehouse - Floor Surface Preparation and Coating)	N						-	-	-	-	1,000	
ESR 2011 - 09 il (Astoria Warehouse - Distribution Floor Rehabilitation)	N			-			-		-	-	50	
ESR 2008 - 56 mm (Astoria WWT Facility - Ramp Removal)	N	-	-	-			-		-	-	80	
ESR 2013 - 03 mm (Astoria - Access to TechLab A/C Unit #2)	N							-	-	-	75	
ESR 2013 - 01 mm (Astoria Telecom Building - Flooding Evaluation)	N					-			-	-	75	
ESR 2013 - 14 il (Astoria - Ponding Condition In Front of Storage Tent Used by Transmission Ops)	Y				213	-		-	-	-	40	
ESR 2013 - 45 il (Astoria - LNG 31st Roadway Ponding Condition)	N								-	-	250	
Resurfacing/Drainage)									-	-	-	
ESR 2014 - 02 il (Astoria B/Q Electric Underground Bldg Ponding Issue)	N								-	-	150	
MH1/MH2)	N								-	-	300	
ESR 2013 - 39 mm (CPB - Sinking Ground at East Side of Building	N									-	1,000	
ESR 2677 (Astoria - Truck Scale Replacement)	N						358	-		-		
ESR 2692 Astoria - Salt Bulk Storgae Area	N							535		-		Prog - 2
ESR 2734 Astoria Park - Concrete Pyramids Removal	N						-	-	402	-		
College Point - Yard Resurfacing at East Main Driveway/Employee Parking Lot						62						
TLC - Yard Resurfacing at Loading Dock	N					32						

FACILITIES CAPITAL BUDGET PLAN

DESCRIPTION	Eng Comp	2011 Actuals	2012 Actuals	2013 Actuals	2014 Actuals	2015 Planned	2016 Request	2017 Request	2018 Request	2019 Request	2020 Request	
Davis & VB - Transportation Garage Floor Resurfacing	N	-	-		-		-		-	300		
Neptune Ave S/C - Parking Area Resurfacing	N		-		-		-		-	300		
ESR 2010 - 63 il (3rd Ave Yd - Flush Facility Canopy)	N					-	-		-	100		
ESR 2012 - 18 il (Eastview - Elec Equip Storage for Flood Conditions)	Y			744								
Eastview S/C - Employee parking lot expansion	N	-	-		-	-	-	-	-	3,000	-	
Rye HQ - Parking Area Resurfacing	N	-	-	-		130	-	-	-	1,000	-	
ESR 2009 - 32 il (Eastview & Rye - C&D Storage Covering System)	N		-		-		-		-	225		
ESR 2010 - 06 mm (Verplanck - Pond Drainage Evaluation)	N	-	-		-	-	-	-	-	100		
ESR 2012 - 55 mm (Eastview - Suitable Surface Portable Truck Lifts) - $100	Y				66			-	-	125		
ESR 2013 - 43 il (Rye S/C - Pole Training Area Semi-permeable Substrate)	n								-	250		
ESR 2008 - 17 il (110th St Trans Garage Cover of Decommissioned In-Grou	N	-	-		-		-		-	25		
ESR 2008 - 01 co (110th St, 28th St & 16th St - Resurfacing Transportation	N	-	-		-	-		-	-	250		
ESR 2008 - 78 co (Sherman Crk - Redesign Block 2185/Lot# 51 for Parking	N		-		-	-	-	-	-	800		
ESR 2008 - 99 mm (28th St - 29th St Driveway Apron Evaluation)	N	-	-		-		-		-	75		
ESR 2009 - 58 il (28th St - Pot Holes Issue)	N	-	-		-			-	-	100		
16th St S/C - Enlarge Ave C gate for truck traffic	N	-	-	-		-	-	-	-	-	300	
ESR 2014 - 2633 (750 16th St Paving)	N											
Other locations (tbd)	N	-	-	-					-	-		
SIDEWALKS/GATES/FENCES/GARAGE DOORS/SIGNAGE		-	-						-			
Flatbush Ave - Sidewalk Replacement (Structural Assessment Program)	Y				17	200	1,163	-				Prog - 3
ESR 2012 - 10 ab (Astoria Signage)	Y			-	338							
ESR 2012 - 16 mm (CPB - Staircase at Egress Men's Locker-room Area)	N				-			-	35			
ESR 2009 - 51 er (750 16th St - Fence for Steam Work Room)	N	-	-	-			-		25			
ESR 2012 - 58 mm (28th St - Main Gate Replacement)	Y									35		
ESR 2010 -51 er (Irv Pl - Courier Door in Main Lobby)	N		-	-		-			90			
ESR 2010 - 20 mm/il (Irv Pl - Parking Lot Gate Failure)/ESR 2012 - 09 mm (Irv Pl - Main Fencing Replacement)	Y	-	-	-	1,120							
ESR 2011 - 53 mm (Irv Pl - 15th St Sidewalk Slab Restoration)	Y		-	470								
ESR 2011 - 55 mm (Van Nest - Yard Sinkhole Repair)	Y		59	400								
Van Nest - Building 3 Garage Door	N	-	-	-		-	-	-	-	-	400	
ESR 2013 - 18 mm (3rd Ave Yard - Damaged North Garage Wall)	N								20			
ESR 2014 - 16 fc (Flatbush Ave - Garage Steps Accident Evaluation)	N									50		
Other locations (tbd)	N	-	-	-					-	-		
WINDOWS												
Davis Ave - Window & Lintel Replacements	N	-	-	-	-		-	-	-	-	3,000	
ESR 2009 - 09 vk (3rd Ave Yd - N. Garge Window Replacement)	N			-	-			-	-	-	1,000	
ESR 2008 - 25 co (Astoria Guard House Gate #5 - Window Frames Replace	N	-	-		-			-	-	-	150	
Other locations (tbd)	N	-	-	-	-					-	2,000	
BATHROOM/LOCKER ROOM/DOMESTIC WATER/KITCHEN RENOVATIONS												
ESR 2008 - 69 vk/ds (Irv Pl - Basement Men's Locker Rm/Showers)	Y	651	-	-	-							
Van Nest Bldg 1 - Renovate 1st fl Mezz Bathrooms/Locker rooms -$500K	N	-	-	-	-		-	-	500			
Van Nest Bldg 1 - Renovate Shop fl Bathrooms/Locker rooms	N	-	-	-	-		-	1,000	-	-		
Rye S/C - 2nd fl bathroom renovation	N		-	-	-		-		-	150		
Eastview - Men's & Ladies Bathroom Renovations								1,000				
WEA - 2nd & 3rd fl Ladies Bathroom Renovation*	Y		-	-	343	1,300						
ESR 2008 - 115 er (28th St - Trans Garage Bathroom Reno) - $400K	N		-		-			-				
Cleveland St - Men's Bathroom/Locker room Renovation -	N	-	-	-	-	-	550	-	-	-		Prog - 4
Flatbush Ave - BQECC Locker Room Upgrade						40						
CPB S/C - 1st Fl Bathroom renovation - $200K	N				-			-				
ESR 2743 Astoria Warehouse 136 - Women's Locker Room	N					-	900			-		
ESR 2011 - 11 er (Davis Ave - Mens Rm in FOB/Troubleshooters Area)	N						-		-	150		
ESR 2784 - Neptune Ave - Ladies Bathroom	N						-	-	250			
ESR 2014 - 05 im (Irv Pl - Redundant Auxiliary Domestic Water Pump)	N								-	225		
Irv Pl - G Stairwell Washroom upgrades	Y	-	-	-	-		-	-	-	-	500	
Other locations (tbd)	N	-	-	-					-	-		

FACILITIES CAPITAL BUDGET PLAN

DESCRIPTION	Eng Comp	2011 Actuals	2012 Actuals	2013 Actuals	2014 Actuals	2015 Planned	2016 Request	2017 Request	2018 Request	2019 Request	2020 Request	
HVAC		-	-									
Irv Pl - Air Handler Replacement PA - 2	N		-	-	-		-		1,000			
Irv Pl - Air Handler Replacement PA - 4	N		-	-	-	-	500	-				
Irv Pl - Air Handler Replacement 20NW & 20NE	Y	-	-	17	116	780						
Irv Pl - 11th Fl Chiller - By-pass/Auto Failure Cutover - place holder for 2015	N					-						
Irv Pl - Cooling Tower Vibration Sensors Replacement	N		-	-	-			-	50			
ESR 2008 - 23 ds (Irv Pl - BMS Upgrades)	N	-	-	-	-	-	1,000	-				
Irv Pl - Rm 228 HVAC/PET Device Room Improved Ventilation	N		-	-	-			-	20			
Irv Pl - 1452-S Pressure Control Box Installation	N	-	-	-			-		50			
ESR 2008 - 28 im (Irv Pl - Rm 1320-s MAP Room Cooling/Additional Outlets	N	-	-	-			-					
ESR 2010 - 80 im/mm (Irv Pl - LAN Rm 211 HVAC & Additional Equip)	N				-		-		300			
ESR 2010 - 55 im (Irv Pl - Visual Communications Rm 1641 -S AC)	N			-		-	-	-				
ESR 2014 - 04 sm (Irv Pl - 9th Fl Humidification System)	N								150			
Irv Pl - Main Vacuum/Condensate Skid Evaluation	N				-	-	-	250	-			
Irv Pl - Pressure Switches for Chilled & Secondary Water Pumps	N	-	-	-		-	-	-	-	-	150	
Irv Pl - Additional Points for Alarm Panel in Control Room	N	-	-	-		-	-	-	-	-	200	
Irv Pl - Alarm for Glycol Systems	N	-	-	-		-		-	-	-	150	
Cleveland St S/C - Yazaki Absorption Unit Replacement	N	-	-	-		-	-	1,500	-			
Neptune Ave - 2nd Fl AC Unit Replacement	N	-	-	-	-		-	-	810			
ESR 2007 - 163 ds (Neptune Ave - AC Removal/Fire Rated Wall)	N		-	-			-		75			
ESR 2007 - 154 ds (Flatbush - Ventilation Design & IA Quality Issues)	N		-	-			-	-	800			
ESR 2009 - 06 ds (3rd Ave Yd - BMS for New Building, Breezeway & Trans	N	-	-	-		-		-	600			
ESR 2009 - 68 sm (Victory Blvd - Conference Rm A/C Improvement)	N	-	-	-			-		80			
ESR 2013 - 37 an (3rd Ave Transportation Garage - Ventilation Issues)	N								40			
ESR 2011 - 92 da/sm (Flatbush Ave - LAN Rm 407 Cooling) - $370,000	Y			350								
ESR 2008 - 104 vk (3rd Ave Yd - AV Equipment Electric Construction)	N	-	-		-	-		-	-	-	120	
ESR 2008 - 14 ds (Flatbush Ave - Electrostatic Discharge 2nd Fl Humid Sy	N		-	-								
Van Nest - Main Boiler Replacement	Y	2,529	-	63	-							
Van Nest - Building 1 Air Handler and Steam System Upgrade	N		-	-	-	300	2,580	-				Prog 5
Van Nest Building 1 - HVAC Replacement for 3rd Fl Offices	N	-	-	-	-		-		500			
Van Nest - Planning Office HVAC	N	-	-	-	-		-		500			
Bruckner - Transportation Garage Heating System Upgrade	N	-	-	-		-	-		250			
Bruckner - Yazaki Replacement	Y	-	-	-	186	1,000	-					
Van Nest 21/21A - BMS For HVAC Systems	N		-	-	-		-		200			
ESR 2009 - 30 sm (Van Nest - Relocate Flush Trucks to Hi Pot Testing Area	N	-	-	-			-		125			
ESR 2009 - 70 sm (Van Nest 1601 - Lobby Draft Complaints)	N		-	-			-		40			
CPB - Meter & Test Area HVAC	N	-	-	-	-		-		300			
TLC - 350 ton Chiller Wellan Rings and Absorber/Condenser Retube	Y				314							
ESR 2013 - 24 an/ak (Astoria Warehouse - Duct System to Vent Ozone from Hot Stick Test Equipment)	N								150			
ESR 2008 - 47 ds (Astoria Chem Lab - Airmont HVAC Controls)	N	-	-	-	-			820	-			
ESR 2008 - 55 im (Astoria Trans Shop - 1st Floor QA Office IA Issue)	N	-	-	-			-		65			
ESR 2007 - 164 co (Astoria Warehouse - ~~Roof Repair~~ & New Exhaust Fan)	N	-	-	-	-			-	250			
ESR 2010 - 54 sm (Astoria Warehouse - Main Office HVAC)	Y		639	44	-							
ESR 2011 - 46 hy (Astoria Warehouse - 2nd Fl LAN Rm UPS#2)	N			-			-		35			
Astoria - Transportation Bldg 2nd Fl Renovation/HVAC upgrade	N				-	-	1,285					
ESR 2011 - 08 sm (Astoria - Tech Lab Humidifier)	N						-		-			
ESR 2014 - 14 im (Astoria Tech Lab - HVAC/Climate Control	N				-	-	-	600				
ESR 2013 - 48 sm (ChemLab - Air Handler #2 OA Preheat System Corrosion)	N								135			
ESR 2013 - 36 sm (Van Dam Trane A/C Duct Insulation Deterioration)	N								115			
WEA - LAN/Communications Rm HVAC (inspection program)	N	-	-	-	-	-	-	500				
ESR 2008 - 79 ds/mm (700 16th St - 2nd Fl Tele/LANroom A/C unit)	N	-	-	-	-	-	-	300				

FACILITIES CAPITAL BUDGET PLAN

DESCRIPTION	Eng Comp	2011 Actuals	2012 Actuals	2013 Actuals	2014 Actuals	2015 Planned	2016 Request	2017 Request	2018 Request	2019 Request	2020 Request
WEA - W. Control Rm Chiller Replace (wp)	Y	-	260	554	1,063	-					
WEA - BMS Upgrades	N	-	-	-	-		-	-	-	1,000	
WEA & 16th St Cooling Tower Make-up Water Meters	N	-	-	-		-	-	-	-	160	
28th St - Bathroom Ventilation Improvements	N	-	-	-			-	-	100	-	
28th St - Heat Pump replacement	N					-		175	-	-	-
28th St - Bay #7 Exhaust Fan	N	-	-	-			-	100	-	-	-
28th St - SSC Office HVAC	N	-	-	-	-		-	100	-	-	-
ESR 2008 - 63 ds (750 16th St - Cross Connection Piping Between Conden	N		-	-			-		-	-	60
ESR 2008 - 107 ds (WEA - Machine Rm Refrigerant Detection System)	N	-	-	-			-		-	-	50
ESR 2009 - 15 ds/bs (16th St - Environ Shed Heating/Lighting Sys Evaluati	N		-	-			-		-	-	50
ESR 2009 - 63 sm (750 16th St - Add Unit Heaters Stores Area 1st Fl)	N	-	-	-			-		-	-	45
ESR 2010 - 50 ds (28th St-1st Fl Men's Locker Rm Exh Fan EF-1 Repl)	N		-	-			-		-	-	30
ESR 2011 - 15 sm (WEA - IPC Rm Cabinet AC Load and Electrical Analysis	N						-		-	-	45
ESR 2011 - 47 an (WEA - Repl Stm Pneu PRV's w/Spencer Pilot CV's)	N			-			-		-	-	75
ESR 2011 - 51 sm (28th St - Repl 2ton Split AC Units SSC Offices/Muster A	N			-			-		-	-	75
ESR 2011 - 78 sm (750 16th St - Elevator Shaft Air Vent Snow Issue)	N			-			-		-	-	15
ESR 2013 - 04 an (WEA - Basement AC unit in Chiller Room)	N							-	-	-	500
ESR 2014 - 2710 (750 16th St Cooling Tower 1 & 2 Replacment) - HVAV Assessment Program - place holder need $	N										
ESR 2006 - 209 ds (Rye HQ - Building Management System)	N		-	-			-		15		
ESR 2010 - 53 sm (Eastview - Cafeteria Thermoking HVAC Failure)	N		-	-	-		-		-	-	
ESR 2014 - 2668 (Eastview Chiller 1 & 2 Replacement) - #2 & #5						330					
Other locations (tbd)	N	-	-	-					-	-	
LIGHTING & ELECTRICAL UPGRADES											
Regional Storerooms Bronx - Lighting	N	-	-	-	-		-		-	200	-
ESR 2012 - 31 il (Bruckner S/C - Fallen Lamp Pole Review)	N				-			-	-	500	
Irv Pl - Electrical Distribution Panel Upgrades	N	-	-	-	-		-	-	-	2,000	
Irv Pl – Strategic Planning Lighting Upgrade	Y				131						
ESR 2010 - 48 vm (Irv Pl - Service Switch Load Monitoring System)	N		-	-			-		100		
CPB Storerooms - Lighting upgrade	N	-	-	-	-		-		200		
TLC - Arcade area lighting replacement	N	-	-	-		-		-	-	-	300
ESR 2008 - 24 bs (700 16th St - 30 amp (GFCI) Recep Mobile Abatement Ve	N	-	-	-			-		25		
ESR 2008 - 12 vk (WEA - Evaluation for Replacemnt of Exterior Perimeter L	N		-	-	-			-	400		
ESR 2009 - 04 hy (28th St - Outdoor Electrical Service for Flush Trucks - C	N			-	-		-		300		
ESR 2008 - 85 bs (700 16th St - Yard Light Fixture Replacement)	N				-			-	50		
ESR 2010 - 36 bs (WEA - UPS Pwr to Metering Sources in Relay Room)	N	-	-	-			-		-	150	
ESR 2012 - 34 bs (28th Street - Light Pole Replacement)	N					-		-	-	-	500
ESR 2013 - 02 bs (Gowanus Yard - Lighting Once Trailers are Removed)/ESR 2013 - 16 bs (Gowanus Construction Site - Investigative and Asset Protection Site Survey)	N					-	300		-		
TLC - Perimeter Lighting for Security Breach - deferred	N			-			-				
Regional Light Pole Upgrade Program	N							300			
Other locations (tbd)	N	-	-	-					-	-	
SECURITY											
ESR 2008 - 21 bs (Van Nest Replace Security Guard Booths White Pl Rd/B	N		-	-	-	-	-		-	750	
Van Nest - Security Surveillance Upgrade					56						
ESR 2012 - 24 vk (Bruckner Blvd - Guard Booth & Main Entrance Gate	N						-		-	15	
Bruckner Blvd S/C - Security Upgrade (place holder 2018)									500		
Van Nest - Cable Yard High Security Fence						100					
16th St S/C - Security Upgrade (place holder 2018)	N	-	0	0	0	0	0	0	750	0	
28th St S/C - Security Upgrade	N	-	0			0	0			0	420
110th St S/C - Security Upgrade (place holder 2018)	N								250		
28th St - Gate Replacement ($35,000)											
ESR 2008 - 108 mm (750 16th st - Surveillance Camera)	N	-	-		-			-	-	25	
ESR 2008 - 114 bs (110th/28th/16th St Transp Parts room Card Swipes)	N	-	-			-			-	100	

FACILITIES CAPITAL BUDGET PLAN

DESCRIPTION	Eng Comp	2011 Actuals	2012 Actuals	2013 Actuals	2014 Actuals	2015 Planned	2016 Request	2017 Request	2018 Request	2019 Request	2020 Request
ESR 2009 - 50 er (110th St - Guard Booth Replacement)	Y	-	-	74							
ESR 2009 - 65 vk (ECC & AECC Parking Lot Turnstile Entry to Bldg)	N	-	-	-			-		-	125	
Irv Pl - MECC Upgrades Associated with Corporate Security Audit	N	0	0	0	0			0	0	129	
ESR 2011 - 76 er (Irv Pl - DC II Door Replace for Security Reasons)	N			0			0		0	0	
TLC - Security Upgrades (place holder 2016)	N	-	-	-	-		300	-	-	-	-
CPB - Security Upgrades (place holder 2016)	N	-	-		-	-	1,000	-	-		-
ESR 2011 - 89 vk (CPB - Gates 2 & 3 & Main Gate...Replacement of Astoria Perimeter Security $175,000	N			-	-	450	202				
Astoria Cable Yard Security Upgrades (wp) (2014 in Carryover)	Y		-	2,614	372						
ESR 2011 - 72 er (Astoria Warehouse - Corp Security Office Expansion)	N				-			-	-	750	
Cleveland St - Security Upgrades (place holder 2016)	N	-			-	-	700	-	-	-	
Victory Blvd - Security Upgrades (place holder 2017)								750			
Neptune Ave - Security Upgrades (place holder 2017)	N	-	-	-		-	-	750	-	-	-
ESR 2010 - 45 bs (3rd Ave Yd - North Garage Security Cameras)	N		-		-		-		-	350	
ESR 2013 - 34 bs (3rd Ave Yd - Small Parking Lot Turnstile Gate/Swing Ga	N						170				
Worth Street - Security Upgrades (place holder 2017)								500			
Eastview - Security Upgrades (place holder 2018)									500		
Other locations (tbd)	N	-	-	-						-	
EDG UPGRADES - INCLUDES SYSTEM ENGINEERING ASSESSMENT									-		
Flatbush Ave - EDG Upgrade	Y	1,791	-	28							
Irv Pl - EDG ATS Monitoring System	N	-	-	-	-	-	-	-	1,500		
Irv Pl - New Load Bank for testing EDG	N				-	-	-	1,500	-		
Irv Pl - Install New Emer Pwr Bus Duct Riser in Converted Elevator Shaft	N				-	-	-	-	-	-	2,000
ESR 2013 - 41 mp (16th St - CNG Station Power Restoration/Emergency Generator Connection)	N									350	
TLC - EDG CERC & Business continuity upgrades	N	-	-	-	-	-	-	-	-	-	5,000
TLC - EDG Upgrade	N		-	-	-	-	-		-	-	2,000
Van Nest Shop - EDG Upgrade (i.e. backup)	N	-	-	-			-		-	-	1,500
Davis Ave - EDG Upgrade	N	-			-	-	-	-	1,590		
Rye HQ - EDG Upgrade	N	-	-	-	-	1,975	3,650				
ELECTRICAL UPGRADES - SYSTEM ENGINEERING ASSESSMENT											
Bruckner Blvd - Rewire/Replace Main Distr Boards/Pnls to Correct Overcr	N			-	-	-	-	900	-	-	-
Bruckner Blvd - Replace Existing Circuits in Garage Area	N			-		-	-		-	-	250
ESR 2012 - 21 hy (Bruckner Building 3 - Electrical Upgrades for Compressor Room, Transportation, Development Lab and Block Heaters)	N						-		-	-	310
ESR 2013 - 38 mp (Atlantic Ave - Electrical Service Showing Signs of Stress)	Y				505						
WEA - Rewire Mech Equip Distr Board/ATS to Alleviate Overheating	N			-	-	-	-	-	500	1,500	500
Irv Pl - Repl 17 Main Service Switches w/Load Break Type	N					-	-	-	-		2,000
ESR 2725....Davis Ave - 2nd Fl LAN Room UPS	N									90	
Van Nest - BR Electrical Upgrade for Proper Operation of Air Comp	N				-	-	-	-	-	-	2,000
Astoria Transportation Building - Electric Service Upgrades (1st Fl Mech Rm/Garage)						200					
3rd Ave yard - Stores Building Electrical Upgrade	N					161					
FIRE PROTECTION											
ESR 2008 - 39 im (Davis Ave - Fire Panel Compatibility Review)	N	-	-	-			-		150		
ESR 2008 - 111 vk (3rd Ave Yd - Fire Alrm Sys Extend to Weld Shed)	Y	20									
Flatbush Ave - Cellar and Subcellar Fire Alarm Upgrades	Y			112	68						
ESR 2007 - 159 im (Flatbush - Rm 419 Server Farm Fire Suppression Syste	N	-	-	-			-		450		
ESR 2007 - 160 im (Rye S/C - 2nd Fl Server Farm Fire Suppression System	N	-	-	-			-		425		
ESR 2011 - 12 sm (VN Bldg 2 - CFS Storeroom Sprinkler Heads in Office A	N			-	-			-	130		
ESR 2013 - 15 fc (Astoria Warehouse - Crane Way Fire Wall Louvers)	N							-	25		
CPB S/C - Addition LPG Storage	N	-	-	-		-	-	-	-	-	200

FACILITIES CAPITAL BUDGET PLAN

DESCRIPTION	Eng Comp	2011 Actuals	2012 Actuals	2013 Actuals	2014 Actuals	2015 Planned	2016 Request	2017 Request	2018 Request	2019 Request	2020 Request
TLC - Employee/student notification system	N	-	-	-		-		-	-	-	600
WEA - HALON System Replacement with FM200	Y	-	-	13	2,442	650					
WEA - HalonSystem Ventilation Transfer	N										
MISCELLANEOUS											
ESR 2009 - 61 il (28th St Garage - Overhead Crane System)	N	-	-		-	-	-		-	75	
ESR 2011 - 61 il (28th St Garage - Hoist Floor/Wall Evaluation)				-	-		-		-	25	-
Eastview - Automation of Chemical Water Treatment System	N	-	-	-		-			-	100	-
Eastview S/C - Create new bay in switch area	N	-	-	-		-		-	-	-	300
Various OWS - Replacement of Pneumatic with Electric Driven Pumps	N	-	-			-	-	-	-	200	
ESR 2008 - 45 ds (Astoria - Transportation Operations Compressor Shed)	N	-	-			-	-	-	-		60
ESR 2008 - 92 er (Flatbush 2nd Fl - Door Failure & Replacement)	N	-	-			-			-	-	60
ESR 2012 - 08 sm (Astoria Transformer Shop - Transformer Oil Line Inspection/Assessment) & ESR 2012 - 23 il (Astoria Transformer Shop - Oil Pipe Tunnel Structural Evaluation) - $460,000	Y			251							
TLC - Grease trap replacements	N		-	-	-	-			300	-	
Astoria Building 137 - Tools Air Compressor Replacement	N						135				
CPB S/C- Flush Truck Shed	N	-	-	-	-	-	-	-	-	-	2,500
TLC - Building 1 & 2 assembly area	N	-	-	-		-		-	-	-	500
ESR 2014 - 2692 (Astoria - Salt Storage Area)	N										
Van Nest - Summer Door Upgrade & Air Curtains				78							
Van Nest - Building 1 Winter Shed	N	-	-	-		-	-	-	-	-	120
Van Nest - Use of Paint Storage Building for Gasoline Storage Variance	N	-	-	-		-		-	-	-	175
ESR 2010 - 79 il (Victory Blvd - Nitrogen Storage Shed)	N			-	-			-	-	-	100
ESR 2765 - Victory Blvd - Sprinkler System for Protective Systems Testing Area In Warehouse	N							-			220
ESR 2783 - 280 South Ave Staten Island Building Exterior Repairs	N							2,100			
Cleveland St S/C - Garage building - New shape-up room	N	-	-	-	-		-	-	-	-	600
ESR 2008 - 13 il (Van Nest - Building 1 Main Entrance Canopy)	N		5	9	-						
Irv Pl - Stage G FP Tank Level Control Wiring Upgrade - defer	N	-									
ESR 2013 - 05 il (Irv Pl - Replacement of Existing Working Platforms in Electrical Shaft at Elevator Bank D with Permanent Platforms)	N							-	-	-	475
ESR 2012 - 57 mm (Irv Pl - 15th St Base Building Decorative Metal Ornament Repair/Replacement) - $3,000,000 (Expense)	N							-			-
Critcal Infrastructure Miscellaneous Carryover from years prior to 2015		1,492	-		1,410	238					
		6,483	1,548	6,415	12,516	10,220	14,793	14,000	17,000	17,500	37,364

Roofs (Inspection program/ESR)

		-	-	-				-			
Miscellaneous Roof Carryover					(337)	-					
Bruckner Building 3 - Garage Roof (Inspection Program)	Y	3,314	439								
Davis Ave Trans Garage Roof (Inspection Program)	Y	-	318	191					-		
3rd Ave Yard - Garage Roof & Truss Repair	Y	-	-	3,374	(427)	164					
Astoria - ATS Roof	Y		36	599		-	3,000	-			
Astoria Garage Lower Roof (Inspection Program)	Y	-	1,560	341			-				
College Point Roof Repl (Inspection Program)	Y	-	1,419	1,116		-					
ESR 2014 - 24 fc (College Point Blvd - Water Leak Investigation)	N									-	200
Astoria Warehouse Roof (Inspection Program 3 -$6,350,000)	Y	-	-	3,492	3,272	1,650	-				
ESR 2014 - 01 fc (Cleveland St - Men's Bathroom Roof Evaluation) - part of bathroom project	N					-			-		
Van Nest - Building 3 Roof	N		-	-	-	-	-	-	2,770		
Van Nest - Car Wash Building (to be demolished with Server Farm project)	N					-		-		-	
Irv Pl - 19th Floor South Promenade	N					-		-	170	-	
DaviS Ave - Meter Readers Reporting Station	N					-		-	60	-	
ESR 2014 - 13 fc (Victory Blvd - Main and Transportation Bldg Roof Leaks)	N								-	3,600	

FACILITIES CAPITAL BUDGET PLAN

DESCRIPTION	Eng Comp	2011 Actuals	2012 Actuals	2013 Actuals	2014 Actuals	2015 Planned	2016 Request	2017 Request	2018 Request	2019 Request	2020 Request
Astoria - Communication Building	N					-		100	-	-	
TLC - Placeholder	N					-	-	1,200	-		
Eastview - Car Wash Building	N					-		100	-	-	
Neptune - Transportation Building & Office & Garage Building	N						-	-	-	2,400	
Davis Ave - Front Garage	N						-	-	-	590	
Davis Ave - IDL Classroom	N						-	-	-	40	
Van Dam - Main Building	N							1,600	1,400	-	
Eastview - Main Building	N		-	-	-	-	-		4,000	-	
Emerging Roof - tbd			-			-	-	-	1,600	4,370	10,800
		3,314	3,772	9,113	2,508	1,814	3,000	3,000	10,000	11,000	11,000
Irv Pl - Window Replacement	N	-	-	-	-	-	-	-	5,000	7,500	7,500
Hurricane Hardening (TLC LL Restoration - 2013)/2015 - 16th, 28th St & TLC - $3,969,000; 2016 - CPB, Neptune Ave, 110th St	N			572		2,969	5,000	-	-		
Facilities Flood Mitigation (Eastview, TLC)								5,000			

Service Center Renovations

									-		
Irv Pl – 16th Floor - Public Affairs SVP Office	Y				349						
Irv Pl - Lobby Reception Area Renovation	Y				136						
ESR 2008 - 94 er (Bruckner Transportation Area Wall Installation in Lunch	N	-	-	-			-	-	-	-	40
ESR 2010 - 34 as (Van Nest 1601 Revenue Protection Area Renovation)	N			0			0	0	0	0	600
for Transmission)	N				0			0	0	0	70
continuation of ESR 2011 - 44) cancel	N		-								
Engineering Distribution Group)	N							0	0	0	500
Davis Ave - Call Center Renovation	N			0		0		0	0	0	500
ESR 2009 - 24 mm (Victory Blvd - Remove Office Walls for EO expansion)	N			0			0		0	0	75
Victory Blvd - Renovation of Electric Ops Space	N			0			0	0	0	0	500
ESR 2010 - 23 as (Flatbush Ave - Control Center Reorganization)	N			0			0		0	0	140
ESR 2010 - 52 mm/co (Eltingville - Roof & Exterior Envelope/Fasade work)	N				0		0	0	0	0	750
ESR 2742 Davis Ave - SIECC Upgrade	N									0	3000
ESR 2008 - 103 er (110th St - Electric Operations Office Renovation)	N	-	-	-		-			-	-	660
ESR 2008 - 89 co (110th St - Communication Rm Renovation for Expansio	N	-	-	-			-		-	-	70
ESR 2008 -112 vk (WEA - Office / Training Room Expansion)	N		-	-		-			-	-	425
ESR 2008 - 113 as (700 16th St - Parts Rm Relocation/Office Area Expansic	N		-		-			-	-	-	500
ESR 2012 - 59 er/as/mm (28th St - Flush Office Replacement)	N							-	-	-	250
ESR 2013 - 52 er (16th St - Underground Department Ready Room Door)	N								-	-	30
ESR 2014 - 23 fc (28th St - 2nd Floor Office Area Renovation)	N									2,000	339
Sherman Creek - Gas Ops Site Prep & Fencing						935					
CPB - 2nd Fl Renovation	N	-	-	-	-	-	-	-	-	1,500	2,500
CPB - 2nd Fl IH Ergonomic Improvements	N	-	-		-	-			-	-	350
Structure/Enclosure)	N								-	-	60
Astoria - ChemLab Office renovation	N	-	-		-	-			-	-	550
Astortia - Builidng 136 Space for Gas/CM	N										1,500
ESR 2008 - 22 as (Astoria - Operations Control Center (OCC))	N	-	-		-			-			
ESR 2008 - 53 mm (Astoria Warehouse - Sliding Door for Trans Ops Re-Re	N	-	-	-			-		-	-	60
ESR 2009 - 19 as (Ast - Transmission Operations Office Modifications)	N	-	-	-			-		-	-	40
ESR 2009 - 21 as (Transformer Shop - QA Office Furniture)	N	-	-	-			-		-	-	60
ESR 2009 - 56 er (Astoria Warehouse - Door betw Janitorial Compactor/Re	N	-	-	-			-		-	-	10
ESR 2012 - 06 er (Astoria ChemLab - Field Group Office Space Exp)	N						-		-	-	11

FACILITIES CAPITAL BUDGET PLAN

DESCRIPTION	Eng Comp	2011 Actuals	2012 Actuals	2013 Actuals	2014 Actuals	2015 Planned	2016 Request	2017 Request	2018 Request	2019 Request	2020 Request
ESR 2013 - 32 li (CPB - Cable Yard Building Replace or Repair)	N								-	-	415
ESR 2797 - Astoria - Construction Services Modular Office Expansion	N										84
Eastview Office Renovation	N							-	5,000		
Yonkers - Customer Ops Relocation from Eastview to Worth Street	N					200					
ESR 2008 - 106 co (Eastview - Modular Office CFS Admin Functions	N	-	-	-			-		-	-	55
ESR 2008 - 11 ab (Eastview - Cable Coiling Building)	N	-	-	-			-		-	-	250
ESR 2010 - 04 er/sm (Pine St/New Rochelle - Office in Garage Area)	N	-	-	-			-		-	-	140
ESR 2746 - Eastview Bronx/Westchester AECC Renovation	N									1,500	-
ESR 2816 - Rye HQ Control Room Renovation	N							-		-	900
Other locations (tbd)	N	-	-	-				-	-		
		-	-	-	485	1,135	-	-	5,000	5,000	15,434
Critical Infrastructure			1,745	4,553	14,058	13,455	13,400	12,000	15,000	17,500	18,000
Roofs ($7M - 2013; includes 2012 Carryover)			3,772	9,113	2,508	1,814	3,000	3,000	10,000	11,000	11,000
Irving Place Windows							-	-	5,000	7,500	7,500
Hurricane Hardening						2,969	5,000	-			
Facilities Flood Mitigation								5,000			
Service Center Renovations								-	5,000	5,000	5,000
Other Cat B & C (Stand Alone White Papers)		3,712	8,030	7,222		-	-	-			
All Other Buildings and Yards - 2012			17,105	11,775	16,566	18,238	21,400	20,000	35,000	41,000	41,500

SPECIAL PROJECTS

Flush Improvements ($6,300 in 2011)	N	-	-	-	-	-	-				
Rye HQ - Emergency Operations Center	N	-	-	-	-	-	-				
Hurricane Building Hardening Projects *see specific projects below - $3,375 in 2011)	N	-	-	-	-	-	-				
Astoria A-11 & A-12 Dock Restoration - wp	Y	3,712	1,029	2,691		-	-				
PCB Shed Upgrades - wp	Y	-	1,610	918	-	-	-				
C/M Moves (QB Relocation - $2,375,000; Farrington - $285,000, Gowanus - $1,225,000) - C/M wp	Y	-	2,470	409	-	-	-				
GRAND TOTAL		38,987	42,337	50,215	56,849	42,535	62,900	61,500	56,500	46,000	46,500

X	Capital
	O&M

2016 – Shared Services / Corporate Security

Project/Program Title	Enterprise Security Platform
Project Manager	Kayla Prettitore
Hyperion Project Number	20708813
Organization's Project Number	10100799
Status of Project	Ongoing
Estimated Start Date	November 1, 2014
Estimated Completion Date	December 31, 2018
Work Plan Category	Regulatory Mandated

Work Description:

To date, the first phase of the project is complete. Corporate Security along with Information Technology (IT) and outside contractors, designed, developed and implemented a security platform. This advanced security platform provides real-time monitoring of ingress and egress points within Con Edison facilities. New software will require the installation of the vendor's access control panels replacing the old vendor's access control panels.

The new vendor's platform incorporates various security functions to provide a robust and comprehensive security management tool. Visitor management, video management, access control and biometrics are all components that will be fused providing an all-inclusive monitoring system for the company's assets.

Phases two through four will consist of migrating all existing access control panels from the legacy Continental control panel to the new access control panels at 110 company locations.

Phase five will require the installation of Radio Frequency Identification (RFID) readers and tags to monitor the egress of employees and visitors during an emergency evacuation drill or event. In addition, all company personnel will be re-badged with a new smart ID card providing the company with a more secure credential and the ability to utilize ID cards in other areas such as logical access.

Justification Summary:

Vast improvements have been made over the past few years in the area of security technology. Currently, most of Corporate Security's equipment / software are independent, don't communicate with each other, and lack the ability to provide a comprehensive overview of our assets to the security team or our stakeholders. In addition, some of the existing security software platforms currently utilized are no longer supported by the initial vendors, nor are the technical advancements made to both server and operating systems by IT.

Currently, Con Edison relies heavily on proprietary hardware that limits our ability to competitively source new technology and security integrators that would significantly enhance our security posture.

The Company originally deployed a system developed by a company called Continental Access. Continental's access control system was originally designed for a smaller platform which supported two servers, 26 locations, and 275 card readers in 2005. However, since 2005 Con Edison's access control footprint has grown exponentially. We continue to install access control readers and panels at each of our facilities. Currently there are110 Con Edison locations, 485 card access control panels and 1,623 card readers a vast increase from 2005.

Our current access control software system has multiple limitations including the number of communication servers, access groups, workstations, database records, and sites. Over the past seven years the current system had to be frequently upgraded to be compatible with the Con Edison network. Continental's Card Access Version 2.7 will not support a Windows 7 operating system nor the 2008 R2 servers being implemented on the Con Ed network.

Due to the vast amount of records now in our database, the software is unable to compile daily reports or provide security with working features used to manage badge holders efficiently and accurately. Currently employee transfers need to be manually recorded in the system to reflect changes to access privileges.

To date there are 1,049 security cameras at 85 company locations that are not tied to the card access system. These cameras safeguard the facilities' assets and support employee safety. Without an integration to access control we lack the ability to provide a real-time, instant view of conditions at each facility. Security operators are often alerted to unusual or suspicious behavior first by triggered alarms in card access. By integrating a video management system alongside an access control system we can provide security operators with every advantage to protect both personnel and inventory.

Also, this project will fund the addition of new security systems at important Con Ed locations.

In addition, there are specific requirements that must be met under the North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection (CIP) standards. The NERC CIP version 5 sites rated as High or Medium impact under these standards must adhere to specific alarm triggers, segregation of data, as well as the ability to audit all changes within the system.

Supplemental Information:

- Alternatives: On a cost effective basis, access control provides the most effective deployment of a robust security system at all locations requiring increased security.

- Risk of No Action: Without action, the company will be left with outdated and limited security technology. The current system does not support the features required to comply with NERC CIP v5. In order to address these requirements, costly workarounds would need to be created. No adherence to NERC CIP v5 would be costly to the company.

- Non-financial Benefits: The enterprise wide security software suite will provide an important cyber security measure to protect the critical cyber assets of the company. Employee safety and security are significantly enhanced when these measures are introduced.

- Summary of Financial Benefits (if applicable) and Costs: As a result of implementing an enterprise wide security software suite the company will be better equipped to strategically source competitive bids for security software, hardware, and integration. In addition, by moving toward an open enterprise security panel, the company is assuring that we are not locked into one software manufacturer or one set of integrators as we are now with proprietary panels.

- Technical Evaluation/Analysis: This security system will provide state of the art security and safety at all company locations. Con Edison will especially benefit from centralized monitoring and data management functions, which integrate access control, video surveillance, and fire and burglar alarm systems. The expected results are increased efficiency at a lower cost. System integration will help Con Edison to respond more quickly to potential security threats. New technology helps maximize the convergence of physical and logical access control. Centralized access control systems feature control of multiple databases and systems from a single point, giving our company greater efficiency and simplicity.

- Project Relationships (if applicable): The companies' data centers, server farms and communication rooms will be protected by this enhanced access control and RFID system. It will better protect the cyber assets our company is implementing for cyber security, for better business continuity.

- Basis for Estimate: Amount reflects the access control equipment costs, smart cards, RFID readers and vendor/departmental labor for implementing the software, installing new panels in the field, purchasing smart cards, and overseeing contract labor forces.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
			2,179		**8,516**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor				43		1,113
M&S				313		1,702
A/P				1,798		3,082
Other				27		2,619
Total				**2,179**		**8,516**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
7,880	**6,699**	**4,730**		

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor	904	938	864		
M&S	2,473	1,255	984		
A/P	2,666	2,830	1,653		
Other	864	747	523		
Overheads	972	930	705		
Total	**7,880**	**6,699**	**4,730**		

	Capital
X	O&M

2016 – Shared Services / Corporate Security

Project/Program Title	Enterprise Security Software Suite
Project Manager	Kayla Prettitore
Hyperion Project Number	N/A
Organization's Project Number	10100799
Status of Project	Planning
Estimated Start Date	September 1, 2016
Estimated Completion Date	Continuous
Work Plan Category	Operationally Required

Work Description:

Corporate Security has the operational need to acquire two contract security guards, a service support agreement from the manufacturer and support from Information Technology as a result of the capital project to install and configure an enterprise security software suite. Upon commencement of this project current staff will be involved in day to day operations including physical install, contractor oversight, software head –end configuration, and overall project management.

The Honeywell ProWatch platform incorporates various security functions to provide a robust and comprehensive security management tool. Visitor management, video management, access control and biometrics are all components that will be fused providing an all-inclusive monitoring system for the company's assets.

Corporate Security is seeking the additional contracted guards to monitor the additional features and sites supported on the enterprise security software suite. Currently, only video streams are being monitored by our contract guards. With the new system, contract guards will be monitoring video, access control alarms, visitor watch systems, perimeter alarm triggers, etc. The maintenance support agreement will allow the company to obtain timely support and secure future upgrades to the software. In addition, Corporate Security will require maintenance and support of the software from Information Technology. Information Technology will need to dedicate resources to ensure 24/7/365 availability of the systems including the necessary support for any upgrades and customizations.

2 Additional contract guards 24/7 to monitor additional sites
Enterprise Software Support Agreement
IT Support

Justification Summary:

As Corporate Security moves forward in implementing an enterprise wide security software suite, the work load pertaining to the Security Operations Center contract guards will significantly increase. This project will result in additional sites and cameras being monitored on a full time basis. Contracted guards will provide 24/7 support remotely to all sites using access control, perimeter intrusion detection systems, video surveillance, and visitor management.

The service support agreement that Corporate Security is seeking to obtain will provide the company with periodic upgrades, a direct connection with a technical support analyst, and 24/7 overall support to our technical team and Information Resource department as required.

Information Technology will need to dedicate resources to support the enterprise security software suite. These resources will ensure 24/7/365 availability of this critical security system and provide support during any future upgrades the software may require.

Supplemental Information:

- Alternatives: Corporate Security would operate without a maintenance agreement and need to utilize costly services when software fails to work, problems are found,

- Risk of No Action: Without a maintenance support agreement, the company would not be entitled to receive technical support from the manufacturer, software upgrades, or program/ feature enhancements added.

  Contract guards are utilized to respond immediately to events and alarms generated by the new software as well as visually inspect site cameras in the video management system. Without additional guards, the current staff will not be able to handle all of the incoming alarms and events generated by the new system.

  Without the support of Information Technology, Corporate Security cannot ensure the reliability of the software and the systems that it will operate on.

- Non-financial Benefits: The enterprise wide security software suite will provide an important security measure to protect the critical cyber assets of the company. Employee safety and security are significantly enhanced when these measures are introduced.

- Summary of Financial Benefits (if applicable) and Costs:

- Technical Evaluation/Analysis: This security system will provide state of the art security and safety at all company locations. Con Edison will especially benefit from centralized monitoring and data management functions, which integrate access control, video surveillance, and fire and burglar alarm systems. The expected results are increased efficiency at a lower cost. System integration will help Con Edison to respond more quickly to potential security threats. New technology helps maximize the convergence of physical and logical access control. Centralized access control systems feature control of multiple databases and systems from a single point, giving our company greater efficiency and simplicity.

- Project Relationships (if applicable):
  This is directly related to the Corporate Security Enterprise Security Software Suite.

- Basis for Estimate:

2 Additional contract guards 24/7 to monitor additional sites	450,000
Enterprise Software Support Agreement (to begin in 2018)	430,000
IT Support	240,000
Total O&M	$1,120,000

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
345	**690**	**1,120**	**1,120**	**1,120**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor	120	240	240	240	240
M&S					
A/P	225	450	880	880	880
Other					
Overheads					
Total	**345**	**690**	**1,120**	**1,120**	**1,120**

X	Capital
	O&M

2017 – Shared Services / Corporate Security

Project/Program Title	Corporate Security – Company Wide Camera Rollout Program
Project Manager	Joseph Tringali
Hyperion Project Number	20283654
Organization's Project Number	21266720-0001
Status of Project	Recurring Annual Program
Estimated Start Date	January, 2017
Estimated Completion Date	December 2020
Work Plan Category	Operationally Required – Critical Repairs

Work Description:

Currently, the company has over 1,400 cameras system-wide. Many of the fixed and pan/tilt/zoom PTZ cameras have exceeded their useful life (seven years) and are in need of replacement. Additionally, the recent advances in camera technology, especially video analytics, provide the ability to program and tailor the video recording to specific threats and concerns. The Company started to replace the cameras in 2012. Since 2014, we have continued this project as part of an annual replacement program. The Company classified the project as Common Utility Plant in Service – General Plant – Miscellaneous Equipment. A Budget Reference number had previously been validated for this program under capital project 39728.

This program continues with this replacement project and increases the amount from $345,000 to $ 1 million annually, taking advantage of technological advances in equipment, and coupling it with installing new cameras to provide more enhanced security protection of our facilities especially on access/egress points and perimeter coverage. This request will provide sufficient funding for purchasing closed circuit television CCTV and associated equipment plus the associated internal and vendor labor to install the cameras, cabling, switches and any other associated costs.

Justification Summary:

Over 50% of the cameras are operating beyond their seven year useful life and with each passing year, more cameras will reach their lifecycle threshold unless a more aggressive replacement program is initiated. Additionally, increased manpower allows us to manage the increase in camera replacements. This request will also take advantage of technological changes and increased capabilities of internet protocol IP cameras which provide much sharper images then the previous generation of analog cameras. Currently only five percent of the cameras currently deployed at Con Ed are the more technologically advanced/clearer image IP cameras.

As the company strengthens its electronic security measures, the number of cameras being installed and integrated back to our Security Operations Center continues to grow. These new camera installations are all IP based so it makes good business sense to replace the existing inventory of outdated analog cameras quicker.

Cameras have a two-fold purpose to protect our assets from theft, vandalism and sabotage while also providing a safety measure for our employees. The replacement of the outdated CCTV equipment also avoids many other potential issues such as, parts no longer being available from the manufacturer or the camera being deemed beyond economical repair. In addition, older cameras lose their capability of providing quality video and require more maintenance to keep them functional.

The company is implementing an Enterprise Suite project, which is a software platform that integrates all security systems including access control, CCTV, visitor management, etc. Replacing the older cameras will help support this platform by providing clearer images of alarm conditions and ingress/egress points to our facilities and restricted areas.

Supplemental Information:

- Alternatives: Waiting for a camera to fail is not a proactive strategy, and entails ad hoc type of responses which could result in loos of video until the repair or replacement is scheduled and completed. This puts our employees and assets at risk if an incident were to occur at a location with a broken camera.

- Risk of No Action: Cameras will ultimately fail. The resulting loss of video is a vulnerability concern by not having continuous monitoring of our perimeter, access points and assets. In addition, required maintenance/repair costs would be borne and if the situation could not be immediately resolved, may entail increased costs for hiring guards.

- Non-financial Benefits: Maintaining continuous video monitoring is a deterrent for a would-be adversary. Having the ability to forensically retrieve video is beneficial to conducting security investigations.

- Summary of Financial Benefits (if applicable) and Costs: Over time, utilizing newer equipment would lower costs, since newer equipment would help keep maintenance costs low, while maintenance costs of older cameras will only continue to increase.

- Technical Evaluation/Analysis: Security technology is constantly evolving. Besides the video clarity advantages of installing IP cameras, built-in camera analytics provides a more consistent and viable solution than the human element. Our Security Vulnerability Assessments will identify areas where advances in this technology can be more effectively deployed.

- Project Relationships (if applicable): This request is to continue the previously approved ongoing camera project.

- Basis for Estimate: Amount reflects the camera/ancillary equipment costs and vendor/departmental labor for replacing outdated cameras. This is a continuous program to ensure cameras do not operate beyond their seven year life.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
0	**208**	**0**	**331**		**345**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor	0	0	0	53		0
M&S	0	0	0	0		0
A/P	0	208	0	265		345
Other	0	0	0	13		0
Total	**0**	**208**	**0**	**331**		**345**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
345	**1,000**	**1,000**	**1,000**	**1,000**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor	0	520	520	520	520
M&S	0	0	0	0	0
A/P	345	350	350	350	350
Other	0	30	30	30	30
Overheads	0	100	100	100	100
Total	**345**	**1,000**	**1,000**	**1,000**	**1,000**

Exhibit ___ (SSP-9)

Corporate Security – Cyber Forensics

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* Will be distributed pursuant to a protective order

X	Capital
	O&M

2016 – Shared Services / Emergency Management

Project/Program Title	Emergency Operations Center Incident Information Management System
Project Manager	Robert Pettenato
Hyperion Project Number	21173404
Organization's Project Number	N/A
Status of Project	Planning
Estimated Start Date	2016
Estimated Completion Date	2019
Work Plan Category	Strategic

Work Description:

The objective of this project is to implement a new Emergency Operations Center (EOC) Incident Information Management System (commonly called Crisis Information Management Software – CIMS) that will enhance the Company's ability to manage workflow through our existing Incident Command System (ICS), manage requests between organizations, provide event reporting, and improve communications among employees staffed at both internal and external operations centers. Event reporting builds a sharable repository of information, readily accessible for daily use. Personnel can keep track of files, contact information, plans, procedures, and compliance reports. The program will initially involve procurement and implementation of the software, and training users. Thereafter, the Company's emergency response plans will be integrated into the system's workflow and include customized forms.

Justification Summary:

The EOC Incident Information Management System will replace the Company's current home-grown and antiquated "CERC Docs" system that was created in the early 2000's. It was useful years ago, but since Sept. 11, 2001, the software industry began earnest development of much more comprehensive systems to help organizations manage emergencies. Such software is commonly referred to as Crisis Information Management Software (CIMS) Systems, which are used by government, most industries, and almost every utility. FEMA, NYS DHS, NYC EM, and WCDES all have CIMS systems.

Our "home-grown" CERC Docs system was created as simply a filing system with forms and storage. The current system does not have many of the capabilities that these CIMS systems have and that we need to meet growing regulatory and customer demands. The Company is looking to evaluate, procure, and implement an emergency response EOC software designed to meet the needs of a crisis management situation, and be flexible to easily accommodate unique custom processes associated with different types of events, emergencies, and commodities. The new system will provide a significant increase in functionality, including an increase in situational awareness, resource management, event reporting, and after-actions reports. Situational awareness capabilities provide real-time event tracking for all stages of an event. These features are important and permit an individual or party to identify, comprehend, and process the critical elements of information occurring during an event. Requests can be submitted and routed to the designated department, permitting effective resource management with easily configurable action management capabilities.

This new application will better facilitate communications, responsibilities, and actions of ICS staff to develop and implement restoration efforts in response to events and emergencies. The system's capabilities will also include the ability to quickly provide redundant operations in the event an organization's operational network experiences a disconnect from the Company's main computer network. These features improve the transparency and effectiveness of building after-action reports because the system will allow the user to document comments and recommendations after an event. By strengthening and structuring the workflow process, the Company can more effectively communicate and manage events, which results in reducing restoration times, enhancing customer satisfaction, and increasing operational performance.

Supplemental Information:

- Alternatives: The alternative is to retain the current system that is incapable of performing any of the important functions available today in CIMS system, other than to hold the various forms and provide storage for the completed ones. Not having an up-to-date CIMS system and its capabilities would force the Company to rely on manual processes requiring constant updates, freeform and inconsistent email messages for communications, and spreadsheets that lack validation and the ability to escalate information.

- Risk of No Action: By not implementing an up-to-date crisis information management system and continuing to use the primitive legacy product, the Company must rely on manual processes requiring constant updates, freeform and inconsistent email messages for communications, and spreadsheets that lack validation and the ability to escalate information.

- Non-financial Benefits: The EOC software enhancement will better facilitate communications, coordination, and actions of the ICS staff to develop and implement response and restoration efforts in emergencies. This will take us away from our reliance on manual processes requiring constant updates, freeform and inconsistent email messages for communications, and spreadsheets that lack validation and the ability to escalate information when the standard for managing these process, which has already been adopted by most government emergency response agencies as well as utilities, has become using a CIMS.

- Summary of Financial Benefits (if applicable) and Costs: Costs associated with EOC software are provided below.

- Technical Evaluation/Analysis: N/A

- Project Relationships (if applicable): N/A

- Basis for Estimate: Estimates are from the vendor with additional funding for software customizations to mirror Company EOC and incident management workflow. Estimate also includes training, practice session development, and exercise costs.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Overheads						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
300	**125**	**124**	**121**	**0**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	50	50	50	50	0
M&S					
A/P	196	40	42	43	0
Other					
Overheads	54	35	33	28	0
Total	**300**	**125**	**124**	**121**	**0**

X	Capital
	O&M

2016 – Shared Services / Emergency Management

Project/Program Title	System Emergency Assignment Module Development
Project Manager	Robert Pettenato
Hyperion Project Number	21173389
Organization's Project Number	N/A
Status of Project	Planning
Estimated Start Date	2016
Estimated Completion Date	2019
Work Plan Category	Strategic

Work Description:

The objective of this project is to continue the development of modules that will enhance the System Emergency Assignment (SEA) program. The SEA program uses a callout software system that allowed the Company to automate communications with employees prior to, during, and after corporate incidents and/or emergency events. Prior to this system, the local organizations worked with Emergency Management and Human Resources to manually contact individual employees notifying them their SEA has been deployed. This process was quite arduous and ineffective. Therefore, adapting this callout system will improved the Company's event response capabilities. Over the years, enhancements have been identified to expand the functionality and capabilities of the software that will increase our preparedness, enhance employee safety, and increase operational performance by being better able to communicate, manage, and deploy our workforces. Some of these major enhancements include:

- expanding Storm Role User's capabilities;
- developing scheduling and callout structure for all functions within the ICS structure;
- developing and implementing a callout to check on employees before, during, and after an event – creating comprehensive "are you okay" process;
- creating better interfaces around individual scheduling;
- creating mobile application for individual employee interface to all current functions;
- creating a real-time dashboard;
- and enhancing capabilities so that organizations can access their employee's current status.

Another fundamental part of this project is to assess and strengthen the suite of core internal applications that interface and work in conjunction with the SEA module. The internal systems include a SEA database, Human Resources database, and Employee Photo software, which is currently not flexible enough to keep up with the dynamic changes required to schedule and provide resources in order to effectively respond to corporate events and emergencies. Many of the required enhancements will benefit employees by providing them with more specific

information on the variety of SEAs they have been assigned. This will also allow for more data to be exchanged between external and internal systems.

The external system's callout and notification features will be enhanced to allow easy maintenance of pre-determined staffing schedules for the Incident Command System (ICS), permit greater transparency to all staff positions, and can be used for rapid deployment during Company events and emergencies. These developments will leverage existing scheduling and call out features, thereby minimizing additional training and more easily gaining acceptance of users.

A new SEA Performance Dashboard with drill-down capabilities will more effectively manage corporate resources. Managers will be able to track the real-time response of their employees and create performance statistics to evaluate and implement measures to improve response performance. Currently, employees can "walk into" an assignment or receive a different assignment without advanced notification, resulting in their manager not knowing their employee's whereabouts.

Another new feature addresses the well-being of employees before, during, and after events where dangerous and hazardous conditions may exist. Before SEAs are initiated, the Company will have the ability to contact employees to determine if they are "ok." If they themselves have been impacted by the emergency or event, the Company may determine their ability to report to their assignments or possibly need assistance. This functionality will be developed to operate on commonly used operating systems that will permit use on a wide variety of mobile devices that are readily available and widely used in everyday life. This robust mobile feature, coupled with reporting, can result in more effective use of resources and increased communications.

Justification Summary:

In addition to the annual maintenance of the SEA module system, these enhancements and new functionalities will enable the Company to leverage technology and tools to enhance their capabilities more effectively and safely manage employees and assignments.

The enhanced SEA module system will have additional reporting capabilities that provide real-time information for storm role owners, leadership, and managers upon which to make better and more timely decisions. Currently, the system has limited reporting capabilities and requires manual configuration of reports from various systems, which is time consuming.

Upgrades to the core suite of applications will also ensure flexible and sustainable systems going forward, while implementing advances in mobile technology strengthens communications by providing information to portable devices, typically used in remote locations during events and emergencies.

Supplemental Information:

- Alternatives: The alternative is to work with another company. But since no company has the software that the current SEA software is capable of doing, we would have to partner with them do develop what we already have and then develop these capabilities described in this paper with them. This would take much more time and cost.

- Risk of No Action: By not developing the new modules, the current SEA software stays stagnant and fails to realize all the critical real-time information and reporting that can be used to effectively manage the deployment of SEA manpower. Company must continue to rely on manual processes that do not allow the Company to continuously improve and take advantage of technology improvements and sustainability. The lack of automated reporting capabilities may hinder expedient regulatory reporting requirements.

- Non-financial Benefits: The development of these module1s will increase the Company's effectiveness at managing SEAs when they are most needed – during events like storms where available staffing from alternate resources such as contracts are in high demand and low supply (costs are very high).

- Summary of Financial Benefits (if applicable) and Costs: Costs associated with enhancements are provided below.

- Technical Evaluation/Analysis: In 2011, a review of several major players in the "messaging to employees" business such as SendWordNow, Everbridge, InstaAlert by Honeywell, CNS, and ARCOS was conducted. It was decided to use ARCOS because: their product was developed for the utility industry so it required the least amount of customization and cost; it was a product that we were already using and were familiar with their high quality work; and they were willing to partner with us and develop these products in a timely manner. Over the last two years we have revisited the "messaging to employees" business and still find the same results as in 2011.

- Project Relationships (if applicable): N/A

- Basis for Estimate: Estimate from vendor based on similar enhancement costs.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
200	0	0	0	0	0

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of 500 thousand or more and, for all other organizations, projects/programs of 1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S	200	0	0	0	0	0
A/P						
Other						
Overheads						
Total	**200**	**0**	**0**	**0**	**0**	**0**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
350	**344**	**342**	**337**	**0**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor	50	50	50	50	0
M&S					
A/P	242	239	239	239	0
Other					
Overheads	58	55	53	48	0
Total	**350**	**344**	**342**	**337**	**0**

	Capital
X	O&M

2016 – Shared Services / Emergency Management

Project/Program Title	System Emergency Assignment Software Annual Fee
Project Manager	Robert Pettenato / Patricia Hong
Hyperion Project Number	N/A
Organization's Project Number	N/A
Status of Project	NA
Estimated Start Date	Ongoing
Estimated Completion Date	Ongoing
Work Plan Category	Strategic

Work Description:

This O&M funding is to pay for the annual maintenance of the System Emergency Assignment (SEA) software, which is a hosted product. This software system started development in 2011 which was a collaboration between Con Edison and a vendor (already a provider of call-out service) to address a deficiency identified in prior large storms where we could not effectively deploy personnel during the event. We had no system to effectively manage and maintain the company's SEA roles prior.

This software is a third-party vendor hosted service and the subscription fee is required on an annual basis.

This software does the following:

- Warehousing employee's job history / skills
- Warehousing employee's contact information and allowing self updating and preferences on how to contacted
- Self-service ability to change and update personal information
- Creating and maintaining employee's storm roles
- Contacting employees on multiple phone lines
- Creating pre-scripted and just-in-time distribution lists based on various attributes (such as job history or location) and callout those employees that match the criteria
- Scheduling employees for storm roles
- Reporting capabilities and analytics

Justification Summary:

During storm and system emergencies, the Company may have a need to leverage its SEA workforce to respond and report to work at any given time including off hours, weekends and holidays. The Company needed a more effective way to contact and communicates with employees during such emergencies. Logistically, it becomes difficult to notify the employees individually to help on restoration efforts and to perform their storm roles. This SEA module system allows Con Edison to summon hundreds of employees at one time with reporting capabilities. The system can also send out update notifications to employees while on or prior to arriving to their shift.

This program supports the corporate goals of assigning SEA roles to all employees, and to achieve specific staffing levels in multiple operating departments in order to facilitate customer restoration in accordance with corporate emergency response plans.

Supplemental Information:

- Alternatives: The alternative is to not keep the SEA program software, which would drastically limit the Company's ability to reach out to employees in a timely manner during events. There is no alternative "off the self" option on the market that can provide all the features built into this software program to:
    - Warehousing employee's job history / skills
    - Warehousing employee's contact information and allowing self updating and preferences on how to contacted
    - Creating and maintaining employee's storm roles
    - Contacting employees on multiple phone lines
    - Creating pre-scripted and just-in-time distribution lists based on various attributes (such as job history or location) and callout those employees that match the criteria
    - Scheduling employees for storm roles
    - Reporting capabilities

  Alternatives include go manual, which is described below, or find another vendor that can re-create everything that has already been created in this system.

- Risk of No Action: If we do not continue to pay the maintenance, we will no longer have access to the SEA software.

- Non-financial Benefits: The system enhancements will increase the Company's ability to manage staff and resources, send notifications to employees in an expedited and efficient manner, and create real-time reports during events and emergencies.

- Summary of Financial Benefits (if applicable) and Costs: Costs associated with enhancements are provided below

- Technical Evaluation/Analysis: N/A

- Project Relationships (if applicable): N/A

- Basis for Estimate: Cost provided by vendor

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
69	**69**	**69**	**69**	**69**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor					
M&S					
A/P					
Other	69	69	69	69	69
Overheads					
Total	**69**	**69**	**69**	**69**	**69**

	Capital
X	O&M

2016 – Shared Services / Emergency Management

Project/Program Title	Enhancing New Risk Planning, Training, and Exercise Program
Project Manager	Robert Pettenato, Nelson Yip, and Richard Boscarino
Hyperion Project Number	N/A
Organization's Project Number	N/A
Status of Project	Ongoing
Estimated Start Date	Ongoing
Estimated Completion Date	Ongoing
Work Plan Category	Operationally Required

Work Description:

This program enhances our preparedness planning, training, and exercise programs by going beyond traditional risks, like storms and heat waves, to further address new risk**s** that are significant such as cyber-attacks, physical attacks on utility infrastructure, soft target attacks (attacks in areas that focus on non-critical and relatively unguarded areas) effecting our employees, communications-down, and emergent public health crises. It will also include a reformatting of our emergency response plans to include specific emergency scenario modules (modularizing) that will allow the overall plan to be expandable and robust to include new risks and improve the layout in to a more usable format.

Justification Summary:

Most of Con Edison's current emergency response plans, and associated training and exercises, focus on severe weather as these have been the most common events causing significant disruption of services to our customers. Newer risks, however, have emerged that are equally, or even possibly more, threatening and disruptive than that of traditional risks. Cyber-attacks continue to increase in frequency and sophistication, and are being perpetrated by hackers, terrorists, and foreign governments, and have the potential to compromise control systems and/or computer network(s), upon which we are highly dependent on. Physical attacks on critical utility infrastructure, such as substations and transmission towers, have been occurring around the country. Terrorist-planned soft attacks on our employees, active-shooter incidents, civil unrest, and disgruntled employees causing harm in the workplace are becoming more frequent. Recently, the Company has experienced police protests near critical infrastructure, substations, steam generating stations, and workout facilities; a disgruntled employee attack at Con Edison's corporate headquarters (4 Irving Place, NY, NY); and recent health crises (e.g., Legionellosis and Ebola). These incidents can be highly disruptive to customers due to the potential impact to Con Edison's workforce and/or system infrastructure that may not be easily replaced or repaired. Therefore, we are looking to enhance our plans, training, and exercises by working with consultants and internal organizations to create more comprehensive response plans addressing the newer risks mentioned above.

As newer risks have emerged, the Company has developed initial response plans, but as they rapidly evolve, it is necessary to enhance the preparedness planning, training, and exercise programs associated with them. This program's approach will focus on that mission through the following initiatives:

- Regarding Con Edison's emergency response plans, after conducting post-event reviews, benchmarking with utility peers, and comprehensively addressing these newer risks, the Company has identified that our emergency plans can be streamlined to become more usable and effective.

Currently, the Company develops response plans to address each risk, which is cumbersome and inefficient since the number of risks are growing rapidly. The Company will work with consultants to take the existing and newly incorporated risks and modularize them to be an "all-hazards" style plan that focuses on response actions rather than on each risk. For example, if there was a fire in the headquarters that rendered office space unusable, or if a pandemic flu outbreak occurred, the response for many office workers may be the same (i.e., work at an alternate location or stay at home and work remotely as best you can using computers, tablets, and phones).

- The Company is looking to enhance, develop, and implement more training and exercises to focus on continuous reinforcement of the training employees initially received and to be better prepared for newer risks. Specifically, the Company is looking to improve its training capability by developing refresher modules through case studies and eLearning courses. Performing exercises validates the Company's updated approaches and identifies further opportunities for improvement.

Supplemental Information:

- Alternatives:
  Maintain and further add to the existing emergency response plans and exercise programs. .

- Risk of No Action:
  Maintain existing emergency response plans and exercise programs. As we continue to add new risk(s) to our current programs without modularizing our plans, thus increasing the overall number of risks that we must plan, train and exercise for, we dilute our effectiveness for each of these risks.

- Non-financial Benefits:
  The Company has identified that Con Edison's emergency response plans can be modularized, to become more usable and effective, and training more focused and sustainable. This will allow the Company to conduct exercises more effectively, since the focus will be driven by response actions and not the risk.

  Enhancements to training and exercise programs will focus on continuous reinforcement of the training employees initially received, and identify areas that require additional focus so that they are ready for the next events. Specifically, the Company is looking to improve its training capability by developing refresher modules through case studies and eLearning courses. Performing exercises validates the Company's updated approaches and identifies further opportunities for improvement. The exercises will give employees a practiced baseline for upcoming events.

- Summary of Financial Benefits (if applicable) and Costs:
  Costs associated with enhancing preparedness planning, preparedness training, and preparedness exercise programs are noted below.

- Technical Evaluation/Analysis: N/A

- Project Relationships (if applicable): N/A

- Basis for Estimate:
  For years 2016 - 2019, the effort to develop modularized and more usable emergency response plans is estimated to cost $50k per year. This would include an assessment of the current state, interviews with key plan stakeholder groups, a gap analysis, and the development of the plan.

  Ongoing efforts to develop and conduct additional exercises will cost $65k in 2016, $50k in 2017, $75k in 2018, and $100k in 2019.. The Company anticipates conducting five more exercise per year. The Company's plan to incorporate 12 different/new types of training which will cost $75k for

years 2017 – 2020 and may include the development of eLearning modules, checklists, practice sessions, job aids, and more just-in-time guides.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
115	**175**	**200**	**225**	**225**

Request by Elements of Expense:

EOE	2016	2017	2018	2019	2020
Labor					
M&S					
A/P	115	175	200	225	225
Other					
Overheads					
Total	**115**	**175**	**200**	**225**	**225**

X	Capital
	O&M

2016 - Shared Services / Human Resources

Project/Program Title	Occ Health Integrated Data Management Platform
Project Manager	Dr. Daria Luisi
Hyperion Project Number	10079910
Organization's Project Number	2XC9809
Status of Project	New initiative
Estimated Start Date	January 2016
Estimated Completion Date	December 2019
Work Plan Category	Strata - Strategic IT Enhancements

Work Description:

The Occupational Health department functions in large part through paper records and the existing electronic system – Occupational Health Administrative System (OHAS). OHAS has limited functionality, and has not been significantly updated since it was implemented 15 years ago. As a result, Occupational Health department employees must match data across discrete systems and manually key the data for each query in order to produce reports; these actions can lead to the inefficient and time-consuming practices of generating reports that have a greater probability of erroneous information.

The deployment of the Occupational Health Integrated Data Management Platform (IDMP) will improve Con Edison's management of clinic functions related to regulatory examinations, return to work evaluations, and wellness programs. As a result, Con Edision will gain improved abilities around meeting the demands of future sick absence plans/policies.

In addition, the implementation of electronic health records will provide Con Edison greater oversight of its OSHA, and Department of Transportation regulated exams and drug testings. An electronic medical record will provide clinicians the ability to evaluate an employee's medical condition and determine their fitness for duty using easily accessible (yet secure) medical history.

The goal of this project is to integrate and enhance Con Edison's medical information systems to improve Con Edison's compliance with mandated evaluations/screenings (e.g., occupational and environmental exposures, Department of Transportation, substance abuse, and safety sensitive jobs) in accordance with federal, state, and local laws and policies. These evaluations are critical functions which ensure the safety of Con Edison employees and the public. In addition, this project will make Occupational Health complient with new federal mandates regarding the electronic filing of medical records.

The current system of managing sick absencesneeds to be updated to meet the changes to the sick policy that occurred in 2013. The changes forced the system to interact not only with an external vendor disability system, but also with internal systems (e.g., payroll). The system needs to handlebifurcated programs, since union and managem have different sick policies.

The project will use a multi-stage approach, in which application features will be developed and rolled out in five phases. The phases are independent but sequential, each having its own cost and timeline. It may be feasible for phases to run concurrently.

The attached chart outlines the project's phases and their associated components (see chart attached).

Justification Summary:

Phase 0 of the proposed IDMP was funded and implemented in 2011. The gap analysis and discovery report resulting from Phase 0 recommends the implementation of an electronic Health Management System. The report provides gap analysis on the functionality of the current systems as well as benchmarking information against other companies and vendors' data solutions. The data outlines the best method for the implementation of Phases 1 through 4. Also, the Phase 0 analysis recommends the best course of action to be the purchase a software solution as well as which vendors meet Con Edison's functional specifications.

Currently, the OHAS system is not capable of efficiently handling the changes to the sick policy and requires manual altering to address these changes. Without an IDMP (inclusive of an electronic medical record system), the Occupational Health department will continue to function with inefficiencies and the potential for manual entry errors. The limitations of the OHAS system prevents Con Edison from having the needed understanding of the factors that affect lost time and regulatory requirements – these are necessary to support the work of the Occupational Health Department.

Deployment of the IDMP will provide Con Edision with the ability to conduct more advanced analyses that will provide information for strategic planning, as well as provide the ability to identify trends and potential health concerns through the centralization of data. Also, Occupational Health will need to have the ability to receive and send medical information on behalf of our employees while abiding by the standards setforth by the Federal government, or the clinic will be hampered in reviewing medical information for employees – this will be alleviated by the IDMP.

Moreover, electronic medical record practices will improve regulatory monitoring as well as provide a standardized platform to facilitate interoperability between the Occupational Health Clinic and external entities (e.g., physicians, hospitals, laboratories and disability vendors). This interaction needs to be aligned with the new federal mandate for physicians and laboratories to fully comply with developing an electronic medical system. External entities were mandated to convert to electronic medical records by January, 2015 and the implementation of this project will put Con Edison in line with the best practices for the security and accessibility of health records.

Finally, the electronic medical record and the IDMP will allow for the exchange of medical treatment information and eligibility of sick benefits between Con Edison and the Total Rewards disability vendor. This is needed in order to create a comprehensive record of employee illness and injuries that may impact their ability to perform their job duties. The project will also increase regulatory efficiency in the Occupational Health clinic and capacity to identify and manage absence patterns.

Based on the Phase 0 findings, Occupational Health released a Request for Proposal (RFP) to potential Electonic Record vendors in September 2015. The vendor will be selected by December 1, 2015 and the contracted vendor will begin the Pre-implementation phase (Phase 1) in Januray 2016 (see timeline attached).

Supplemental Information:

- Alternatives: Con Edison hired an outside vendor to conduct a discovery/gap analysis; the exercise focused on three main considerations: technological feasibility of implementation, costs (upfront and recurrent) and fit with user defined functional specifications. The discovery/gap

analysis identified pros and cons of the following three alternative plans of action: 1.) purchase of a software solution that can be customized for Con Edison's use, 2.) redesign of the existing in-house system by internal staff or, 3.) a combination in which some functionality is achieved through a purchased solution and other modules are created by enhancing existing applications.

- Risk of No Action: First, Occupational Health risks a loss of interoperability with employees' personal clinicians, hospitals and vendors who manage various aspects of employee health and absence records. Employee health conditions and absences would have to continue to be managed largely through paper records, which lends itself to operating errors and does not ensure the level of security of information as an electronic system would.

  Next, the department will be further hampered in their receiving and sending of medical information on behalf of employees when the standardized international diagnostic coding system moves from the ICD-9 (13,600 codes) to a much more comprehensive version, ICD-10 (69,000 codes). The expanding coding system will allow the Department to track and trend illnesses and diseases more accurately

  Finally, if the IDMP is only partially funded or developed, Occupational Health will be forced to continue operating with its current system, which likely will not be fully interfaced with any new partially developed system. This key shortfall would prevent the department from creating a centralized depository of data and reaching optimal functioning. Outsourcing some of the current unsupported processes may be an option, as would improvement to existing paper processes and/or the elimination of existing departmental functions.

- Non-financial Benefits: The deployment of an IDMP has several non-tangible benefits. Primarily, it serves to develop collaborative efforts and strengthen the Con Edison's support activities by standardizing, consolidating and improving the processes associated with tracking lost time and medical data. By linking the various existing application functions and allowing these programs to create standard reporting mechanisms, the work processes of Occupational Health will be greatly improved. These improvements will build stronger relationship with employees by addressing their questions and concerns and with operating groups by providing needed information and data to manage their workforce.

  Next, the electronic system will allow for better utilization of CECONY medical staff and resources, creating efficiencies and the ability to more quickly review employee records and address concerns. In addition, as OH provides assessments in mobile locations this will allow for a centralized repository for medical record recording, sharing and transfer. This will permit a seamless operation regarding employee evaluations. A more consistent and clear electronic communication with employee's personal clinicians will allow Occupational Health to gain a complete understanding of the employee's medical situation. OH clinicians will be able to more thoroughly focus on employee well-being, fitness for duty and regulatory compliance.

  Finally, the system will lend itself to a reduction in potential human error, increase the efficiency with which Occupational Health can manage employee health conditions and absences, as well as contribute to an overall "greening" and carbon footprint reduction for the department.

- Summary of Financial Benefits (if applicable) and Costs: The electronic medical record system will enable the Occupational Health department to run more efficiently and reduce the internal review process. For example, OH nurses are required to review the medical charts to compile a medical history on employees applying for the DOT licenses prior to visits to the Vans and/or Clinic. The current process is estimated at $195,000.00 per year. This estimate is based upon the

hourly rate ($65.00/ hour) for a nurse multiplied by the number of DOT exams (approximately 3,000) in a given year. It is estimated that over the course of 3 years the IDMP will decrease the time spent on reviewing paper medical charts and allow the nurses to spend their time on case management.

- Technical Evaluation/Analysis: The IDMP can support better follow-up for regulatory requirements, health care decisions, more coordinated care within the clinic, and with better access to information from employees' physicians.

  Additionally, the IDMP will allow for the technical capabilities of health information between Occupational Health and the external entities that inform decision making. This will enable Occupational Health to make comparative decisions for a particular condition, exchange of data among physicians, hospitals, laboratories, pharmacies and other health organizations, as well as methods for ensuring the privacy and security of patient data that is essential for making informed decisions to return employees to work with or without restrictions. Moreover, with improved electronic and technical capabilities, Occupational Health will be positioned to work more directly with EH&S and other internal Con Edison departments such as Workers Compensation and Health benefits.

- Project Relationships (if applicable): Several current Company projects are directly linked to the Occupational Health OHAS system and will need to interface with the medical system to efficiently manage the new sick policy (which was outsourced for short and long term disability for managers). These include: 1.) Seamless process for PeopleSoft to link to the short term and long term disability usage; 2.) Con Edison is updating the sick registration system (VRU) and the IDMP will need to interface with this new system to track daily absences. 3.) The information on the VRU will need to be synchronized with OH's automated emails and other communication channels, such as the Employee Personal Information Center (EPIC). The IDMP will allow these systems to interact seamlessly.

- Basis for Estimate: During Phase 0, potential vendors who met our functional specifications were identified. The gap analysis consultants met with the vendors to discuss implementing the vendor's product and the estimated associated costs. The project estimate for the IDMPincludes costs for the electronic medical record (EMR) software, implementation, and trainingThe 2016 budget allocated $726,000 to begin the Preimplimentation Phase of the project. The funding will be used for the set-up of the electronic record systems and interfaces with other Con Edision systems. Yearly funding is inticipated to continue until the completion of the project in 2019.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
60					

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Overheads						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
726	**745**	**328**	**132**	

Request by Elements of Expense:

EOE	2016	2017	2018	2019	
Labor					
M&S					
A/P	717	736	324	130	
Other					
Overheads	9	9	4	2	
Total	**726**	**745**	**328**	**132**	

2015				2016				2017				2018				2019			
Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
				Pre- Implementation (Phase 1)						Testing & Documentation (Phase 2)		Implementation (Phase 3)				Post-Implementation (Phase 4)			
	Create RFP	Release RFP	Select vender and contract to secure EMR software	Acquisition of equipment (hardware and software)						Documentation of all business rules, notifications, and process flows associated with new applications		Training of OH staff and other impacted users				Adjustment of business rules and work processes as needed work processes as needed		Maintenance of business rules and work processes as needed	
				Construction of business rules and security structure						Ensure system meets CE specifications for work flows		Communications to employees about new electronic system and how this impacts them				Additional data migration as practical of past paper medical charts, microfiche, old x-rays.			
				Construction of business intelligence (includes custom reporting)						Ensure all interfaces are properly functioning		Occupational Health Department staff begin to use EMR							
						Customization to CE processes (includes notifications, scheduling, building of questionnaires etc)													
						Mapping of old electronic OH data to new system- to populate new system with old medical information when possible													
						Creation of bi-directional interfaces with labs													
					Construction of interfaces by IR														

*Q4 of 2014 ICD-9 update to the current medical system completed for compatibility with selected EMR

EXHIBIT ___ (SSP-11)
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X	Capital
	O&M

2019 – Shared Services / Human Resources

Project/Program Title	PeopleSoft HR/Payroll System Upgrade
Project Manager	Vincent Saccente and Shailesh Kamath
Hyperion Project Number	10025292
Organization's Project Number	1XC9718
Status of Project	Planning
Estimated Start Date	January 2019
Estimated Completion Date	December 2019
Work Plan Category	Operationally Required

Work Description:

The existing support and maintenance for the current version of PeopleSoft Human Capital Management (HCM) A*pplication* and *PeopleTools* expires in 2018.There are four major modules within the application that manage the workforce administration, time and labor, payroll, and benefits administration for all active and retired employees for both CECONY and O&R. PeopleTools is the underlying framework for the Application. The HR Payroll support team recommends upgrading both the PeopleTools and the Application simultaneously; this will also avoid significant duplication of work (e.g., software installation, analysis, build, and testing). Both the Application and PeopleTools require separate and distinct Oracle support (i.e. upgrades, bug fixes, security patches, etc.), and one cannot operate without the other. Every quarter Oracle releases security patches, application patches, and tax updates. These patches and updates are critical to ensure the proper operation and security for the Application and its toolsets.

For many large Enterprise Resource Planning (ERP) application implementations, the upgrade process is complex and time consuming, and they often require technology changes, application changes, and a number of internal customizations. The future release of PeopleSoft HCM will include functional changes to each of the four major modules. Thus, the high level effort estimation to update these systems is approximately 12 months; this is based on estimates to complete required critical implementation tasks (e.g., run upgrade scripts, conversion, build, and testing). The upgrade project is estimated to be completed in 2019. However, the estimated project start date is contingent on the vendor's expected delivery date of major upgrades. Con Edison may postpone the upgrade if it is determined that a new release of the PeopleSoft product is imminent.

Justification Summary:

The Oracle support for PeopleSoft HCM version 9.2 is scheduled to expire in 2018; Oracle support provides three major benefits for the maintenance of the system.

The PeopleSoft HCM application is used for payroll processing. The Oracle support provides updates to the system as tax laws are changed by the Internal Revenue Service (IRS) and by State and Local

governments. The second benefit is access to the quarterly security patches for PeopleSoft and PeopleTools as well as any emergency fixes. The third benefit is the support of all delivered system functionality. Con Edison can open a trouble ticket with Oracle for any issues identified and has the ability to escalate the issue based on the severity.

Upgrading the system to the most current version will continue this level of support.

Supplemental Information:

- Alternatives: Due to the need to obtain mandatory tax updates and support, there are no alternatives to the Company performing the upgrade. However, we have some flexibility on "when" to perform the upgrade. If we go beyond the PeopleSoft Sustained Support, then there will be significant risk to operating the system without support from Oracle

- Risk of No Action: If Con Edison does not upgrade the Oracle systems by 2019, it will result in the loss of system support through Oracle. Additionally, Con Edison will encounter significant risk operating the system since Oracle provides scheduled mandatory tax updates, system bug fixes and other security patches. It is recommended that the Con Edison remain within compliance of all required tax updates, system bug fixes and security patches. . These patches and updates are critical to ensure the proper operation and security for the Application and its toolsets.

- Non-financial Benefits: System upgrades are required to maintain system support (e.g., mandatory tax updates, system bug fixes and security patches) through Oracle.

- Summary of Financial Benefits (if applicable) and Costs: No financial benefits have been identified for this project. The project is required to maintain current operations. The project costs have been estimated for the purchase of hardware, contractor resources, labor, and overhead.

- Technical Evaluation/Analysis: PeopleSoft is a vendor product customized for CECONY and O&R operations. Upgrade project will require reviewing and analyzing the impact to Con Edison system customizations.

- Project Relationships (if applicable): PeopleSoft HCM is the foundation for the PeopleSoft Recruitment module and the PeopleSoft HR Help Desk system. Both projects will require significant integration with PeopleSoft HCM. The schedule and scope for the upgrade will be impacted by the completion of these projects however the project will continue as planned.

- Basis for Estimate: The project cost estimates are based on the historical spend on the prior system upgrade in the previous years.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year *(O&M only)*	Forecast 2015
1,067	**31**	**705**	**456**		

Historical Elements of Expense

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor		31	295	293		
M&S						
A/P	1,067					
Other			410	163		
Total	**1,067**	**31**	**705**	**456**		

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
			2,339	

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor				330	
M&S					
A/P *				834	
Other **				1,020	
Overheads				155	
Total				**2,339**	

** New servers and equipment*
*** Consultant labor*

X	Capital
	O&M

2017 – Shared Services / Human Resources

Project/Program Title	PeopleSoft HR Help Desk
Project Manager	Marie Chatterjee
Hyperion Project Number	21546554
Organization's Project Number	N/A
Status of Project	Planning
Estimated Start Date	January 2017
Estimated Completion Date	September 2017
Work Plan Category	Strategic

Work Description:

The Human Resources Service Center (HRSC) responds to calls and written requests from employees, Human Resource Professionals (HRP) and retired employees. The HRSC representatives respond to calls and written requests, including emails, by initiating tasks using Microsoft Outlook. This manual process relies on the HRSC representatives to initiate the task, manually complete it, and document its completion. The requests from the HRPs come in various formats and are again logged as tasks using Outlook. The HRSC handles approximately 26,000 requests annually. Supervisors manually monitor the status of the requests to ensure timely completion. There is no transparency for the customer to monitor the status of their requests. Additionally, there are no metrics or reports available to monitor the completion of the requests or determine if any Key Performance Indicators (KPIs) related to the written requests are at risk. The current process does not allow retirees to process minor transactions, and they must call the HRSC or wait to receive their pay statement in the mail. Finally, under the Health Insurance Portability and Accountability Act (HIPAA) regulations, disclosure of Personal Health Information (PHI) must be recorded and reportable. The current method of recording such disclosures is manual.

The PeopleSoft HR Help Desk, a module of PeopleSoft CRM designed to integrate with PeopleSoft HCM, will apply automated workflow for tasks, inquiries, and requests for all of Human Resources (HR). It will be implemented in the following business areas:

- Employee Benefits
- Compensation
- Labor Relations
- Occupational Health
- HR Support
- Payroll Department
- Learning and Inclusion

Employee requests and questions can be routed to responsible departments and the status will be maintained within the system in real time. The Help Desk is also essential for Human Resources to maintain regulatory compliance, achieve productivity and cost savings, improve internal customer experiences and provide self-service for retirees and employees.

Estimated Project Timeline Starting January 2017

Project Start-Up – 12 - 16 Weeks

- Technical assessment of security requirements
- Create a Request for Proposal (RFP) for the selection of a vendor to assist with the implementation as an integrator
- Review and select a vendor who responded to the RFP
- Requisition and purchase orders placed
- HR and IT resources identified for project team

Define Phase – 4 Weeks

- Determine business requirements
- Complete technical analysis of planned work
- Create detailed project plan and budget
- Establish steering committee

Design Phase – 4 Weeks

- Complete detailed functional and technical system specifications
- Validate compliance and business requirements are met
- Complete system configuration and user security set up

Build Phase – 5 Weeks

- Complete technical development and unit testing of system requirements
- Develop detailed plans
    - Testing and defect resolution
    - Communication and training
    - Post production support

Testing Phase – 4 weeks

- System Testing – Validate PeopleSoft HR Help Desk functions as expected
- Integration Testing – Validate PeopleSoft HR Help Desk integrates with PeopleSoft HR Payroll System as designed
- User Acceptance Testing – Validate PeopleSoft HR Help Desk functions perform to user expectations.

Deployment Phase – 2 Weeks

- Execute planned communication and training
- Complete mock go live and develop cutover checklist
- Establish post production support

Justification Summary:

The following objectives are being strengthened by the implementation of PeopleSoft HR Help Desk.

Reduce and Manage Risk
The system will provide enhanced security to reduce the risk of a data breach of employee or retiree's Personally Identifiable Information (PII) and Protected Health Information (PHI). All correspondences and call notes will be stored securely within a corporate system and will be safeguarded. This will eliminate the need for physical notes that may be compromised. The HR Help Desk security profiles and permissions are integrated and kept in sync with the core PeopleSoft HCM system. This minimizes maintenance of security profiles and will ensure that users are not able to access any unauthorized data.

Calls that require access to PII and PHI will be logged and an automated prompt will be displayed for identify verification with all the appropriate information. Any data retrieved for a specific call will be logged within the system with a clear audit trail.

Specific benefits include:

- Adherence to the (HIPAA) requirement to log all PHI disclosures.
- Provides secure escalation of complex and confidential cases containing PHI such as call notes and information from the benefits provider in accordance to HIPAA.
- Ability to record and manage requested PII and PHI disclosure restrictions as prescribed by HIPAA.
- Automate identity verification to reduce the risk of PII/PHI data breaches.
- Elimination of manual paper process will reduce the risk loss or theft of PII/PHI.
- All stored documents and case history will be maintained on a corporate system managed by Con Edison Information Technology (IT) in accordance to all security protocols

Strengthen Company Processes
The system will gather analytics to improve productivity and enable HR to proactively address employee and retiree concerns. Greater efficiencies can also be achieved for tasks and requests that need to be coordinated between multiple sections across organizations, resulting in the reduction of human resources needed to support the HRSC. Specifically this system will:

- Improve workflow and routing of HR, Benefits, and Payroll tasks and requests and eliminate manual paper processes.
- Provide data for root cause analysis and highlight training and communication opportunities through metrics and reports.

- Drive employee interaction to self-service versus the call center to realize cost savings.

Enhance Customer Experience
Employees, Retirees, and HR Professionals can monitor the status of requests. In addition, work can be routed to the various sections within HR, Learning and Inclusion and Payroll for more expeditious processing.

The project will also create a Knowledge Base that will assist in organizing information on policy and procedures and deliver self-service answers to employees and retirees more effectively and consistently which will reduce the call volume.

Customer feedback survey functionality is built into the system and can be generated based on logged calls or tickets submitted via self-service. Customer feedback is critical in improving the customer experience.

Specific benefits include:

- Deliver a consistent service experience regardless of the manner in which the employees engage HR.

- Employees will be able to open cases and requests 24 hours a day using a self-service tool. The system will also generate customer feedback surveys to help continually improve the service provided.

- Case status will be available online 24 hours a day in real time. The requester will be able to see all the activity and kept up to date which will result in increased trust.

- Introduce enhanced self-service functionality for retirees to update W-4, direct deposit, and view paystubs online.

- Improve and expand quality assurance analysis of completed cases, requests and transactions by simplifying the retrieval and review process.

In addition, self-service for active and retired employees will be provided. The self-service application will be available during off hours and tickets can be submitted at a time that is convenient for the employee and retiree. The system will provide employees and retirees with up to date status on submitted tickets on a dashboard providing transparency and enhanced communication.

The implementation of this project will also reduce calls and requests that require manual intervention. Some examples of self-service function include updating retirees contact information, changing W-4 Tax withholding, changing their banking information for direct deposit, and viewing their paystub online.

Supplemental Information:

- **Alternatives:** The HR Service Center investigated two technical alternatives to meet the business objectives.

    - The HP Help Center is the product used by the IT Help Desk. After discussions with the IT Help Desk, it was determined that Human Resources would not be able to use the existing installation in the Help Center. The existing HP Help Center has been installed and set up specifically for IT related issues and cases. In order for HR to utilize the HP solution a new system would need to be purchased and installed.

      The HP solution does not offer the same integration capabilities with our existing PeopleSoft HR Payroll system. All required integrations will have to be created and maintained internally. Data security would be maintained separately from the core PeopleSoft HR Payroll system.

    - Customer Operations is currently planning on a case management system in 2017. The case management is part of the I3 system that was implemented for call and email routing in all of customer operations. This new system would be designed specifically for customer operations and would require extensive modifications for use by the HR Service Center.

      The I3 system is not designed specifically for HR functions and any specific requirements and security needs will have to be built. The I3 system does not offer the same integration capabilities with our existing PeopleSoft HR Payroll System. All required integrations will have to be created and maintained internally. Data security would be maintained separately from the core PeopleSoft HR Payroll system. Additionally, the support of the system would be managed by customer operations which could limit HR's ability to update the system as business needs change.

  Other HelpDesk or workflow/Customer Relationship Management (CRM) products, from other vendors like HP or Pega systems, were not considered as they would require extensive coding for integration to HR Payroll and security requirements and updates would be costly and inefficient.

- **Risk of No Action:** The Company is at risk of unauthorized disclosure of PII/PHI for employees and retirees due to a failure in a manual process or procedure resulting in a violation of HIPAA regulations which may include civil and criminal penalties assessed by the Department of Health and Human Services. In addition, if we do not install PeopleSoft HR Help Desk, we would need to meet the security and retiree access requirements with other methods.

- **Non-financial Benefits:** Increased self-service and transparency to our internal customers and retirees

- **Summary of Financial Benefits (if applicable) and Costs:** The implementation of PeopleSoft HR Help Desk is projected to reduce a net of three full time equivalencies (FTE) from 2018-20. The reduction amounts will be used to offset annual software maintenance fees.

  One FTE will be required for long term production support and data analytics for the new system which has a slight impact on the financial benefit (see below).

Description	Financial Benefit per FTE	Financial Benefit Total
Two union employees	$65,000	$130,000
Two Management employees	$100,000	$200,000
Total FTE Reduction		**$330,000**
One management employee for support	$100,000	$100,000
Total Annual Financial Benefit		**$230,000**

- **Technical Evaluation/Analysis:**

  Infrastructure Support:
  Oracle's PeopleSoft Help Desk for HR is a module of the PeopleSoft Customer Relationship Management (CRM) application, and is not currently installed at Con Edison. We expect that we will need to install new server infrastructure (database server, application, and web and stat server) to support this effort. In addition, Help Desk requires the Secure Enterprise Search feature of Oracle, which will require additional infrastructure. Access to the system by retirees will require additional security, servers and configuration.

  System Compatibility:
  PeopleSoft HR Help Desk shares the same architecture and technology with the PeopleSoft HR Payroll system so it will tightly integrate using existing PeopleSoft PeopleTools framework. Con Edison should be able to leverage current HR/Payroll Security and auditing features to integrate with PeopleSoft HR Help Desk.

  While PeopleSoft HR Help Desk is a different application, the PeopleTools architecture is the same as that used for the existing HR/Payroll system, and can be maintained by our current technical and functional PeopleSoft HR Payroll support team with help from some additional resources or staff augmentation on technical and business support teams during the implementation.

  Customization/Development:
  As per Oracle's guidance there is usually about 5-10% customization done by customers to the delivered application while deploying PeopleSoft HR Help Desk.

- **Project Relationships (if applicable):** PeopleSoft HR Help Desk will be an augmentation of the existing PeopleSoft HCM system. Maintenance of the two systems will be handled together by the HR Payroll Support team. All future upgrades would be done together and managed by a single team.

- **Basis for Estimate:** Vendor price quote for software purchase used for white paper estimate. Oracle database cost estimates are based on historical spend for HR and Finance systems using the same platform.

Expense Description	Estimated Cost
PeopleSoft HR Help Desk Software Purchase	$ 834,300
PeopleSoft HR Help Desk Maintenance Fee	$ 183,546
Oracle Database License	$ 938,124
Oracle Database Maintenance Fee	$ 185,400
Program Migration Tool	$ 13,905
Technical Hardware	$ 444,960
Vendor/Contractor (Integrator)	$ 973,426
Internal IT Support	$ 371,000
A&G/Labor Overhead	$ 251,868
Total	**$ 4,196,529**

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
					2,700

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						2,700*
Other						
Total						**2,700**

*It should be noted that funding has been advanced in 2015 during the Corporate Governance Optimization process for the hardware and software. Should additional funds become available in 2016, the balance of the funding below will not be necessary in 2017.

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
	1,500			

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor		268			
M&S					
A/P		967			
Other		86			
Overheads		179			
Total		**1,500**			

	Capital
X	O&M

2017 - Shared Services / Human Resources

Project/Program Title	Strike Contingency
Project Manager	Vincent Frankel
Hyperion Project Number	20354648
Organization's Project Number	N/A
Status of Project	Planning
Estimated Start Date	July 2017
Estimated Completion Date	N/A
Work Plan Category	Operationally Required

Work Description:

The existing Local 3 contract expires in June 2017 and the Local 1-2 contract expires in June 2019. In preparation for the expiration of these union contracts the company will incur costs associated with these negotiations. These costs include consultants, hotel expenses, electronic data processing, reproduction and forms, telephone/communication and other miscellaneous items. Additionally, to prepare the company for the possibility of a work stoppage there will be contingency plans made which include incremental costs associated with training management for new assignments and food supplies and transportation costs associated with these food supplies to work out locations.

Justification Summary:

This program is required for the company to conduct contract negotiations with both Local 1-2 and Local 3 and to have in place our contingency plan in the event of a work stoppage.

Supplemental Information:

- Alternatives: There are no alternatives. The company must negotiate with the union to continue operations.
- Risk of No Action: Company not prepared to assume operations if there is a work stoppage.
- Non-financial Benefits: N/A
- Summary of Financial Benefits (if applicable) and Costs: Budget is consistent with the 2012 spend for negotiations and contingency planning.
- Technical Evaluation/Analysis: N/A
- Project Relationships (if applicable): N/A
- Basis for Estimate: Prior contingency plan spend. A straight line recovery has been requested and Accounting will address the proper allocation of these O&M costs among electric, gas and steam.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
	7,481	**110**			

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of 500 thousand or more and, for all other organizations, projects/programs of 1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S		7,481	110			
A/P						
Other						
Total		**7,481**	**110**			

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
	450	**450**	**450**	**450**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor					
M&S					
A/P					
Other		450	450	450	450
Overheads					
Total		**450**	**450**	**450**	**450**

X	Capital
	O&M

2016 – Shared Services / Learning & Inclusion

Project/Program Title	PeopleSoft Recruitment Module
Project Manager	Tom Aloisi
Hyperion Project Number	21173140
Organization's Project Number	N/A
Status of Project	In Progress
Estimated Start Date	Oct 1, 2015
Estimated Completion Date	July 31, 2017
Work Plan Category	Common

Background:

Finding and hiring the right talent in a timely and effective manner is becoming more complex in a competitive job market. The accelerating pace of change in the utility industry directly impacts our workforce and talent needs. Changing demographics, increased competition for technical and skilled workers, advancements in technology and how energy is distributed, increasing pressures for compliance and cost-management are setting the pace for how we hire and retain employees capable of serving the wide ranging needs of our stakeholders.

Currently, our hiring processes are inefficient and time consuming, and involve several disparate systems. Key challenges include significant delays in the hiring process, limited engagement of job seekers during the process, inadequate tools to support decision-making, and workflow design requiring excessive manual entries. These challenges directly impact our customers.

Our hiring strategy requires a robust recruiting solution. Managers, jobs seekers and recruiters need an application that quickly identifies talented, qualified applicants to meet our business hiring needs. The current recruiting solution (eHire) was internally developed to transition the company from a predominantly paper-based recruitment process to a web-based platform. Today, eHire has fallen behind industry standards and lacks the agility to meet the varying demands of our stakeholders. eHire is supported by several disparate systems that are costly to maintain. Futhermore, the system does not provide real-time business intelligence to effectively manage recruiting activities. Also, eHire does not have a platform to support interactive technology to enhance the applicant experience - a functionality that is critical to the customer experience and strategic recruiting. The lack of functionality in eHire creates unnecessary challenges that hinder our ability to effectively and efficiently recruit and hire employees.

Work Description:

The goal of this project is to implement Oracle's PeopleSoft 9.2 Recruiting Solutions, which offers comprehensive functionalities that streamline the recruiting process and improve the hiring experience for job seekers in furtherance of our recruitment strategy. Oracle's PeopleSoft version 9.2 Recruiting Solutions, includes two modules: *Candidate Gateway* and *Talent Acquisition Manager*. *Candidate Gateway* provides both internal and external job seekers with a self-service interface to search, apply for,

track, and respond to job opportunities. The *Talent Acquisition Manager* provides recruiters and managers with a complete, integrated system to effectively manage workforce acquisition across all employment categories and screen, interview, and hire applicants quickly and efficiently.

The implementation of PeopleSoft version 9.2 Recruiting Solutions will replace our homegrown recruiting application – eHire.

The implementation is to be scheduled as below:

- Define Phase: Oct 1, 2015 – Dec 31, 2015
  - Assess the delivered product against the business requirements and conduct Fit/Gap Analysis
  - Finalize the business processes design and project scope
  - Finalize project budget, resources, and project timeline
- Design Phase: Jan 1, 2016 – Jul 31, 2016
  - Design system configuration
  - Design customizations (Enhancements, Interfaces, and Reports)
- Build Phase: Aug1, 2016 – Mar 31, 2017
  - Develop the customizations
- Test/Implementation Phase: Feb 1, 2017 – July 31, 2017
  - Testing (System, Integration, Stress and User Acceptance Testing)
  - Training

Justification Summary:

Finding the right people to do the right job at the right time is more important now than it has ever been. The changing nature of our business coupled with the scarcity of talent compels us to move towards a more forward-thinking strategic approach to recruitment. Elimination of administrative and transactional tasks will enable time to engage in strategic hiring practices that include building a continuous talent pipeline that involves workforce planning, branding, continuous sourcing, and onboarding.

Oracle's PeopleSoft version 9.2 Recruiting Solutions is a recruiting tool to help increase efficiency and improve the overall hiring experience, while also supporting our strategic recruitment efforts. There are significant advantages to adopting this robust application, including the following: realize productivity increases; reduce time to fill; facilitate regulatory compliance; streamline recruitment process; improve strategic focus; recruit higher quality candidates; and improve manager, recruiter, and candidate hiring experience.

The solution offers managers and recruiters easy-to-use recruiting tools to search for candidates, including, automatically screening resumes and matching candidates for jobs based on job descriptions. As a result, costs associated with reviewing candidate applications can be cut in half. Additionally, recruitment process improvements, such as standardized workflows and automated resume screening, are expected to improve the time it takes to fill open positions.

Relevant, real-time information for hiring managers and recruiters about the status, progress and performance of the recruitment process is essential to recruiting and hiring talented employees. The PeopleSoft application provides information dashboards for all stakeholders at each stage of the recruitment process. The interactive analytical grids and charts available as part of the PeopleSoft application will allow users to filter data, pinpoint bottlenecks, and identify trends. Transparency and tracking functionality enables in-depth analysis to identify areas of opportunity, fostering continuous improvement to drive down inefficiencies and expedite hiring.

Better candidate experiences will be made possible with personalized, intuitive, self-service interface with job seekers. In this setting, we can offer candidates' easier ways to obtain information about the company, apply for jobs and keep track of job search activities throughout the entire process. Additionally, as more and more job seekers rely on career portals and social media to find jobs, the PeopleSoft tool can help us target and virtually engage a larger candidate pool and higher quality hires. This will advance our organizational brand and enhance our ability to attract top talent.

Oracle's PeopleSoft version 9.2 Recruiting Solutions provides an opportunity to improve regulatory compliance. For example, our efforts to comply with standards and regulations for protecting personal identifiable information (PII) appropriately are supported by the system-level security of PeopleSoft that protect us against data breaches. In addition, the ability to monitor candidate flow, automate EEOC and OFCCP tracking, and create advanced reporting of workforce analytics, will help to continuously improve potentially reduce risks associated with discrimination claims about the hiring process.

The implementation of PeopleSoft version 9.2 Recruiting Solutions will enhance our existing Oracle HR System which already includes four modules: HR, Payroll, Time & Labor, and Benefits. The implementation will further integrate HR systems providing for seamless data sharing and the elimination of silo systems in addition to the technological and operational benefits all of which positively impact effective recruiting.

Supplemental Information:

- Alternatives: Among one of the alternatives we explored, was enhancing our current eHire recruiting system to meet current business needs. Enhancing eHire such that it evolves into a fully automated recruiting solution requires a complete redesign to consolidate and develop features found in leading recruiting solutions. A redesign may enhance the current state, however, the risk of falling behind technology and industry standards as the sophistication of recruiting applications evolves is great and highly probable. Over the past eight years, we have made several unsuccessful attempts to simplify and enhance the current system to align with best practices. To date we have submitted over 300 change requests to eHire and other silo systems associated with recruiting efforts.

  Current business needs and the competitive market for talent demand a robust recruiting solution to support our recruitment strategy. We've concluded that enhancing eHire would not fit the complexities associated with the recruiting process.

- Risk of No Action: The risks of taking no action would result in continued maintenance of multiple recruiting solutions, manual processes and workarounds, data entry redundancies, poor data quality, and limited transparency and information to effectively manage and reduce the cost of recruiting activities. These risks impact our ability to support the wide ranging needs of our stakeholders and effectively attract the desired caliber of applicants.

  Effective recruiting requires a streamlined process as well as the right tools and technology to proactively engage applicants and effectively recruit to retain. The risks of taking no action could result in potential loss of qualified candidates due to delays in the hiring process; high support and administrative costs to manage the complexities associated with the recruiting process; inadequate tools to support informed decision-making and selection of applicants, and limited transparency and information to effectively manage recruiting activities. These risks directly impact the company's ability to execute a recruitment strategy that meets both business and customer needs.

- Non-financial Benefits: The implementation of PeopleSoft version 9.2 Recruiting Solutions will provide significant benefits and process improvement aligned with our recruitment strategy and evolving business needs. We believe the proposed system will deliver value to the company and support the recruitment strategy. A more robust recruitment solution will improve the way we work and better positions the company for the future. Non-financial benefits include:
    - Reduce transactional work by increasing reliance on self-service capability to drive lower administrative costs
    - Standardize and streamline processes to eliminate non-value added tasks
    - Improve data accuracy
    - Enable data analytics for continuous process improvement
    - Enhance decision support capability with automatic screening functionality tailored to unique business needs
    - Maximize workforce utilization
    - Improve engagement and collaboration among stakeholders
    - Integrate processes within Oracle HR Solutions (e.g. recruiting, payroll, time & labor, and benefit management)
    - Reduce compliance risk
    - Establish platform to support future recruitment initiatives and trends such as strategic sourcing, and leveraging social media engagement.

- Summary of Financial Benefits (if applicable) and Costs: The proposed system will deliver financial benefits to the company by consolidating recruiting systems, streamlining recruiting processes, and reducing our time to source and fill vacancies. The implementation of PeopleSoft version 9.2 Recruiting Solutions will provide the technological foundation to develop a faster, more efficient recruitment process. Features include greater clarity in application requirements; increased transparency at each step; timely status notifications at key stages in the selection process; and improved feedback to applicants. Upon full implementation, estimated cost savings is expected to be $380,000, driven primarily by lower transaction costs associated with automation. We anticipate 47% less time spent on transactional activities; productivity time that can be shifted to strategic activities associated with sourcing and hiring talent.

- Technical Evaluation/Analysis: Infrastructure Support: The implementation of Oracle version 9.2 Recruiting Solutions will be an addition to our current Oracle HR System, and is fully supported by the current technology infrastructure, and will be maintained by our current technical and functional Oracle HR support team.

  System Compatibility: Our current Oracle HR System was recently upgraded to version 9.2, which is fully compatible with this implementation.

  Functionality Improvement: Currently, we utilize four Oracle HR modules in our day-to-day operations: HR, Payroll, Time & Labor, and Benefits. The implementation of the Recruiting Solution will streamline recruiting processes, further integrate HR systems and data, and maximize the utilization of Oracle HR Solutions.

- Project Relationships (if applicable): N/A

- Basis for Estimate: The below high level estimate is based on the prior analysis in 2008, high level business requirements, Oracle recruitment module functionality, past implementation experience, the existing resources/licenses and the project resources needed to implement the Recruitment module within existing the Oracle HR/Payroll system.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
					$324

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
2,457	**3,105**			

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor	440	596			
M&S					
A/P	1,100	1,840			
Other	538	163			
Overheads	379	506			
Total	**2,457**	**3,105**			

	Capital
X	O&M

2016 – Shared Services / Learning & Inclusion

Project/Program Title	EEO Compliance - Corporate Training
Project Manager	Nicole Leon
Hyperion Project Number	N/A
Organization's Project Number	N/A
Status of Project	Not started
Estimated Start Date	March 2016
Estimated Completion Date	December 2020
Work Plan Category	Strategic / Regulatory Common

Work Description:

A critical priority for the company is ensuring that Con Edison is a workplace that complies with antidiscrimination laws and regulations, and that otherwise promotes diversity and inclusion.

An important prerequisite for achieving this objective is to develop and provide company-wide antidiscrimination training. As a starting point, there is the requirement to provide a firm understanding of the various federal discrimination laws applicable to employees in the workplace. We must also educate employees about state and local laws and train employees on our own internal policies. In addition, the introduction of updated regulations for veterans and individuals with disabilities require enhanced efforts to recruit and retain members of such groups. This demonstrates a further need for sensitivity and awareness training.

Demographic trends reveal an increasingly more diverse workforce and customer base. Therefore, it is vitally important that we develop the cultural understanding and dexterity of our workforce to be able to connect across a myriad of different areas, backgrounds, and focuses. This enables us to work more effectively work together in the workplace and to better serve our customers.

Compliance training will be conducted by select consulting firms with broad expertise in the area of equal employment opportunity, diversity and inclusion. Engaging such firms to design and deliver training that enables the company to leverage the experience and knowledge of the firm in facilitating large scale, corporate–wide, multi-layered training in a manner that is efficient, systemic and sustainable.

Justification Summary:

The focus of this project is to facilitate compliance with Federal, State, City and local antidiscrimination laws, by conducting comprehensive, company-wide equal employment opportunity and diversity & inclusion training.

Establishing the standards of acceptable behavior for employees is a big priority for the company. Of course, the company's Code of Conduct and EEO policies are useful vehicles for teaching employees how we expect them to behave, and more importantly, why we expect them to behave that way. However, ensuring a work environment that is free from any form of discrimination, harassment or retaliation requires more than just policies. It requires instituting training and awareness programs that fosters a work environment where our employees feel valued and respected; where employees readily contribute to the success of the organization by drawing upon their unique backgrounds and perspectives; and where we afford equal employment opportunities to all employees and applicants, without regard to age, race, sex, color, and religion, national origin, disability, marital status, covered veteran status, genetic information, sexual orientation, or any other characteristic protected under state, federal or local law.

The goal of our compliance training program is to reinforce our values of professionalism and mutual respect in the workplace in the following ways:

1. Raise awareness about equal employment opportunity laws, and regulations, including sexual harassment
2. Identify protected classes
3. Recognize employment practices and actions that violate antidiscrimination laws and policies
4. Ensure that employees are aware and continue to be aware of the company's policies and procedures regarding discrimination and harassment, including how to report allegations of discrimination and harassment and prohibitions against retaliation
5. Ensure that employees become familiar with all aspects of sexual harassment
6. Create self- awareness and personal accountability in fostering a culture of inclusion and mutual respect in the workplace and with our customers
7. Develop cultural competence and a deeper understanding of the benefits and impact of equal treatment, and of diversity and inclusion for all stakeholders

Developing a training plan for legal compliance is not just a "nice thing to do"; rather it is an investment for the success of the organization. For example, in today's diverse marketplace and workplace, a well-trained workforce is imperative in order to remain competitive and to meet our customers' ever-changing needs and expectations. Our employees are not just expected to make a positive contribution to our work environment; they are also expected to work respectfully and collaboratively when interacting with co-workers, vendors, customers, or other third parties with whom they may come into contact. In addition, our leaders are expected to support our diverse culture by encouraging all employees to work respectfully with their team members, to adhere to our policies regarding equal employment opportunities, and to promptly address any concerns regarding disrespectful behavior in the workplace.

In addition to meeting legal requirements, equipping our employees with the knowledge and skills necessary to prevent discriminatory behaviors and to build a culture of inclusion has many advantages. It helps us to avoid costly and unnecessary legal claims and challenges and helps to promote a more productive, team-oriented workplace. It also helps to prevent employee turnover and low employee engagement.

Training consultants will be identified and selected based on broad expertise and resources in the area of antidiscrimination laws and regulations, diversity and inclusion. Our training efforts will extend beyond a one-time, single event. Training will occur periodically and attendance will be mandatory. Our approach is to establish a learning continuum for employees at all levels in order to create transformative and sustainable culture change.

Supplemental Information:

- Alternatives: Without proceeding with this project, ensuring legal compliance with laws and regulations related to antidiscrimination and harassment, as well as advancing the corporate commitment to build a more inclusive culture becomes increasingly challenging. Preventing and addressing unlawful behaviors would be slow and ineffective. The Office of Diversity and Inclusion could minimally support the effort to train and educate the workforce, however, due to size of the workforce in comparison to number of in-house trainers, this approach is neither comprehensive, nor timely, and will not yield the desired culture shift.

- Risk of No Action: Damage to Corporate Public Image – External agencies such as the Equal Employment Opportunity Commission (EEOC) – federal, the New York State Division on Human Rights (NYSDHR) and the New York City Commission on Human Rights (NYCCHR), Office of Federal Contract Compliance Programs (OFCCP), Attorney General (AG) investigate allegations of unlawful discrimination filed by applicants for employment, employees and former employees. In cases where the external agencies find probable cause to substantiate the allegations of discrimination, potential risk exposure to corporate image may occur if the cases are reported by the media – high profile cases. This could also undermine our marketing of Con Edison as an employer of choice.

  Other concerns include the potential exposure to class action lawsuits charging the company with unlawful discriminatory practices, and the risk of decreased morale and unrest of the workforce due to delayed changes in norms and behaviors which may ultimately impact retention and productivity.

- Non-financial Benefits:
  Employer of Choice:
  - Promotes a positive, productive work environment
  - Increased ability to compete for, and retain talent
  - Workplace where employees are fully engaged and able to deliver to their full potential
  - Engaged employees who demonstrate behaviors that support our company values of service, honesty, concern, courtesy, excellence and teamwork
  - Maintain high standards for equity, respect and fairness

  Corporate Image/ Company Brand/ Customer Satisfaction
  - Enhanced customer engagement and relationships
  - Enhanced focus on delivering service excellence
  - Sustainability

- Minimize risk of discriminatory behaviors that are contrary to our standards of business conduct

- Summary of Financial Benefits (if applicable) and Costs:
  N/A

- Technical Evaluation/Analysis:
  N/A

- Project Relationships (if applicable):
  N/A

- Basis for Estimate:
  Based on cost estimates for services and materials provide by training consultants.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
300	**300**	**300**	**300**	**300**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor					
M&S					
A/P	300	300	300	300	300
Other					
Overheads					
Total	**300**	**300**	**300**	**300**	**300**

	Capital
x	O&M

2016 – Shared Services / Research & Development

Project/Program Title	Program Change - Electric
Project Manager	Margarett Jolly
Hyperion Project Number	NA
Organization's Project Number	Various
Status of Project	Planning Phase
Estimated Start Date	Ongoing
Estimated Completion Date	Ongoing
Work Plan Category	Strategic

Work Description:

R&D strives to be an agent of change that drives innovative technological solutions addressing both short-term operations issues and long-term strategic objectives. We review technology developments in all industries, participate in utility industry groups, and perform benchmarking in an effort to leverage best practices and opportunities to improve operations. We track issues and events and assist in developing long-term strategies. The projects identified in this paper represent some, but not all, of our significant efforts in the coming years. Projects are prioritized, selected, and funded based on their potential to improve reliability, increase employee and public safety, reduce cost, reduce risk, and increase customer engagement. Consideration is given to risk reduction, and to the development of new technologies with high potential and/or the readiness of a technology. The projects are intended to balance costs with the potential success and benefits they can provide. Each project goes through an authorization process that includes an evaluation of alternatives and a cost/benefit analysis, including cost to implement if successful. Because these technologies are new or still developing, the Company recognizes that the development or implementation of new or existing concepts, until technically and commercially feasible operations are verified, also carry risks beyond those of normal operations. Because of these risks, it is often appropriate to seek and apply R&D funding to such projects.

Various R&D projects to be undertaken during the rate years include projects that:

- Reduce risk and enhance public and employee safety
- Increase operational performance and flexibility
- Enhance customer experience and engage our customers

These projects include:

- Develop and demonstrate new technologies to mitigate manhole events.
- Develop and continue to demonstrate new technologies to enable a smarter and more resilient overhead system.
- Develop and demonstrate underground transmission dielectric oil leak management technologies.
- Develop and implement technologies to enhance physical and cyber security.
- Develop systems to mitigate impacts of Geomagnetic disturbances and Intentional Electro Magnetic Interference (IEMI).
- Develop and demonstrate new technologies to reduce the risks to our workers of sustaining ergonomic injuries while on the job.

- Develop and demonstrate new technologies to increase operational performance to improve worker and public safety and increase the reliability of the electric system.
- Investigate feasibility of raising substation bus ratings.
- Develop new tools and systems to enhance electric load forecasting.
- Participate in climate and weather impacts studies.
- Investigate microgrid technologies.
- Complete Molten Salt Feasibility study for Hudson Ave
- Identify and demonstrate technologies to deliver and sustain effective customer engagement such as developing analytical tools to gain better insights of our customers to better address their needs.
- Continue to support research to enable the REV vision.

Justification Summary:

Projects that **reduce risk and enhance public and employee safety** are of paramount importance for the safe transmission and distribution of electricity. In order to reduce risks the following projects are proposed or underway:

- Develop and continue to demonstrate new technologies for manhole event mitigation. Manhole events and energized objects present a significant safety threat to the public and our employees.
    - Demonstrate various technologies that have the potential of providing early detection of manhole events.
        - An arc fault is a high power discharge of electricity between two or more conductors. This discharge translates into heat, which can break down the wire's insulation and possibly trigger an electrical fire. These arcing faults occur intermittently and for short durations. They also have a unique electrical signature and potentially can be detected using microprocessor relays.
        - Metal and insulation of the electrical conductor and water in the manhole in the presence of high energy arc creates combustible gases. Detection of these combustible gases would provide an indication of high energy arcing which are precursors to manhole events.
        - E-field sensors which detect abnormally high electric field could be indications of stray voltage.
    - Develop manhole cover restraint systems to avert displacement of manhole covers, which is one of the risks of manhole events.
    - Explore the effect of a change in policy that would target stray voltage detection scans in areas more prone to manhole events.
    - Develop technology to mitigate Alive on Backfeeds (ABFs) on medium voltage feeders to facilitate deenergization as quickly as possible during faults.

- Develop and continue to demonstrate new technologies to enable a smarter and more resilient overhead system. This may include developing sensors, algorithms, and communication protocols to identify and locate faults and manage loading on the overhead distribution system.

- Continue to explore methods of detecting dielectric leaks from transmission cables. We are currently developing the third generation of leak locating methods. The first generation was deployed in 2001; second generation was deployed in 2007. More accurate and faster detection is currently under development. These leaks present environmental challenges for the Company. Monitoring and detection models are being proven in the lab environment and will be transferred to the field as soon as proven effective.

- Implement Secure Remote Substation Access Solutions to explore and address a variety of challenges associated with physical and cyber security. The focus is currently on solutions for Transmission Substations, Distribution Substations, and remote field locations. For each identified challenge, the project team will study implementation options, best practices, and capabilities/limitations. This project may include the use of Electric Power Research Institute (EPRI)'s Cyber Security Research Laboratory (CSRL), as appropriate, to test and evaluate proposed solutions. As an independent non-profit, EPRI's CSRL provides a vendor neutral host site for research. The lab currently supports research on a number of projects in areas that include integrated security operations center, security architecture, network systems management and open standards development.

- Participate in EPRI Substation Physical Security project which explores new technologies for improving substations access controls, monitoring and physical security.

- Develop forensic techniques for incident handling and response in the event of a cyber attack.

- Develop systems to mitigate impacts of Geo and Electromagnetic disturbances. Develop new models and technologies for mitigation of consequences of solar storms in Con Edison's transmission system, as well as Intentional Electromagnetic Interferences (IEMI) with regard to communication and control systems at the Energy Control Centers.

- Introduce new ergonomic technologies which aim to reduce the risk to our workers of sustaining ergonomic injuries.

Projects that **increase operational performance and flexibility** will serve to mitigate increasing costs associated with operating the electric system which in turn serves our customers at as low a cost as possible. Projects intended to improve performance and flexibility include the following:

- Develop embedded sensors for medium voltage splices to add built-in self diagnostics for medium voltage joints.

- Develop an underground splicing machine to make medium voltage live-end caps. Currently, processing and restoring feeders that open automatically consists of many steps, including positive identification, and placement and removal of additional protective grounds around the worksite required for workers. While we have decreased outage durations over the years by process optimization, we see little opportunity to make significant further reductions by process optimization. We envision use of a splicing machine could potentially streamline feeder processing further by changing the existing work methods.

- Develop a device to clear obstructions in our electric ducts and conduits without the need to excavate during cable repairs.

- Investigate feasibility of raising substation bus and associated connector rating from 3000 amps to a higher value potentially deferring the physical replacement of substation busbars and meeting the summer peak load.

  Develop tools and systems to support electric load forecasting days ahead to prepare for weather events, guide operations and fuel purchase and years ahead to guide infrastructure upgrades on our electric system.

- Evaluate the economic and technical feasibility of building a utility scale molten salt energy storage system at Hudson Ave.

Projects that **reduce risk and enhance public and employee safety and increase operational performance and flexibility** include:

- Enhance physical and cyber security by evaluating state-of-the-art solutions in biometrics, surveillance, and sensor technologies. Develop and implement technologies to prevent malicious actors who aim to subvert, circumvent, or disable Con Edison's critical infrastructure surveillance systems. Develop techniques to secure existing and future smart grid infrastructure to thwart physical, cyber and insider attacks.

We strive to continue to meet and exceed our **customer experience and engage our customers**. A number of projects are targeted to enhance our customer's expectations.

- Participate in climate impact and weather and associated damage studies and prediction technologies to minimize the number and duration of outages experienced by our customers and to optimize crewing, including Mutual Assistance crewing. This will improve our ability to allocate Company employees and Mutual Assistance resources to the appropriate jobs, and also enhance our ability to use these resources most efficiently and dynamically as the circumstances in the field change. It will also enable the Company to leverage information collected in the field, such as damage assessment data, in a timely manner.

- Install and continue to demonstrate microgrid related technologies. Microgrids are localized grids that can disconnect from the traditional grid to operate autonomously. Microgrids also support a more resilient grid by enabling the integration of the growing numbers of distributed energy resources such as distributed generation including renewables and energy storage. Integration of microgrids onto the existing electric grid requires development of new technologies. These may consist of controllers, switches, dynamic protection schemes, generation algorithms, energy storage, and/or unique applications - such as a distributed generation quick connect plug to facilitate efficient customer restoration in a microgrid. Microgrids can be demonstrated in many different applications and levels, such as a home, building, community, or network.

- Identify and demonstrate technologies to deliver and sustain effective customer engagement such as demonstrating analytics to provide insights from customer community data to tailor to customer needs.

- Initiate projects that will support NY REV Vision. These may include development of certain DSO (Distribution System Operator) platform layers, developing and testing distribution equipment that supports DG and microgrid interconnections, accelerating fault current mitigating technologies, developing and testing power converter technologies, developing and testing load flow and market modeling software layers to support Distributed Energy Resource (DER) integration, and potential revenue opportunities, developing and testing of Measurement and Verification (M&V) tools, and developing and testing customer engagement and residential and commercial appliance and Building Management System (BMS) interface tools.

Supplemental Information:

- Alternatives:

Below is a brief list of alternatives, or parallel efforts and/or short term efforts for each of the initiatives listed in the Work Descriptions above. Because the technologies are new, or under development, there may not be a direct alternative available, but there are generally options to address the issue at hand.

Manhole Events Mitigation Techniques – Dedicate more resources and increase frequencies of mobile stray voltage detection as well as provide more resources to cable failures replacement.

Overhead distribution system monitoring technologies – Dedicate more resources to patrol feeder lines after storms.

Underground transmission dielectric oil leak management - Continue the current practice of active feeder patrol which requires Transmission Operations and EH&S field personnel to patrol the feeder run with visual inspections and dielectric leak locator/'sniffing' equipment. Dedicate more resource to replace transmission pipe.

Secure Remote Substation Access – Eliminate remote access, increase visits, or maintain a physical presence in these stations. This takes away functionality and flexibility or increases costs.

Physical security project - Deploy high-definition cameras and physical barriers. These techniques will be deployed to some extent but this project will look for innovative techniques to supplement existing physical security measures.

Ergonomic technologies for employees - In the absence of introducing new ergonomics technologies, increased training efforts or different training strategies could be undertaken to reduce the chances of employee fatigue and injury. In order to characterize our worker environment with the goal to improve process we could dedicate ergonomic experts to observe work processes and manually record the incidence and duration of various risky behaviors that might lead to injury.

Investigate substation bus bar ratings and limitations - replace the entire bus bar to allow for higher ratings.

Load Forecasting - For our summer peak load forecast model we can continue to run the model with only the previous summer peak and a handful of more general econometric inputs such as Gross Domestic Product and building permits. Similarly, we can continue to use our short term load forecast model absent the probability data.

The molten salt energy storage system would address future potential load growth on the distribution system. As an alternative the company could build new infrastructure such as a new substation or seek additional customer sited solutions such as energy efficiency and demand response, as well as utility owned and sited solutions such as battery energy storage.

Climate and Weather Impact Studies - Dedicate more resources to the damage assessment effort. If not leveraging data from various sources, the Company would have to use the current data capturing techniques, which are labor intensive and require valuable utility analysis, restoration resources, and often data verification. The company could also provide more frequent and thorough manual survey of infrastructure to identify components that may fail due to weather events in advance including identifying leaning poles, overheating transformers, and lines with foliage encroaching.

Microgrid – Install more sectionalizing devices so that there are fewer customers between automatic devices, reducing the number of customers interrupted by a single event. This is being done already but does not provide a lot of improvement in a big event like Superstorm Sandy, with many points of damage. Creating smaller networks is expensive to implement. Encouraging the installation of back-up generation assets may be a big expense with very little return but we are investigating technologies that allow for utilization of those assets in normally connected scenarios, scenarios that could enable a better return on investment. Back-up generation requires maintenance and operational expertise that can easily lapse, rendering the assets useless when they are needed most. Encouraging the use of renewables, e.g. solar, does not help the customer during big events as grid tied solar systems deactivate automatically during a grid outage. As batteries continue to improve in costs, safety and reliability, grid tied solar plus batteries could be an alternative for customers with modest electrical power needs during a grid outage. Harden infrastructure feeding critical facilities. This is already being done to the extent economically practical. Cost benefits will help determine applicability of alternatives for various scenarios.

Customer Engagement - We can rely on our customers to choose to explore energy management technologies on their own without guidance or incentives from the company. We can also incentivize the products that seem most promising without undertaking pilot tests to verify their performance. We can continue to use human review of surveys and add different analytical procedures that attempt to mimic what text analytics and other software may achieve.

REV - Contend with third party generic solutions that may not be a best fit for the Company's software and grid architecture, or appropriate for the Company's customer demographic, and could lead to lost revenue opportunities.

- Risk of No Action:
  Missed opportunities to engage our customers, reduce costs, improved reliability, shorten outage durations, improve safety, prevent equipment damage, or develop smarter technologies.
  Manhole Events Mitigation Techniques – Missed opportunities to enhance public and employee safety. The company may be perceived by our customers that we are not managing the electric system properly. Company may incur liability if manhole events impact public and employee safety.

  Underground transmission dielectric oil leak management - Without advancement in leak detection tools, we may potentially incur significant O&M cost as result of repair and remediation of dielectric leak caused by disbonded coating on the underground transmission pipe.

  Real Time Condition Assessment of Aging HV (High Voltage) Transition Joint - The alternative is to use a High Voltage Potential Test to identify the fault before a repair can begin. During an emergency, the test can cost $200,000 per incident.
  Secure Remote Substation Access – Missed opportunity to reduce the number of times field personnel are required to visit substations to retrieve IED configuration or event files for analysis, or increased risk of cyberattack

  Physical security projects – Potential for vandalism or terrorism damage to critical equipment, similar to the Metcalf Substation incident in San Jose California.

  Develop systems to mitigate impacts of Geo and Electromagnetic disturbances – Possible vulnerability to solar storms and (Intentional Electro Magnetic Interference) IEMI attacks.

Ergonomic technologies for employees - Although the Company has dedicated much effort to worker safety, we still incur ergonomic related injuries. These injuries can result in significant costs to the company due to workman's compensation claims, missed work and worker retraining.

New technologies to increase operational performance –Non optimal performance can cause disruption of service to the public. For example, an underground splicing machine can expedite feeder restoration during high heat periods potentially mitigating cascading feeder failures. Tools and systems to support electric load forecasting can provide electric load forecasting days ahead to prepare for weather events, guide operations and fuel purchase and years ahead to guide infrastructure upgrades on our electric system.

Investigate substation bus bar ratings and limitations – Continued load growth will require replacement of the entire substation bus bar sections.

Load Forecasting - Without enhancing our summer load forecast model we risk not optimally guiding our system work to prepare for the upcoming summer peak, and therefore the potential for customer outages or overbuild. On multi-year or decade timescales we risk missing insights into unanticipated changes to loads due to, for example, demographic changes such as occurred in the networks fed by the Brownsville 1 and 2 substations. Not providing the enhancements to the short term load forecast model has two primary implications. First, the probabilistic load and TV (Temperature Variable) information is anticipated to improve our ability to target the appropriate fuel purchases. If too much or too little fuel is purchased a higher fuel cost is passed on to our customers. Similarly, less insight into the load and TV may result in overstaffing and understaffing in response to heat events which can result in a cost to the company and/or customer outages.

Molten Salt Feasibility study at Hudson Ave - The risk of no action is that we do not select the most cost effective and reliable measure for addressing potential future load excess on the distribution system, do not take advantage of cutting edge technologies, which can result in greater costs to our customers.

Climate Impact Studies - Missed opportunity to expedite restoration efforts by not correctly accounting for weather impacts to our infrastructure. There is the potential that we miscalculate the number and the timeliness of mutual assistance resources we require for efficient restoration. This may result in not getting the necessary manpower for timely restoration or incurring unnecessary expense for an event that does not fully materialize. Ultimately, this may lead to the public perception that the Company is not managing events properly.

Microgrids – lack of information for customers implementing DG or microgrids or optimizing the distribution grid using microgrid assets. Customers discouraged from adoption or perceived utility as an obstacle.

Customer Engagement - Not using techniques to better understand our customers would represent a missed opportunity to learn how to best design new programs, modify existing ones, and rethink Company operational procedures to provide our customers the best experience. At worst, we miss a chance to improve the satisfaction of our customers, and we waste resources implementing programs or customer facing content that may not be well received by customers. If we don't take the lead on supporting emerging customer technologies and test existing ones we risk our customers choosing technologies which may not perform as advertised or interplay well with our system. The result may be

customer frustration and non-participation in management of their energy usage and limiting our ability to leverage these technologies, for example, to improve system efficiency.

REV – potential for a 'wait and see' approach, letting others develop and test processes that ultimately may not fit, leaving the market untested, and customer subject to out of date technologies, and lost revenue opportunities.

- Non-financial Benefits:

The non-financial benefit of developing manhole mitigation techniques is improved public and employee safety, public perception of the Company and improved reliability.

A reduction in worker injuries results in greater employee satisfaction and reduced mental and physical pain and recognition of an operations-centered company.

We are undertaking two efforts to improve our electrical load forecasting procedures. The first aims to improve summer peak load forecasts on timescales of a year and more. This will allow us to better prepare our system for the stresses of summer load both one year out, and also possibly many years or a decade out. This can result in reduced customer outages as well as more efficient long term planning on decade timescales. A second project focuses on forecasting load on day timescales. This project holds the promise of reducing heat event related outages.

A large energy storage system such as that being studied in the Molten Salt Energy Storage System feasibility study can shift peak load to off-peak periods and thus better utilize our assets. In addition, since the system will charge using an off peak energy generation mix, the overall carbon associated with the peak load served by the system will be lower than the carbon released by a typical peak energy mix.

For weather projects, the benefits relate to improved communications, decision support, allocation of resources, and transparency.

The implementation of microgrids contributes to the adoption of smart grid assets, and DER such as renewable technologies, and interactive customer engagement philosophies.

Improved security measures, both cyber and physical, contributes to providing reliable service to our customers and safety for the public.

For mitigation of dielectric oil leak, the non-financial benefit is environmental excellence.

The customer analytics tools have the promise of pulling out new insights from customers' open end responses to surveys or in chat rooms. This will provide information about how we can most effectively and efficiently design and roll out new customer programs and initiatives with the goal of improving customer satisfaction and increasing customer engagement. Support for and pilot tests of new emerging customer technologies and products will increase the likelihood that our customers engage in active management of their energy and costs, with products that bring value to them, and also to Con Edison's system design and operations.

REV – non-financial benefits of pursuing R&D REV projects include better engagements with our customers, with vendors, and with regulators of Company support for REV goals,

- Summary of Financial Benefits (if applicable) and Costs:
  Every R&D project authorization request must have a path to likely implementation if successful. Every authorization request includes the following items:
  (1) Specific metrics used to determine the success of the project.
  (2) An implementation plan defining how the product or process would be integrated into operations if the R&D effort is successful.
  (3) A cost/benefit analysis. Qualitative benefits should always be discussed, and every effort is made to apply quantitative analysis.

- Technical Evaluation/Analysis:
  The technical component of each project is reviewed by the applicable operating organization and approved as part of the authorization process.

  Reducing manhole events is a major focus in R&D. Manhole events (MHEs) and energized objects (ENEs) present a significant safety threat to the public and our employees and continue to expose the Company to significant financial liabilities. Most manhole events develop over time and are caused when an electric arc burns the cable insulation producing combustibles such as carbon monoxide and hydrogen gas. Our arc fault detection technology is currently undergoing field demonstration in our underground networks. In addition, the fact that specific gases are produced from the burning of the cable insulation, it might be possible to develop a cost effective early warning mobile detection system - via the use of gas and e-field sensors - that would alert us of impending fires, explosions and abnormally high electric field which could be an indication of stray voltage.

  Our Mobile Contact Voltage Detection Program has been a significant contributor to the reduction in reported electric shocks. Developing an updated independent or improved technology for mobile scanning represents the next level of improving public safety by earlier identification and mitigation of energized objects.

  Advanced analytics may be employed to determine if events can be predicted with useful precision and confidence to allow economic condition-based maintenance before failure. Repair or replacement of anomalous components will enhance public and employee safety and reduce collateral damage to adjacent infrastructure. Network performance in terms of public safety as measured by Energized Objects and Manhole Events, varies significantly network to network. We seek to explore the effect of a change in policy that would target scans to more active areas in the belief that public safety events could be reduced.

  We are also investigating a number of manhole cover restraint systems for Con Edison's manholes and evaluate its effectiveness, practicality and cost on Con Edison infrastructure. Development and deployment of a cost effective system will avert launching of manhole covers, one of the risk factors of manhole events.

  Mitigating Alive on Backfeed (ABF) is a challenge on our distribution system. ABFs are caused when a feeder is de-energized, whether it opened auto due to a fault or for maintenance, and one or more of the associated Network Protectors (NWPs) fail to trip allowing the transformer to energize the feeder via the secondary network. These "ABF Events" result in multiple crews working to locate the failed NWP, prolonged feeder processing and restoration times, and increase the likelihood of damage to our equipment as a result of over voltages. There is also safety concern when feeder faults are not deenergized and isolated as quickly as possible. By devising a scheme to automatically exercise the NWPs periodically, we can potentially identify the problem NWPs pre-emptively and proactively make repairs.

When overhead power lines fail and fall on low-conductive surfaces, they generate high-impedance faults. These down conductors pose a great public safety concern because the fault currents are generally too small for detection by conventional overcurrent relays. Without timely correction, these faults can be hazardous to human lives and property. Detection and recognition of these events will be one of the research focuses in our R&D program. In addition, development of faulted circuit indicator with secure communication protocol is expected to enable a more resilient and smarter overhead system.

For underground transmission area, developing techniques and equipment to expedite detection and locating of dielectric fluid leaks in high pressure, fluid-filled (HPFF) cables, implementing state-of-the-art hardware and software to reduce O&M cost for locating and remediation of dielectric oil leaks; and examining the present and expected performance of HV (High Voltage) and EHV (Extra High Voltage) cable systems. For reduction in dielectric oil leak, two on-going research projects are underway to develop underground pipe coating disbondment detection. Some of the High Pressure Fluid-Filled (HPFF) feeders on the Con Edison Transmission System have experienced dielectric fluid leaks that were caused by the shielding effect of disbonded coating on the pipe. When the coating is not well adhered to the surface of the pipe, water can penetrate and support galvanic corrosion of the pipe surface. This condition is one that cannot be overcome by the application of cathodic protection because the coating prevents cathodic protection current from reaching the pipe surface. For leak mitigation, R&D developed a very accurate Slow Circulation and Static HPFF system based on mass balance. The next step is to commercialize the technology. Dielectric oil leaks are a major environmental challenge for the Company. Another on-going research effort to mitigate oil leak is to develop sensors to be placed inside transmission manhole to detect and report presence and volume of dielectric oil. The objective is to discover very small leaks below the detection threshold of the existing leak detection system. To eliminate dielectric leaks, the Company is seeking to design and qualify a transmission joint for EHV (Extra High Voltage) feeder in pipe. The transition joint will allow retrofitting existing EHV HPFF cable with water cooled (which therefore does not contain oil) solid dielectric cable to be done in sections. Partnering with EPRI, Con Edison developed the first dielectric leak locator using Gas Chromatography. We continue to work on improvements to isolation of the tracer and background interferents.

Safeguarding critical infrastructure against growing and evolving threats – both physical and cyber – is becoming increasingly important and there is a growing need for a holistic thinking about security risk management for a layered approach to security and resilience. The Company has already seen that our service territory is a target of significant interest to terrorists, criminals, and hackers. The attack on the Metcalf substation in San Jose, California is an alarming example of potential impact of physical attacks. It emphasizes the need for high-definition cameras and coordinated sensing technology. It is imperative that the Company stays ahead of methods and techniques used by attackers, and research in this field will provide these tools.

We plan to introduce two new ergonomic technologies which aim to reduce the risk of our workers sustaining ergonomic injuries while on the job. One technology is an exoskeleton which aids the worker in maintaining proper posture and motions during work. The second is a wearable sensor/receiver device that can characterize the working environment for possible process improvements and also provide alerts during risky behavior.

Research and Development has projects to develop and demonstrate new technologies to increase operational performance, flexibility and enhance our customer experience and reliability. We are developing embedded sensors, e.g. temperature, voltage, current, or partial discharge etc. for

medium voltage splices for an added level of built-in self diagnostics for medium voltage joints. We are seeking to develop an underground splicing machine to make medium voltage live-end caps for circumstances where traditional splicing and normal personal protective processes would create undue risk to continuity of service.

The excavation process associated with clearing conduit and duct obstructions stemming from cable repairs is costly, time consuming and impacts the public. Obstructions found include cable slag, cable insulation, broken pieces of cable, dirt/silt and dropped ducts. These problems coupled with permitting and restoration costs create a great deal of difficulty and cost for the Company. We are seeking to develop a device that has the ability to perform clearing functions from within a duct or conduit thus eliminating the need for excavation and all of the costs associated.

Load Forecasting – The long term load forecasting project entails enhancing the existing Con Edison summer load forecast model. Currently the load for an upcoming summer is forecasted using an in-house model that requires the current year weather adjusted peak demand as an initial condition input. As a result, the following year's forecasted summer load is not available until about October of the previous year. This leaves less time than desired for optimal planning of distribution system work. Additionally, using the in-house model with the current summer load does not provide insight into demographic changes in the population of a network such as those observed in the networks served by the Brownsville No. 1 and No. 2 substations. In networks that are near capacity, a lack of awareness of such demographic changes that can result in an increased load, much wider peak period, or a shift from day or night peaking, presents challenges to the company. The overall goal of the project is to identify data sets that will allow for upcoming summer load forecasting without the current summer load as well as determining datasets that provide indications of a growing network in the coming years. These data inputs may also potentially improve the accuracy of the in-house model when used in conjunction with current summer data. Con Edison will work with a member of the Center for Urban Science and Progress (CUSP) at NYU Polytechnic to identify the data sources that best capture the predicted load in various networks.

In the short term load forecasting model an enhanced probabilistic electric forecast model will be developed. This will provide key information to company decision makers who purchase fuel for electric and steam operations as well as those staffing for heat or other weather events. Rather than merely knowing the predicted temperature variable (TV) and electric load, the operators will also have access to probabilities of those conditions occurring, such as knowing the likelihood of certain TV or load thresholds being exceeded on a given timescale of days. The short term load forecasting model can be tested by inputting to the probabilistic forecast models previous weather forecasts and comparing the model output to the actual TV and customer load that were observed. The long term model may be tested by inputting into the Con Edison summer load model the data sets identified and comparing the actual summer load that resulted to those predicted by the model output.

Research and Development has been providing financial and technical support for a NYSERDA funded feasibility study for repowering Hudson Avenue with a molten salt energy storage system. The study, currently underway, aims to assess the economic and technical feasibility of building a utility scale energy storage system at the Hudson Avenue property. The system would charge molten salt with low-carbon mix off-peak electricity and discharge the electricity during peak periods to shift the peak load to lower peak times. The study shows that the storage system could be used to address peak load demands in Brooklyn networks and defer capital expenditures.

During the past three years the Company response to Superstorm Sandy has included several Research and Development projects aimed at hardening and increasing the resiliency of our infrastructure to minimize the damage and expedite restoration if and when the Company faces a similar event. At the same time, R&D is analyzing the impacts and probabilities of other types of natural disasters including, but not limited to, geomagnetic disturbances, and heat events. We continue to apply smart grid tools and philosophies to improve grid performance during both routine and emergency operations. Evaluating the effects of a storm and developing detailed, accurate ETR's (estimated time of restoration) has been challenging because there are many variables. Understanding the extent of the damage, how it will be repaired, and the resources available to do the work, makes it more straight-forward to determine which customers will be restored when. It also makes it easier to provide information to customers, giving them confidence in our abilities, a clear understanding of how serious the damage is, and how long it will take to fix. Today damage assessment and trouble analysis consume valuable resources, take time, provide limited detail, and present communication/coordination challenges. R&D has already demonstrated a tablet platform to make it easier to capture damage information, including photos, and tie it to specific trouble reports. The most significant variable in repairing storm damage is the number of human resources that can be applied to the work at hand, and the quality of the analysis. When an event occurs, and all internal resources have been applied, the Company relies on Mutual Assistance agreements with other utilities to supplement the workforce. When the event is significant enough to affect multiple utilities, such as with Superstorm Sandy, these resources can be difficult to obtain and complex to manage. Weather prediction methods, damage estimation models, and early determination of human resource requirements are essential components in securing the required resources to provide the best possible restoration response. R&D has been working with weather and climate change specialists on efforts to create highly granular weather forecasting, and Company specific parameters to predict and justify staffing levels.

Research and Development has projects to evaluate and leverage smart grid components and systems which are appropriate as we redefine the distribution grid and its capabilities. Microgrids have received attention as potentially providing resiliency in the event of a natural disaster affecting electric service. For over 10 years, Con Edison has been working with customers, Staff, Stakeholders, and NYSERDA to encourage smart growth of distributed generation systems. NYSERDA (New York State Energy Research and Development Authority) recently awarded the Company a grant to study the application of microgrid architectures to include properties and facilities with multiple owners. There are other projects exploring the requirements of microgrid controllers, tools to analyze and develop advanced communication, and explore isolation, fault current mitigation, protection, and switching equipment required to both enable and encourage microgrid applications in our service territory. We continue to look for opportunities to encourage the application of developing storage, renewable, high efficiency, and clean technologies as part of the microgrid applications. We are partnering with NYSERDA, FDNY and NYCDOB on a project to investigate safety and develop first responder guidelines for energy storage systems to facilitate project permitting in New York City. We will be demonstrating various energy storage technologies including a Transportable Energy Storage System (TESS) which will be used to provide grid support. We will be demonstrating a Distributed Generation Quick Connect Plug which will enhance the method of connecting generators to the secondary grid and in microgrid applications. For a community microgrid, identifying open secondary mains prior to its attempt to island is critical as disconnecting from the grid for islanded operation is usually a last resort. An open main due to a blown fuse could prevent loads from being served during this scenario. We are developing the methodology to locate open secondary mains via smart meter voltage readings.

With the implementation of microgrids, distributed generation, and smart grid concepts, increasing fault currents are a continuing problem that remains difficult to deal with. The problem is exacerbated by increasing loads (which causes the need for capacity increases), connection of new non-traditional distributed energy resources, and efforts to provide additional transmission capacity. In order to cope with fault currents, a number of design strategies have already been incorporated into the Company's standard design, including the use of high impedance transformers in area stations, impedance grounding of transformers, and selective application of high impedance series reactors. However, these methods have their limitations. Con Edison's higher fault currents and congested substations in many cases require first-of-a-kind equipment development. R&D funding in the area is aimed at developing a 15kV fault current limiter that can be used at distribution substations to mitigate the fault current contribution of specific sources to avoid the expense of upgrading equipment. Development of better or more cost-effective fault current limiting devices will help support the adoption of distributed generation.

Performance of the customer analytics tools will be benchmarked against the current methods of analyzing open ended responses to ensure the new conclusions from the software are accurate and robust and to test the ability of the software to elucidate insights not unearthed by current means. Performance of emerging and current customer engagement technologies will undergo measurement and verification, including evaluation of product performance as well as customer experience and satisfaction.

Costs to develop and test the REV related technologies listed above are estimated at $2M/year in total. The $2M includes an additional R&D project engineer and funding to engage vendors, labs, start-ups, and academia in projects that are not yet commercial or have not yet been developed for the electric distribution grid.

- Project Relationships (if applicable): N/A

- Basis for Estimate:
  Project estimates are based on budgetary estimates delivered by potential vendors, contractors, or by the sponsor organization after evaluating approximate costs for time, labor and equipment. Co-funding from third party collaborators or from the sponsor organizations are also considered when applicable.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
12,782	**10,271**	**7,986**	**10,061**	**7,837**	**10,771**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor	1,609	1,516	1,558	1,541	1,416	1,445
M&S						
A/P	11,173	8,755	6,428	8,520	6,421	9,326
Other						
Total	**12,782**	**10,271**	**7,986**	**10,061**	**7,837**	**10,771**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
10,854	**12,909**	**12,897**	**12,885**	**12,872**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor	1,696	1,746	1,799	1,852	1,908
M&S					
A/P	9,158	11,163	11,098	11,033	10,964
Other					
Total	**10,854**	**12,909**	**12,897**	**12,885**	**12,872**

	Capital
X	O&M

2016 - Shared Services / Research and Development

Project/Program Title	Program Change - Gas
Project Manager	Richard J. Trieste, Jr.
Project Number	Various
Status of Project	Planning Phase
Estimated Start Date	Ongoing
Estimated Completion Date	Ongoing
Work Plan Category	Strategic

Work Description:

R&D strives to be an agent of change that drives innovative technological solutions addressing both short-term operations issues and long-term strategic objectives. We review technology developments in all industries, participate in utility industry groups, and perform benchmarking in an effort to leverage best practices and opportunities to improve operations. We track issues and events and assist in developing long-term strategies. The projects identified in this paper represent some, but not all, of our significant efforts in the coming years. Projects are prioritized, selected, and funded based on their potential to improve reliability, increase employee and public safety, reduce cost, reduce risk, and increase customer engagement. Consideration is given to risk reduction, and to the development of new technologies with high potential and/or the readiness of a technology. The projects are intended to balance costs with the potential success and benefits they can provide. Each project goes through an authorization process that includes an evaluation of alternatives and a cost/benefit analysis, including cost to implement if successful. Because these technologies are new or still developing, the Company recognizes that the development or implementation of new or existing concepts, until technically and commercially feasible operations are verified, also carry risks beyond those of normal operations. Because of these risks, it is often appropriate to seek and apply R&D funding to such projects.

Various R&D projects to be undertaken during the rate years include projects that:

- Reduce risk and enhance public and employee safety
- Increase operational performance and flexibility
- Enhance customer experience and engage our customer

Projects that reduce risk and enhance public and employee safety include:

Field trial of Picarro Surveyor gas leak detection technology to provide enhancement to the current practice used to survey the gas distribution system for gas leaks.

Development of methane sensors by advancing the technology and governing codes and standards to facilitate a widespread adoption of the technology to enhance leak detection by customers.

Robotic corrosion detection of coated piping housed in utility tunnels to identify the presence of corrosion that is under pipe coating in order to prevent leaks.

Design and development of ground frost prediction model to be able to use actual field conditions and forecasted weather to predict when the distribution system will be experiencing frost, and a frost condition requires a special gas leak patrol.

Pilot demonstration of an acoustic leak detection system for transmission main in order to identify the presence of and location of a significant pipeline breach in order to facilitate an immediate shutdown to stop the release of gas.

Pursue damage prevention technologies to prevent third party excavators from damaging the gas infrastructure and prevent the release of gas or the interruption of gas to our customers.

Development of a jackhammer side compartment for utility trucks to reduce the risk of injury to field crews who utilize this heavy tool.

Protection of plastic gas pipe from electrical arcing and burn-out to protect newly installed gas distribution gas mains from being damaged by an electrical arc where buried electric infrastructure fails.

Demonstrate tracking and traceability technology for PE fusions to comply with both federal regulations and the NYS DPS order to be able to track plastic pipe fusions with regard to installer and material manufacturer, and then locate the installation.

Develop tool to seal a severed gas service tee in an elevated pressure gas main from outside of the excavation at a safe distance to immediately mitigate the event without the need to isolate the gas main, which could result in extensive customer outages.

Projects that improve operational performance and flexibility include:

Development of plastic pipe repair fittings to repair plastic butt fusions, saddles fusions and electrofusions without having to take the distribution main out of service or replace the main.

Develop an automatic house pipe integrity test device to serve as a 3rd party confirmation of the adequacy of an integrity test to automatically capture the data of the test and transfer that data to a data management system.

Remote monitoring system for water drip pots on gas distribution mains in order to provide a remote means to determine that a drip pot is accumulating water in order to prevent an interruption of the supply of gas to our customers.

Design and development of gas distribution line flood protection device and associated instrumentation to protect gas mains from being flooded by water entering the system through customers piping.

Pursue voice-enabled applications for operations to explore opportunities to enhance communications and automate processes in the way that improve the business by replacing common keyboard entry with voice actuated data entry.

Continue technology deployment and implementation efforts by proving technical support to overcome code or regulatory barriers that preclude implementation of successful research.

Demonstration of advancements to cured in-place lining (CIPL) process for gas main rehabilitation by seeking opportunities to continue advancing the technology by development of new processes such as robotic drills to open service connection points without having to dig over the service.

Evaluate high-temp cured CIPLs to rehabilitate gas mains that are in vicinity of the steam distribution system and as are precluded from use by the 125 degree Fahrenheit temperature limitation of the epoxy used to secure the liner to the host pipe.

Demonstrate waterproofing technology for applications in below ground infrastructure such as manholes and utility tunnels to prevent water intrusion from damaging the facilities housed within.

Pursue commercialization of the emergency main stop-off station (EMSOS) for field deployment in order to allow for an economical means of installing isolation points on large diameter low pressure gas mains without the need to install a valve.

Develop a 16" diameter plastic pipe squeeze-off machine to be able to isolate short segments of 16" diameter plastic pipe.

Develop a new high temperature limit switch and improve the diaphragm of the LNG plant's turbine bleed valves which presently are subject to failure resulting in the liquefaction system tripping off line for several days to facilitate repair.

Evaluate the application of the genesis internal spray lining system to coat the inside surface of an existing gas main as a means of a pipe rehabilitation.

Evaluate a gas pipe water extraction system capable of accessing a live low pressure gas main through one tap hole without any gas blow-by to locate water in a gas main.

Demonstrate the 12" ConSplit systems ability to replace 12" steel gas mains to eliminate the install a like sized main by the traditional direct burial process.

Perform a pilot testing of a paved-over valve box locating and reinstatement process to restore access to the valve box by a no-dig process.

Projects that enhance customer experience and engage our customer through the Company commitment to installing an automated meter intelligence (AMI) network include:

Pursue smart grid applications for gas operations to provide technologies that can be utilized to upgrade current strategic and operational management capabilities across the various planning, engineering and operational units to provide customers with an enhanced experience.

Development of methane sensors by advancing the technology and governing codes and standards to facilitate a widespread adoption of the technology to enhance the customer experience.

Justification Summary:

Projects that reduce risk and enhance public and employee safety are of paramount importance in order to provide for the safe distribution of natural gas. In order to reduce these types of risks, projects are undertaken to improve the safety and reliability aspects of Gas Operations. Projects that reduce risk include the following:

- Field trial of Picarro Surveyor – The Picarro Surveyor leak detection system is the current state of the art in leak detection technology that uses cavity –ring down spectroscopy process to reliably identify the presence of hydrocarbons. The Surveyor then takes the gas readings and using a proprietary algorithm that incorporates weather data from on-board weather instrumentation and GPS locating equipment, creates Leak Indication Search Areas (LISAs). This is much more advanced than the current leak detection technology, which simply acknowledges that the inlet to the instrument has measured a hydrocarbon. By identifying LISAs, the Surveyor enhances the leak investigation process, providing an area where a subsequent close up leak investigation should be performed instead of just an acknowledgment of the presence of a hydrocarbon. The Leakage Survey section of Gas Operations will be testing this new technology in the field to understand its performance and limitations, with the ultimate goal of creating a standard for its full deployment.

- Robotic corrosion detection of coated piping – Gas Operations operates utility tunnels under the major waterways in New York City. The facilities in these tunnels are susceptible to corrosion from water intrusion. The facilities are coated with a wax tape as a corrosion protection, but the wax tape can develop gaps as it ages and these gaps allow salt water to contact the steel pipe creating a location where corrosion can occur. This project is exploring the development of a robotic platform that will allow the coated steel pipes in the riser portion of the tunnels to be inspected for corrosion without the need to remove the wax tape and potentially identify areas for repair before a leak occurs.

- Remote monitoring system for water drip pots - If a gas main has a leak and the main is installed in a wet ground area, water can seep into the gas main. Throughout the gas main distribution network, drip pots are installed to collect water at topographically-established low points where it can be siphoned out. A build-up of water in a gas main can interrupt the flow of gas to our customers. Current practice requires field crews to routinely pump-out drip pots in areas known to accumulate water. Water infiltration may occur at any time resulting from any combination of high water-table, heavy rains, or water main breaks; and there is no telemetry in place to warn of rising water levels in drip pots. The objective of this project is to field test pre-commercial drip pot sensor units at various drip pot locations around the service territory. The results of this project will improve the quality of our data to deal with emergencies and to maintain the reliability of our gas distribution system by identifying situations that may result in a gas outage or low pressure condition.

- Design and development of gas distribution line flood protection device and instruments - Following Hurricane Sandy, water was found in sections of the low pressure gas distribution system within flooded areas that was likely due to existing leaks on mains and also damaged customer equipment due to flooded basements. When basements flood, customer equipment such as water heaters can float and a floating water heater can cause a house gas distribution pipe to break. A broken pipe in a basement can serve as a conduit for the water to flow into the low pressure gas distribution system. This situation results in not only outages to the flooded buildings, but also to neighboring buildings in the area. There is currently no device available in the gas industry that could prevent this type of customer-caused infiltration into the distribution system. As a result, the company is pursuing the development of technology that can mitigate the infiltration of water into the distribution system caused by damaged customer equipment and flooded basements by shutting off the flow of gas when water is senses in the gas pipe.

- Design and development of ground frost prediction model – Ground frost has a negative impact on the cast iron distribution system by making it susceptible to cracking associated with ground movement. The Gas Leakage Survey section in accordance with written procedures performs

high speed cast iron main patrols when specific temperature and ground frost criteria are met. The determination of the depth of frost is done physically by excavating. This project seeks a technological solution to continually monitor ground temperature and combine the actual ground temperature data with forecasted weather data to perform analytics that predict future frost conditions based on forecasted temperatures.

- Pilot demonstration of an acoustic leak detection system for transmission mains – The Company's gas transmission system is installed in a DOT Code classified area referred to as a high hazard consequence area due to the density of the population in its vicinity. In order to reduce the risk associated with a failure of the gas transmission system, Gas Operations installs Remote Operated Valves (ROVs) in strategic locations. In the event of a transmission gas main rupture, a system is required that would identify the location of a rupture to facilitate the operation of the specific ROVs to mitigate the leak. This monitoring system must communicate to the Gas Operations Supervisory System (GOSS) that a rupture has occurred in a very timely manner. The monitor must also accurately identify the location by identifying the ROVs that bound the rupture. Using this information the Gas System Operator can make an immediate determination of which valves need to be closed to shut off the gas flow to the break.

- Enhanced damage prevention technologies – The streets that contain the gas distribution system also contain a vast network of a multitude of energy and utility products, with each operator of that system performing excavation activities to upgrade, repair, or install new infrastructure. To provide for public and employee safety associated with damages from dig-ins onto other's systems, New York State requires notification to an 811 call center by every excavator to have their future work site marked out for utility infrastructure in order to avoid damages. The application of GPS technology to map infrastructure allows for accurate mapping of facilities which serves to limit damages, but application of GPS has limitations in areas referred to as urban canyons where satellite connectivity is missing or intermittent due to geographical constraints such as tree canopy or tall buildings. This project seeks to develop a prototype system that allows the collection of highly accurate spatial data in urban canyons where traditional GPS technology is ineffective.

- Develop jackhammer side compartment for utility trucks – The heaviest tool used by Gas Operations is a pavement breaker. The weight of this tool creates a risk for injury upon each and every use. The tool is kept on a crew truck and is lifted onto and off of the truck after each and every application of use. This project seeks to develop a side lift compartment to alleviate the lifting of the tool on and off the truck in order to reduce the risk of injury.

- Protection of plastic gas pipe from electrical arcing and burn-out – The gas distribution system has experienced instances where buried electric infrastructure fails and creates a high heat condition from the resulting arc and that arc impacts a gas distribution main by melting polyethylene piping systems or burning through steel piping systems. This project seeks to replicate the arc event in a lab on demand. This replicable arc would then be used to conduct lab testing to determine an optimal thermal protective barrier for use between buried electrical cables and gas distribution pipes.

- House pipe integrity test automation - The process of restoring gas to a customer begins with the performance of a house pipe integrity test to verify the pipe is a closed pressure boundary before turning on the flow of gas. The field data for integrity tests is manually captured for record purposes. This project seeks to develop a customized device for automating the process of performing the house pipe integrity test. This automatic process will serve as a 3rd party

confirmation of the adequacy of a test and will automatically capture the data of the test and transfer that data to a data management system.

- Demonstrate tracking and traceability technology for PE fusions – Recent advance notices of proposed rulemaking by the Federal Government will result in the requirement to institute a tracking and traceability process for gas distribution systems. In addition, the Company is under order by the NYS DPS to have a tracking and traceability process for plastic fusions. This project seeks opportunities to comply with both these federal regulations and the NYS DPS order by seeking technology and its associated hardware in order to be able to track plastic pipe fusions with regard to installer and material manufacturer, and then locate the installation for download into a future GIS mapping system yet to be instituted by the Company.

- Develop tool to seal a severed service tee in an elevated pressure gas main – Excavation activities sometimes impact our gas distribution system by damaging the pressure boundary of the buried gas main or service. Sometimes that damage is severe and results in the severing of a plastic tapping tee from the gas main, resulting in a high energy release of natural gas until the pipe can be isolated. This project seeks to develop a robotic system to install a seal in a hole in an elevated pressure gas main from outside of the excavation at a safe distance to immediately mitigate the event without the need to isolate the gas main, which could result in extensive customer outages.

Projects that improve the way the Company performs its functions serve to increase operational performance and flexibility. Improvements in these areas will serve to mitigate increasing costs associated with operating the gas organization which in turn serves our customers at as low a cost as possible. Projects intended to improve performance and flexibility include the following:

- Develop plastic pipe repair fittings – The natural gas industry has been extensively utilizing plastic pipe and fittings since the 1980's. Plastic pipe and fittings historically have provided a safe and efficient means of installing new distribution system or replacing existing distribution system. Generally the new plastic system performs well but there occur situations where repairs are required. Due to the proven reliability of plastic piping, the gas industry has not pursued extensive means to repair plastic pipe as is available for metallic piping systems. This project seeks to develop fittings to repair plastic butt fusions, saddles fusions and electrofusions without having to take the distribution main out of service or replace the main.

- Voice-enabled applications for operations – Voice enabled technology is advancing to the point where commonly used technology such as smart phones applications allow users to simply speak commands or narratives without the need to manually enter information. This project seeks to explore opportunities to enhance communications and automate processes in the way that improve the business by replacing common keyboard entry with voice actuated data entry.

- Technology deployment and implementation (TDI) Program – The R&D section utilizes research collaboratives such as NYSEARCH to pursue technology development and enhancements. The last phase of research is deployment and implementation. Many times due to code or regulatory requirements, successful research or technology cannot be instituted. This project seeks to overcome such barriers.

- Demonstration of advancements to cured in-place lining process for gas main rehabilitation – Liners represent a potential savings of cost associated with gas main replacement since they do not require the replacement of existing pipe with a new direct buried pipe. They instead utilize the existing pipe as a host pipe for which the new liner is secured to with adhesive. This option of main replacement may offer cost savings over the direct burial option. This project seeks

opportunities to continue advancing the technology by development of new processes such as robotic drills to open service connection points without having to dig over the service.

- Evaluation of high-temp cured in place liners (CIPL) to rehabilitate gas mains - CIPLs represent a potential cost savings associated with gas main replacement compared to the traditional direct burial methods used to replace some gas mains when a reduction in pipe diameter is not appropriate. Current liners utilized have a temperature limitation of 125 degrees F, which is the temperature limit of the epoxy. In Manhattan, the steam system poses a source of heat and as such liners cannot be installed since they may be subject to temperatures above 125 degrees F. This project seeks technology that can serve as an insulator to allow the installation of liners for gas mains in close proximity to steam mains.

- Demonstrate waterproofing technology for infrastructure applications – The gas distribution system includes manholes that house regulators and ROVs and utility tunnels. These structures buried in the ground and beneath waterways are subject to flooding and water intrusion from ground water infiltration. Water in these structures may result in corrosion. This project seeks to demonstrate waterproofing technologies that can be implemented in the tunnels and manhole infrastructure throughout the Con Edison system.

- Emergency main stop-off station (EMSOS) field deployment and testing - The EMSOS project developed a process to install isolation points on the low pressure gas distribution system without the need to install a valve. This project will move beyond the prototype phase to fabricate, install, and test EMSOS on existing infrastructure to complete the commercialization phase of the project so as to be able to deploy the EMSOS strategically on the larger diameter pipes of the low pressure gas distribution system.

- Develop 16" plastic pipe squeeze-off machine – The use of plastic is ever increasing with the Company now regularly installing 16” diameter PE pipe. An emergency means of shutting off a PE pipe is through the squeeze-off process. This project creates a prototype unit capable of squeezing off 16” diameter pipe.

- High temperature limit switch and diaphragm improvements for LNG turbine bleed valves – The Company’s LNG plant utilizes the original natural gas burning turbine to spin a compressor that performs the first step of nitrogen compression for the plant’s liquefaction system. The turbine uses regulating diaphragm controlled (bleed) valves to by-pass hot compressed air as the turbine ramps up in order to bring the unit to operating speed in a controlled manner. The internal switches that indicate valve position are subject to failure. The diaphragms used to operate the valves are also subject to failure. A failed bleed valve can trip the plant and requires the unit be taken off line for several days to facilitate repairs. This result in loss of run time and expense associated with an instantaneous trip that can damage other rotating equipment. This project seeks to redesign the diaphragm and the temperature switches to increase reliability of the Company’s LNG plant liquefaction system.

- Evaluate genesis internal spray lining system – Traditional replacement of gas distribution mains is through insertion of a new pipe in the original pipe or installing CIPLs This project seeks to develop an internal spray epoxy to coat the inside surface of an existing pipe as a means of a pipe rehabilitation process.

- Gas pipe water extraction system evaluation - The low pressure gas distribution system is subject to flooding that causes customer outages. Flooding can be caused by a multitude of reasons with the two major reasons resulting from pipe corrosion where ground water exceeding the head

pressure of the gas mains seeps into the gas pipe through corrosion holes. The second is from water main breaks where the large washout from the flooding waters causes a gas main to also break. The head of pressure from the resulting flood waters typically exceed the pressure in the main too. Both instances result in the loss of gas pressure that can cause customer outages. This project seeks to develop technology capable of accessing a live low pressure gas main through one tap hole without any gas blow-by. This system can then be used to locate water in the main with video camera equipment and then extract the water from the main utilizing a vacuum hose/suction equipment. This process would be a vast improvement to the current process of locating water through trial excavations.

- Demonstrate 12" ConSplits ability to replace 12" steel gas main - Traditional replacement of gas distribution mains is through insertion of a new pipe in the original pipe or direct burial of a new pipe adjacent to the original. This project seeks to expand on the insertion process by using the ConSplit technology to install a new main with a larger diameter than the original main using an expander tool to pull the larger diameter main through the void created by breaking and expanding open the existing main. This project seeks to field test the process to identify areas where the system needs to be improved or enhanced for continued field application.

- Paved-over valve box locating and reinstatement - The Company maintains valve boxes to provide access to buried gas valves in order to facilitate an outside shutdown for emergency situations. Many of these valve boxes are found paved over during mandated inspections requiring an excavation be made to bring the valve box even with the new grade. This project seeks to pilot a no-dig valve box locating and reinstatement process in order to minimize the cost associated with repairing these occurrences.

The Company recently made a commitment to install automated meter intelligence (AMI) network. This network will allow the Company the opportunity to access customer use information on a much granular scale in order to not only perform typical customer functions such as meter reading, but potentially also to provide more specific use data to optimize operation of the system, such as gas pressure. The following projects seek to enhance the customer experience through this AMI network:

- Smart grid applications for gas operations – This project seeks to provide technologies that can be utilized to upgrade current strategic and operational management capabilities across the various planning, engineering and operational units as well as improving the current business model to face increasing demand, new regulations, emerging operational challenges, and uncertain risk scenarios.

- Development of methane sensors – The Company is committed to improving the safety of the public through the wide scale adoption and use of residential methane detectors. This project seeks to advance both technology and governing codes and standards to facilitate a widespread adoption of the technology.

Supplemental Information:

- Alternatives:
  Below is a brief list of alternatives for each of the initiatives listed in the Work Descriptions above. Because the technologies are new, or under development, there may not be a direct alternative available, but there are generally options to address the issue at hand.

- The option to performing the field trial of Picarro Surveyor with the intent of widespread deployment is to utilize the existing leak detection technologies and not taking advantage of more sensitive equipment to potentially locate more gas leaks.

- The option to developing robotic corrosion detection technology is to continue the manual process which is a qualitative effort compared to a quantitative effort.

- Not utilizing a gas distribution line flood protection system leaves gas services in flood prone regions susceptible to flooding and potentially causing extended customer outages.

- Not developing a ground frost predictive model requires the Company continue to manually determine the presence and depth of frost by excavating the ground and physically measuring frost depth as it occurs and reacting to the condition rather than planning for the condition.

- Not having an acoustic leak detection system for transmission mains increases the time required to respond to a significant pipeline breach by using existing data available to the Gas System Operator to evaluate system conditions in order to make a decision as to where to isolate the main to stop the release of gas.

- The alternative to developing damage prevention technologies to prevent third party excavators from damaging the gas infrastructure is to continue to use current technologies. This alternative is not viable because it potentially maintains the status quo which maintains current performance.

- The alternative of a jackhammer side compartment for utility trucks to reduce the risk of injury is to continue the current process of lifting the tool off the bed of the truck. This process does not seek to improve safety and instead maintains the status quo.

- The option of developing a new protective barrier as an arc shield to protect gas mains from damage caused by an arc is to utilize the current barriers that have demonstrated it is not effective in some instances. The other option is to create a greater clearance which is not practicable due to subsurface utility congestion in the streets.

- The alternative of developing an automatic house pipe integrity test device to serve as a 3rd party confirmation of the adequacy of an integrity test by automatically capturing the data of the test and transmit that data to job files is to continue the current manual process. The current process has no automation or means of QA. Another option is to create a peer check, but this alternative would not be cost effective since a typical one person turn-on would now require two.

- The alternative of not pursuing tracking and traceability technology for PE fusions to comply with both federal regulations and the NYS DPS order to be able to track plastic pipe fusions with regard to installer and material manufacturer and then locate the installation is to perform the process manually. A manual process is labor intensive and would require significant transposition of data from field work papers to an electronic data base. This manual process has a higher risk of wrong entry.

- Development of a tool to seal a severed gas service tee in an elevated pressure gas main from outside of the excavation would improves the current practice of sticking or pinning

from in the excavation. Another option is to close valves and this option may result in a large customer interruption of gas.

- Development of plastic pipe repair fittings to repair plastic butt fusions, saddles fusions and electrofusions would improve upon the only alternative which is to replace the section of main that also requires making about 8 more fusion than repairing by installation of a fitting.

- The current process of data entry, which is through the manual process of typing, can be done. Voice-enabled applications would improve upon that process by eliminating manual entry and automate the process.

- The R&D process can include the need to pursue efforts that facilitate deployment and implementation of technology. That process can focus on proving the performance of the new technology in order to overcome code or regulatory barriers that preclude implementation of successful research. Not pursuing implementation could result in the technology not gaining regulatory adoption and therefore not be utilized.

- Pursuit of advancements to cured in-place lining (CIPL) process for gas main rehabilitation by seeking opportunities to continue advancing the technology by development of new processes such as robotic drills to open service connections without having to dig over the service need not be undertaken, and the current process of excavating over each service connection can be maintained.

- Evaluating high-temp cured CIPLs to rehabilitate gas mains that are in vicinity of the steam distribution system need not be undertaken by excluding the use of high-temp CIPLs by steam mains and instead installing steel pipe, which is far less cost effective than installing a liner.

- Demonstrate waterproofing technology for applications in below ground infrastructure such as manholes and utility tunnels to prevent water intrusion from damaging the facilities housed within need not be done. Instead, drip shields can be installed over most tunnel locations and increasing the frequency of inspection of manholes can address manhole water intrusion.

- Pursuing commercialization of the emergency main stop-off station (EMSOS) for field deployment in order to allow for an economical means of installing isolation points on large diameter low pressure gas mains can be stopped. Instead, valves can be installed.

- The option to the project that develops a16" diameter plastic pipe squeeze-off machine is to install more valves.

- Developing a new high temperature limit switch and improving the diaphragm of the LNG plant’s turbine bleed valves need not be done. Instead the valves can be repaired as they currently leaving the valves subject to failure that results in the liquefaction system tripping off line for several days in order to facilitate a repair.

- The alternative to reconditioning a main by internally coating the pipe wall is to insert the pipe with a smaller pipe or to direct bury a new main. The insertion option reduces the inside diameter and as such may not be feasible. The direct burial of a new pipe requires significantly more work.

- The alternative to the project seeking to develop technology capable of accessing a live low pressure gas main through one tap hole without any gas blow-by in order to remove water is to continue to excavate suspected low spots through a trial an error process.

- Demonstrate the 12" ConSplit systems ability to replace 12" steel gas mains would eliminate the option of installing a like sized main by the traditional direct burial process.

- The option to performing pilot testing of a paved-over valve box locating and reinstatement process to restore access to the valve box by a no-dig process is to excavate larger holes through traditional excavation techniques.

- Pursuing smart grid applications for gas operations to provide technologies that can be utilized to upgrade current strategic and operational management capabilities across the various planning, engineering and operational units to provide customers with an enhanced experience can be avoided and instead the Company not take advantage of a new smart grid system and continue the status quo.

- Development of methane sensors by advancing the technology and governing codes and standards to facilitate a widespread adoption of the technology to enhance the customer experience need not be taken. Instead customers can continue to rely on the detection of a leak through odor recognition and then notify the Company of the detected odor.

- Risk of No Action: Missed opportunities to reduce costs, improve reliability and safety. Poor public perception is also a possibility.

  The risk of no advancement to reduce risk and enhance public and employee safety can create an unsafe environment for both our employees and the public. Advances in technology occur each and every day and maintaining the way we do business now in the ever demanding environment that society operates in, where needs are expected to be met immediately and with the utmost of transparency, is not a sustainable future.

  The Company is continually under pressure to not increase rates in an environment where operating costs are ever increasing. The only way to span this gap is to improve operational performance by deploying new technology that will achieve a desired outcome at a lower cost. Utilizing the EMSOS to install isolation zones on large diameter cast iron mains in lieu of installing valves is but one example.

  Society continually wants newer and better. In order to provide service to meet these ever present expectations, we need to develop technology that enhances customer experience and engages our customer. The advancement of technology that can provide system operating parameter on a more granular level such as system pressures at the customer level is one such example. It would allow a proactive response to an event unfolding whereas now many times we react to an event that has occurred.

- Non-financial Benefits:

  The above mention projects are intended to reduce risk and enhance public and employee safety, increase operational performance and flexibility, and enhance customer experience and engage our customer. They all have one major overlying theme and that is to improve upon the way the Company does things now and not rely on the status quo.

- Summary of Financial Benefits (if applicable) and Costs: Every R&D project authorization request must have a path to likely implementation if successful. Every authorization request includes the following items:
  (1) Specific metrics used to determine the success of the project.
  (2) An implementation plan defining how the product or process would be integrated into operations if the R&D effort is successful.
  (3) A cost/benefit analysis that discusses qualitative benefits when appropriate, and quantitative analysis.

- Technical Evaluation/Analysis: The technical component of each project is reviewed by the applicable operating organization and approved as part of the authorization process.

  Projects can be classified into several categories: early detection; prevention; automation; repairs.

  The Research and Development projects that are intended to serve as early detection opportunities to mitigate situations before they evolve into larger events. The projects to develop robotic corrosion detection, develop drip pot monitors, create a ground frost prediction model, and develop an acoustic means to locate a leak on a gas transmission system are some examples. Each project's objective is to gain system knowledge of a situation before it manifests itself as a situation that requires a response.

  Projects classified as prevention are intended to stop an event from occurring. Examples of projects that fall into this category includes the enhancement of damage prevention, electric arc fault protection, and waterproofing technology, and the emergency main stop-off station (EMSOS). The enhanced damage prevention technologies project will seek means to address urban canyon effect in NYC that prevents high accuracy mapping of our infrastructure utilizing GPS technology. The ability to accurately map infrastructure using GOPS coordinates facilities mark-out of our infrastructure when complying with nationwide call before you dig program (811) to avoid damage from 3rd party excavators. The project to protect plastic gas pipe from electrical arcing and burn-out becomes even more critical as gas demand grows and we continue to expand our gas infrastructure. The project to demonstrate waterproofing technology for gas regulator and ROV manholes, and utility tunnels can prevent these below ground infrastructure from corroding and ultimately leaking or in the case of an ROV failing to operate when electronics become damaged. The emergency main stop-off station (EMSOS) field deployment and testing address a recent finding in the NTSB report for the 2014 Harlem incident where a recommendation was made to install isolation valves on the low pressure system. The EMSOS will provide a means of complying with that recommendation in a timely and cost effective manner.

  Projects that fit the field automation need are intended to provide a technical solution to common organizational needs such as automating the house pipe integrity test process and improve tracking and traceability of the gas infrastructure. The house pipe integrity test automation project is intended to provide an automatic means of pressuring a building for an integrity test, verifying the adequacy of that test, then documenting the specific results of the test including duration, and pressure in order to create an auditable history for verification purposes. The project to demonstrate tracking and traceability technology for PE fusions is needed to comply with an order from the PSC that aligns with federal Distribution Integrity Management Program (DIMP) requirements by seeking technology and its associated hardware to track PE pipe fusions with

regard to installer and material manufacturer and then geo locate the installation for download into a future GIS mapping system yet to be instituted by the company.

Projects that meet a repair need are pursued to control costs in the operating area by seeking new and innovative solutions to current operational needs in order to avoid more extensive repair and installation processes. Several projects that meet this need are the projects to advance the use and application of cured in place liners to replace gas infrastructure and the development of repair fittings for plastic mains. Liners have temperature limitations and one project seeks solutions to alleviate transient heat from a steam main by deployment of an insulation medium in between the host pipe and liner. Another project seeks to develop innovative tools such as the remote robotic opening of gas serves sealed over through the traditional lining process. Projects to create plastic pipe repair fittings is of new importance since Gas QA has undertaken a program to inspect any buried plastic fusion exposed during Gas Operations excavation activities for conformance with visual criteria of acceptability. Fusions that do not meet acceptable criteria need to be cut out since there are few means of repairing a plastic fusion.

- Project Relationships (if applicable): N/A

- Basis for Estimate: Basis for preliminary estimates for planning purposes is similar work and field experience. Estimates for projects that are moving beyond planning phase are through formal estimates and vendor proposal evaluations.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
1,099	**1,757**	**698**	**950**	**1,436**	**1,674**

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor	262	247	254	251	230	235
M&S						
A/P	837	1,510	444	699	1,206	1,439
Other						
Total	**1,099**	**1,757**	**698**	**950**	**1,436**	**1,674**

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
1,473	**1,481**	**1,490**	**1,498**	**1,507**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor	276	284	293	301	310
M&S					
A/P	1,197	1,197	1,197	1,197	1,197
Other					
Total	**1,473**	**1,481**	**1,490**	**1,498**	**1,507**

EXHIBIT ___ (SSP-14)
Research and Development Costs
Index

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
ELECTRIC RESEARCH AND DEVELOPMENT 2016 PROJECTED COSTS (000)

CSN	PROJECT	TASK	Title	Test Period Oct 2014 - Sept 2015 plus Oct - Dec 2015 Est with RY1 & RY2 Expend. see exhibit CE E 1A	2016 Forecast - See Exhibit CE E 1B	2017 Budget	2018 Budget	2019 Budget
			ADMINISTRATION					
92032	10064342	0024	SALARIES AND WAGES	$1,834	$1,696	$1,747	$1,799	$1,852
92034	10064342	0025	OTHER EXPENSES	$236	$198	$198	$198	$196
92649	10064342	0372	PATENT SEARCHES IN CONNECTION WITH COMPANY R&D TECHNOLOGY APPLICATIONS	$55	$162	$162	$162	$162
			TOTAL ADMINISTRATION	**$2,125**	**$2,056**	**$2,107**	**$2,159**	**$2,210**
			INSTITUTIONAL					
92071	10064342	0047	EPRI FOR ELECTRIC DISTRIBUTION AND CUSTOMER R&D	$2,216	$1,713	$1,713	$1,713	$1,713
92069	10064342	0045	EPRI - ELECTRIC TRANSMISSION	$1,653	$1,305	$1,305	$1,305	$1,305
99957	21349807	0001	APPLICATIONS RESEARCH - CEATI	$148	$160	$160	$175	$175
92394	10064342	0279	EPRI/NYSERDA/DOE TRAVEL BY ALL OTHER NON-R&D PERSONNEL	$52	$10	$10	$10	$10
92388	10064342	0275	EPRI/NYSERDA/DOE TRAVEL BY SYSTEM & TRANSMISSION OPERATIONS PERSONNEL	$36	$20	$20	$20	$20
92439	10064342	313	INTERNATIONAL UTILITY WORK GROUP PARTICIPATION	$26	$25	$25	$25	$25
92255	10046626	0036	R&D MANAGEMENT BEST PRACTICES	$13	$15	$15	$15	$15
92374	10064342	0263	EPRI/NYSERDA/DOE TRAVEL BY ENVIRONMENTAL AFFAIRS PERSONNEL	$9	$10	$10	$10	$10
92387	10064342	0274	EPRI/NYSERDA/DOE TRAVEL BY CUSTOMER SERVICE PERSONNEL	$5	$10	$10	$10	$10
14106	20829413	1	CIGRE MEMBERSHIP	$2	$2	$2	$2	$2
92090	10064342	59	APPLICATIONS RESEARCH FOR DISTRIBUTION, SUBSTATIONS AND TRANSMISSION - NEETRAC	$0	$140	$140	$150	$150
92204	10064342	142	3G SYSTEM OF THE FUTURE BENCHMARKING	$0	$25	$25	$25	$25
92719	10046626	101	IEEE XPLORE DIGITAL LIBRARY ACCESS COST SHARING	$0	$5	$5	$5	$5
			TOTAL INSTITUTIONAL	**$4,160**	**$3,440**	**$3,440**	**$3,465**	**$3,465**
			INTERNAL PROGRAMS					
			TRANSMISSION					
92146	20281602	1	SURFACE WAVE TECHNOLOGY FOR DISBONDED COATING DETECTION	$598	$125	$85	$100	
98890	20735515	1	AEOLIAN VIBRATION STUDY FOR EHV OVERHEAD FEEDERS	$135	$50	$75	$50	
99974			TRANSMISSION MANHOLE OIL MINDER	$134	$75	$100	$100	
92432	10046626		DISBONDED COATING DETECTION FOR UNDERGROUND PIPE FEASIBILITY STUDY	$107	$100	$100	$100	
92111	10064342	71	MITIGATION OF GEO AND ELECTRO MAGNETIC EVENTS	$74	$25	$50	$50	
92706	10046626	99	EHV TRANSMISSION FEEDERS INSULATOR RISK ASSESSMENT	$52	$60	$80	$50	
92650	20683308	1	PIPE-TYPE CABLING SYSTEM PD DETECTION DEMONSTRATION	$51	$65	$50	$50	
15020			VEGETATION MANAGEMENT STUDY	$50	$0	$50	$100	
15021			LIGHTING AND PROTECTION ANALYSIS FOR OVERHEAD TRANSMISSION FEEDERS	$45	$0	$0	$75	
15022			OVERALL INSPECTION PLAN FOR OVERHEAD TRANSMISSION FEEDERS	$40	$50	$50	$50	
92116	10064342	75	EXPANDED USE OF PHYSICAL OPERATING MARGIN SOFTWARE	$12	$5	$5	$5	
			WATER COOLED EHV CABLE SYSTEM - TRANSITION JOINT DESIGN & TYPE TEST	$0	$250	$105	$0	
13150			NEXT GENERATION OF PFT TECHNOLOGY FOR DIELECTRIC OIL LOCATING	$0	$100	$150	$100	
92135	10064342	92	SOLID STATE FAULT CURRENT LIMITERS	$0	$100	$100	$100	
90212	20932457	1	IMPACT OF FLUID FREEZE ON ENERGIZED HPFF SYSTEM	$0	$75	$0	$0	
			DEVELOPMENT OF FAULT LOCATING SENSOR FOR UNDERGROUND DIELECTRIC CABLING SYSTEM	$0	$70	$150	$150	
			IDENTIFY & DEVELOP PD MEASURING PLAN FOR 59TH ST AGING HYBRID FEEDERS	$0	$60	$80	$50	
13152			AUTOMATED FAULT LOCATING FOR EHV FEEDER	$0	$50	$50	$100	
92765	10046626	109	UNDERGROUND TRANSMISSION FEEDERS ASSESSMENT STUDY	$0	$50	$80	$80	
			END-WALL CORROSION STUDY	$0	$50	$50	$50	
			MANHOLE COATING INSPECTION TOOL	$0	$50	$100	$50	
			TRANSITION JOINT TRANSMISSION MANHOLE REAL TIME ASSESSMENT	$0	$50	$100	$100	
			DEVELOP AN EARLY SUMMER LOAD FORECASTING TOOL	$0	$25	$50	$0	
			DEVELOPMENT OF TOOL TO PROVIDE PROBABILISTIC ELECTRICAL FORECAST	$0	$25	$0	$0	
			ALTERNATE TO PFT STUDY	$0	$10	$50	$75	
12185	20233639	1	OPTIMIZATION OF PFT LEAK EXCAVATING	$0	$0	$50	$50	
13153			COMMERCIALIZATION OF THE ADVANCED LEAK DETECTION SYSTEM	$0	$0	$0	$50	
92070	10064342	46	PARTICIPATION IN EPRI "SUNBURST 2000" PROGRAM RELATED TO GEOMAGNETICALLY INDUCED CURRENTS	$0	$0	$0	$0	
		1	INFRARED LEAK LOCATING TECHNOLOGY	$0	$0	$50	$50	
			OVERHEAD TRANSMISSION FEEDERS CONDUCTORS CLEANING TOOL	$0	$0	$45	$50	
		1	RETROFIT OF M51, M52 STUDY	$0	$0	$50	$100	
			TOTAL TRANSMISSION	**$1,298**	**$1,520**	**$1,905**	**$1,885**	**$1,885**
			SUBSTATION					

CSN	PROJECT	TASK	Title	Test Period Oct 2014 - Sept 2015 plus Oct - Dec 2015 Est with RY1 & RY2 Expend. see exhibit CE E 1A	2016 Forecast - See Exhibit CE E 1B	2017 Budget	2018 Budget	2019 Budget
92736	20707502	1	DEMONSTRATION OF REMOTE BREAKER RACKING SYSTEMS	$52	$10	$20	$20	
92749	20735742	1	NERC CIP TOOLS AND TECHNIQUES	$50	$50	$50	$50	
92637	10046626	80	HIGH & MEDIUM VOLTAGE CIRCUIT BREAKER LIFE CYCLE IMPROVMENTS	$25	$25	$25	$25	
92764	20735208	1	SECURE REMOTE SUBSTATION ACCESS SOLUTIONS	$0	$40	$40	$40	
99928	21444529	0001	DEVELOPMENT OF LINE GROUPS SYSTEM FOR BULK ELECTRIC SYSTEM FAULT ANALYSIS	$0	$125	$0	$0	
99917	21519907	1	DEMONSTRATION OF NEW SF6 LEAKAGE REDUCTION SYSTEM AT WEST 49TH STREET SUBSTATION	$0	$75	$0	$0	
13169	new		SUBSTATION SIMULATOR	$0	$65	$100	$100	
			ADVANCED SUBSTATION PROJECTS - TBD	$0	$60	$75	$75	
			CONFER PHASE 2	$0	$60	$60	$80	
92400	10064342	284	SUBSTATION INFRARED MONITORING DEMONSTRATION	$0	$50	$0	$0	
			SUBSTATION BUS RATING UPGRADE STUDY	$0	$50	$0	$0	
92027	10064342	22	15KV FAULT CURRENT LIMITER (DEVELOP, DESIGN, ASSEMBLE, TEST & DELIVER PROGRAM)	$0	$0	$25	$25	
			TOTAL SUBSTATION	**$127**	**$610**	**$395**	**$415**	**$400**
			TOTAL TRANSMISSION & SUBSTATION	**$1,425**	**$2,130**	**$2,300**	**$2,300**	**$2,285**
			DISTRIBUTION					
99920	21501320		UNDERGROUND SPLICING MACHINE DEVELOPMENT	$323	$150	$50	$0	
92474	20662498	1	INTERGRATING CYBER SECURITY MONITORING IN A LEGACY POWER GRID AND EMERGING GRID AND EMERGING SMART GRID ENVIRONMENT	$236	$25	$25	$25	
92426	20642361	1	COMPACT SUBMERSIBLE 25kA PRIMARY FAULT INTERRUPTING SWITCH & CONTROL CABINET	$168	$100	$50	$50	
92319	20607929	1	REMOTE CONTROL OF NETWORK PROTECTOR RELAY	$105	$0	$0	$0	
99994	21101143	1	REV - DG QUICK CONNECTOR	$90	$25	$30	$0	
99950	21380934	1	IRIS ON THE MOVE BIOMETRIC IDENTIFICATION SYSTEM DEMONSTRATION	$86	$40	$85	$50	
92014	10046626	1	OBSTRUCTION CLEARANCE USING ROBOTIC TECHNOLOGY FOR ELECTRIC CONDUITS / DUCTS	$34	$100	$100	$50	
99996	21095727	0001	DEMONSTRATE GENER-LINK WI-FI	$21	$40	$10	$10	
92385			ARC FAULT DETECTION IN NETWORK PROTECTOR RELAYS FIELD DEMONSTRATION	$15	$153	$50	$150	
92317	20601278	0001	DEMONSTRATION OF AT&T LOCATING INFORMATION SYSTEM FOR INTEGRATION OF FOREIGN CREWS	$14	$5	$0	$0	
99972	21181196	1	ENHANCED VIDEO ALARM	$7	$10	$10	$30	
92205	20401040	1	MOBILE SITE SAFETY STORM RESPONSE TEAM	$3	$15	$12	$0	
90207	20914982	1	USING A MICRO-GRID TO PREVENT A CASCADING EVENT	$1	$50	$50	$50	
13197			AUGMENTED REALITY	$0	$0	$0	$20	
			MONITORING OF UG PRIMARY FEEDERS DURING A BACKFEED CONDITION USING COMMUNICATING NWP RELAYS	$0	$50	$150	$50	
			MULTI-COMMODITY WORK COORDINATION ANALYTICS AND MANAGEMENT DECISION SUPPORT TOOL	$0	$50	$0	$0	
			FLAME SHIELD PHENOLIC CONDUIT	$0	$40	$30	$30	
			HIGH IMPEDANCE FAULT AND ARCING FAULT DETECTION ON OVERHEAD DISTRIBUTION LINES	$0	$25	$25	$25	
			TRIAL USAGE OF NEW ELECTRICAL OVERHEAD AND UNDERGROUND DISTRIBUTION EQUIPTMENT	$0	$25	$50	$50	
15029			CAMERA VIDEO/AUDIO FOR GUN SHOT DETECTION	$0	$0	$0	$30	
			CON EDISON SECURITY GLOBAL MAP - PHASE 0	$0	$0	$0	$50	
			IN SITU CORROSION DIAGNOSTIC TOOL DEVELOPMENT FOR NETWORK TRANSFORMERS	$0	$0	$40	$10	
			LOCKING MANHOLE COVERS	$0	$0	$0	$20	
			AUTOMATED DEVELOPMENT OF OVERHEAD ASSET DATABASE	$0	$150	$0	$0	
			STUDY OF WEATHER PARAMETERS THAT LEAD TO IMPACTFUL STORM EVENTS	$0	$125	$100	$100	
92456	20652549	1	DEMONSTRATION OF NEW SAFETY TOOLS AND EQUIPMENT FOR ELECTRIC OPERATIONS 2013-2014	$0	$100	$100	$100	
92272	20486896	0001	EVALUATION OF LONG RANGE ENSEMBLE WEATHER MODELING	$0	$60	$0	$0	
			DEVELOPMENT OF AN INTELLIGENT AUTOLOOP SYSTEM	$0	$50	$50	$100	
			PROOF TEST FAULT LOCATION ANALYTIC DEVELOPMENT	$0	$50	$20	$0	
			APPLICATION OF INTER CONTROL CENTER COMMUNICATION PROTOCOL (ICCP)	$0	$25	$50	$0	
			FIELD TEST PROTECTION MEASURES FOR WOODEN UTILITY POLE TOPS	$0	$25	$25	$0	
13172			GAS INSULATED TRANSFORMER	$0	$0	$0	$50	
15032			ABF Detection, Location and Mitigation Enhancement	$0	$0	$0	$0	
92084	10064342	57	INTELLIGENT USE OF INTELLIGENT ELECTRONIC DEVICES DEVELOPMENT	$0	$0	$50	$50	
			COMPACT SUBMERSIBLE THREE-WAY SWITCH DEVELOPMENT FOR NETWORK TRANSFORMERS	$0	$0	$25	$50	
			DISSOLVED GAS-IN-OIL ANALYTIC DEVELOPMENT FOR NETWORK TRANSFORMERS	$0	$0	$25	$0	
			FLUID LEVEL DIAGNOSTIC ENHANCEMENT DEVELOPMENT FOR NETWORK TRANSFORMERS WITH DEFECTIVE LEVEL GAUGES	$0	$0	$0	$25	
			LIQUID LEVEL GAUGE ENHANCEMENT DEVELOPMENT	$0	$0	$0	$25	
			MEDIUM VOLTAGE TRANSFORMER ISOLATION SWITCH DEVELOPMENT	$0	$0	$25	$50	
			NETWORK TRANSFORMER DISSOLVED GAS DETECTOR DEVELOPMENT	$0	$0	$100	$50	
			SLOW LEAK DIAGNOSTIOC DEVELOPMENT FOR NETWORK TRANSFORMERS	$0	$0	$0	$25	
			SUBMERSIBLE 1000kVA SOLID-DIELECTRIC TRANSFORMER DEVELOPMENT	$0	$0	$100	$0	
			UNDERGROUND INFRASTRUCTURE HEALTH ASSESSMENT DEVELOPMENT	$0	$0	$0	$50	
			UNDERGROUND INFRASTRUCTURE REHABILITATION DEVELOPMENT	$0	$0	$0	$25	
			LIMITER PILOT & SERVICE CABLE TESTING IN HIGH RISK NETWORKS	$0	$60	$30	$30	
			LOCATE OPEN SECONDARY MAINS VIA SMART METER VOLTAGE READINGS	$0	$40	$50	$100	
92122	10064342	81	DISTRIBUTION CABLE AND SPLICE CENTER FOR EXCELLENCE AT VAN NEST	$0	$0	$50	$50	

CSN	PROJECT	TASK	Title	Test Period Oct 2014 - Sept 2015 plus Oct - Dec 2015 Est with RY1 & RY2 Expend. see exhibit CE E 1A	2016 Forecast - See Exhibit CE E 1B	2017 Budget	2018 Budget	2019 Budget
			BLOWN LIMITER DETECTOR DEVELOPMENT	$0	$0	$65	$0	
			MANHOLE ENVIRONMENTAL TRACKING AND USER INTERFACE	$0	$0	$0	$50	
			NETWORK RELAY PROGRAMMING TO AUTOMATICALLY EXERCISE THE NETWORK PROTECTOR RANDOMLY	$0	$100	$75	$85	
13221			DEVELOP TECHNICAL SOLUTION TO RESOLVE SHARED METERING COMPLAINTS	$0	$40	$100	$0	
			BIFURACTED OVERHEAD RECLOSURE COMMUNICATIONS INTERFACE FOR REMOTE SOFTWARE COMMISSIONING	$0	$40	$0	$0	
			SILVER SPRINGS CAPABLE GRID SENSE PILOT	$0	$40	$0	$0	
			TEST & EVALUATION OF ALTERNATE WIRELESS TECHNOLOGIES	$0	$40	$50	$0	
			REV - NEW METER COMMUNICATIONS FOR CHALLENGED ENVIRONMENTS	$0	$25	$0	$0	
			MOBILE SCADA EMERGENCY MASTER RADIO SITE	$0	$0	$25	$75	
			MOBILE MANHOLE MONITORING SYSTEM	$0	$75	$25	$0	
99946	21393884		VEHICLE MOUNTED DETECTION SYSTEM FOR BURNOUT GASSES DEVELOPMENT	$0	$70	$0	$0	
			UG STRUCTURE SAND-FILL EXPERIMENT TO EXPLORE VALUE AS MANHOLE EVENT DETERRENT	$0	$50	$5	$5	
			FORENSIC TECHNIQUES FOR ICS DEVICES	$0	$45	$50	$30	
			OFF GRID SURVEILLANCE SOLUTIONS	$0	$30	$20	$20	
			WIRELESS IP MESH NETWORK FOR CAMERAS	$0	$25	$20	$10	
			MANHOLE COVER RESTRAINT SYSTEM DEVELOPMENT	$0	$20	$0	$0	
11628			LOW VOLTAGE ARC FLASH MITIGATION DEVELOPMENT AND DEMONSTRATION	$0	$0	$50	$0	
15033			MANHOLE ARC RECOGNITION SYSTEM DEVELOPMENT - PHASE 2	$0	$0	$50	$0	
			460V NETWORK PROTECTOR REMOTE RACK OUT DEVELOPMENT	$0	$0	$25	$0	
			REMOTE FIELD JOB SAFETY BRIEFING DEVELOPMENT	$0	$0	$0	$25	
15031			CUSTOMER EXPERIENCE ENHANCEMENT VIA POWER QUALITY ANALYTICS DEVELOPMENT	$0	$0	$25	$25	
			MOBILE PROGRAM OPTIMIZATION THRU TARGETED SCANNING	$0	$25	$50	$68	
11625			ADVANCED STRAY VOLTAGE MITIGATION DEVELOPMENT	$0	$0	$25	$0	
11627			ADVANCED MANHOLE EVENT MITIGATION DEVELOPMENT	$0	$0	$25	$50	
15034			VEHICLE-MOUNTED CONTACT VOLTAGE DETECTION SYSTEM DEVELOPMENT	$0	$0	$0	$50	
			AUTO MULTI-BANK SWITCH	$0	$90	$100	$100	
			NETWORK RESISTOR PROJECT	$0	$75	$75	$50	
			DUAL-FEEDER BREAKER REMOTE G&T	$0	$70	$75	$150	
			SOFTWARE INTERGRATION TO ASSIST WITH IMPLIMENTATION OF EO-2150 & 2151	$0	$50	$50	$50	
15043			DUAL FEEDER CAPABLE 460V TRANSFORMERS	$0	$0	$0	$0	
			AUTOMATED TRACING CURRENT SUBSTATION TEST SYSTEM	$0	$50	$50	$75	
13176			ENHANCED STORM DAMAGE ASSESSMENT CAPTURE AND ANALYTICS DEVELOPMENT	$0	$50	$0	$50	
13187			USING TWITTER TO IDENTIFY DISTIBUTION EVENTS	$0	$0	$0	$10	
15041			UNDERGROUND STRUCTURE EVENTS ASSESSMENT	$0	$0	$50	$50	
92053	10046626	8	TRANSPORTABLE ENERGY STORAGE SYSTEM (TESS)	$2	$150	$75	$75	
			DISTRIBUTION LEVEL PMU DEVELOPMENT TO EXPAND AND ENHANCE CAPACITY FOR DISTRIBUTED RESOURCES	$0	$50	$0	$0	
			OVERHEAD DISTRIBUTION FAULTED CIRCUIT INDICATOR DEVELOPMENT	$0	$50	$0	$0	
			BUILT-IN SELF-TEST DIAGNOSTIC DEVELOPMENT FOR MEDIUM VOLTAGE JOINTS	$0	$25	$50	$50	
			MICROGRID SYSTEM DESIGN EVALUATION	$0	$15	$0	$0	
			REV - WIDE AREA POWER GRID DISTRIBUTED CONTROL PROGRAM	$0	$0	$75	$150	
			ADVANCE SENSING FOR NETWORK PROTECTOR HEALTH ASSESSMENT DEVELOPMENT	$0	$0	$0	$50	
			COMPUTATIONAL NATURAL LANGUAGE EXPLORATION AND DEVELOPMENT FOR DECISION TOOLS	$0	$0	$0	$25	
			DISTRIBUTED ELECTRONICS FOR ADVANCED TRANSFORMER LOAD MANAGEMENT AND DIAGNOSTICS	$0	$0	$75	$75	
			ENHANCED FAULT LOCATION ISOLATION AND SERVICE RESTORATION PILOT	$0	$0	$0	$50	
			INTELLIGENT USE OF NETWORK PROTECTOR RELAYS IN EMERGING SMARTER GRID	$0	$0	$50	$50	
			INTERGATION OF RMS FUNCTIONALITY INTO COMMUNICATION	$0	$0	$0	$25	
			UTILITY ANALYTICS COLLABORATION	$0	$0	$25	$25	
			VOLT-VAR OPTIMIZATION IN LOW VOLTAGE NETWORKS WITH PERVASIVE DISTRIBUTED ENERGY RESOURCE STUDY	$0	$0	$30	$20	
			Additional REV	$0	$0	$1,550	$1,550	
			TOTAL DISTRIBUTION	**$1,105**	**$2,888**	**$4,582**	**$4,753**	**$4,705**
			CUSTOMER					
			DEMONSTRATE ANALYTICS TO PROVIDE INSIGHTS FROM CUSTOMER COMMUNITY DATA	$0	$75	$0	$0	
			PILOT TEST OF PRE-PAY ELECTRICITY SERVICE FOR CUSTOMER PARTICIPATION AND ENERGY SAVINGS	$0	$50	$150	$0	
99927	21452375	0001	ENEGRY STORAGE SAFETY AND PROJECT PERMITTING SUPPORT	$0	$70	$0	$0	
			TOTAL CUSTOMER	**$0**	**$195**	**$150**	**$0**	**$0**
			EH&S					
			NEW TECHNOLOGIES FOR SAFER LIFTING AND HEAVY WORK	$0	$50	$0	$0	
			UPDATE DESIGN OF RETIEVAL DEVICE	$0	$50	$50	$50	
			LIFE SIGN DETECTOR	$0	$30	$30	$20	
92314	20601276	0001	NEW PROGRAM FUNDING FOR THE DEMONSTRATION OF SAFETY	$0	$15	$0	$0	
			BUILT-IN AC UNIT FOR FIELD WORKER TRUCKS	$0	$0	$100	$0	
			CAMERA TECHNOLOGY FOR FIELD WORKERS	$0	$0	$50	$100	

CSN	PROJECT	TASK	Title	Test Period Oct 2014 - Sept 2015 plus Oct - Dec 2015 Est with RY1 & RY2 Expend. see exhibit CE E 1A	2016 Forecast - See Exhibit CE E 1B	2017 Budget	2018 Budget	2019 Budget
			IN SITU MANHOLE SEDIMENT STABILIZATION TECHNIQUES/TECHNOLOGIES DEVELOPMENT	$0	$0	$50	$25	
			IN SITU PB DETECTION/QUANTIFICATION DEVELOPMENT	$0	$0	$0	$25	
			STUDY AND DESIGN LAYOUT OF UNION WORKER TRUCKS	$0	$0	$50	$0	
15053			PETRO PLUG ENHANCEMENT DEVELOPMENT					
			TEST EQUIPTMENT FOR IN SITU PCB DETECTION/QUALIFICATION					
			TOTAL EH&S	**$0**	**$145**	**$330**	**$220**	**$220**
			TOTAL INTERNAL PROGRAMS	**$2,530**	**$5,358**	**$7,362**	**$7,273**	**$7,210**
			TOTAL PROGRAM	**$8,815**	**$10,854**	**$12,909**	**$12,897**	**$12,885**

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
ELECTRIC RESEARCH AND DEVELOPMENT COSTS (000)
PROJECT COSTS FOR THE PERIODS ASSOCIATED WITH - OCTOBER 2014 THROUGH SEPEMBER 2015 TEST PERIOD - OCTOBER 2015 ACTUAL - NOVEMBER AND DECEMBER 2015 PROJECTIONS - WHICH HAVE RATE YEAR 2017 & 2018 PROJECTED EXPENDITURES

POET	TASK	CSN	TITLE	14-Oct	14-Nov	14-Dec	15-Jan	15-Feb	15-Mar	15-Apr	15-May	15-Jun	15-Jul	15-Aug	15-Sep	Test Year
			ADMINISTRATION													
10064342	0024	92032	SALARIES AND WAGES	$115.0	$137.4	$136.9	$110.6	$110.3	$110.1	$111.1	$111.6	$111.9	$117.3	$119.4	$124.9	$1,416.52
10064342	0025	92034	OTHER EXPENSES	$14.3	$12.5	$43.0	$13.1	$10.3	$18.1	$14.7	$11.2	$4.0	$14.1	$15.9	$15.3	$186.50
10064342	0372	92649	PATENT SEARCHES IN CONNECTION WITH COMPANY R&D TECHNOLOGY APPLICATIONS	($0.3)	$1.0	($5.5)	$11.8	$11.6	$1.8	$0.4	$10.5	$0.0	$0.0	$6.1	$9.7	$47.01
			TOTAL ADMINISTRATION	**$129.04**	**$150.94**	**$174.39**	**$135.46**	**$132.12**	**$129.97**	**$126.19**	**$133.32**	**$115.96**	**$131.32**	**$141.42**	**$149.88**	**$1,650.03**
			INSTITUTIONAL													
10064342	0047	92071	EPRI FOR ELECTRIC DISTRIBUTION AND CUSTOMER R&D	$166.7	$166.7	$166.7	$142.8	$142.8	$145.1	$142.8	$142.8	$142.8	$142.8	$142.8	$142.8	$1,787.32
10064342	0045	92069	EPRI - ELECTRIC TRANSMISSION	$116.0	$116.0	$116.0	$108.8	$108.8	$108.8	$108.8	$108.8	$108.8	$108.8	$108.8	$108.8	$1,326.74
21349807	0001	99957	APPLICATIONS RESEARCH - CEATI	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$143.9	$0.0	$4.5	$0.0	$0.0	$0.0	$148.35
10064342	0279	92394	EPRI/NYSERDA/DOE TRAVEL BY ALL OTHER NON-R&D PERSONNEL	$0.9	$2.0	$3.1	$0.0	$1.2	$10.5	$4.7	$2.7	$0.7	$5.9	$2.5	$1.6	$35.62
10064342	0275	92388	EPRI/NYSERDA/DOE TRAVEL BY SYSTEM & TRANSMISSION OPERATIONS PERSONNEL	$2.3	$0.0	$0.5	$0.3	$4.3	$3.3	$5.0	$1.4	$1.9	$0.0	$2.9	$4.2	$26.05
10064342	0313	92439	INTERNATIONAL UTILITY WORK GROUP PARTICIPATION	$0.0	($0.1)	$0.0	$1.2	$4.1	$10.4	$7.5	($3.5)	$5.9	$0.0	$0.0	$0.0	$25.39
10046626	0036	92255	R&D MANAGEMENT BEST PRACTICES	$0.0	($1.3)	$0.0	$0.0	$14.5	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$13.21
10064342	0263	92374	EPRI/NYSERDA/DOE TRAVEL BY ENVIRONMENTAL AFFAIRS PERSONNEL	$1.9	$0.0	$0.0	$0.0	$0.0	$1.4	$1.4	$0.2	$0.0	$0.7	$0.0	$0.5	$6.18
10064342	0274	92387	EPRI/NYSERDA/DOE TRAVEL BY CUSTOMER SERVICE PERSONNEL	$0.0	$0.9	$0.1	$0.0	$0.7	$1.3	$0.0	$0.0	$0.0	$0.3	$0.0	$0.0	$3.23
20829413	0001	14106	CIGRE MEMBERSHIP	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$1.5	$0.0	$0.0	$0.0	$0.0	$0.0	$1.50
			TOTAL INSTITUTIONAL	**$287.74**	**$284.10**	**$286.27**	**$253.00**	**$276.29**	**$280.75**	**$415.47**	**$252.25**	**$264.48**	**$258.44**	**$256.90**	**$257.88**	**$3,373.58**
			INTERNAL PROGRAMS													
			TRANSMISSION													
20281602	0001	92146	#REF!	$7.9	($29.6)	$0.0	$0.0	$0.0	$0.0	$250.0	$0.0	$0.0	$0.0	$0.0	$0.0	$228.26
20735515	0001	98890	#REF!	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.00
21164235	0001	99974	#REF!	$0.0	$82.8	$34.9	$0.0	$0.0	$0.1	$3.8	$3.6	$2.1	$0.0	$1.5	$4.2	$132.97
10046626	0045	92432	#REF!	$0.0	($8.6)	$0.0	$0.0	$1.4	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	($7.13)
10064342	0071	92111	#REF!	$18.5	($38.6)	($0.2)	$0.1	$55.5	$0.0	$0.0	$0.0	$0.0	$0.0	$0.5	$0.0	$35.72
10046626	0099	92706	#REF!	$0.2	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$7.1	$7.35
20683308	0001	92650	#REF!	$1.1	($0.6)	($0.5)	$15.5	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$15.47
		15020	#REF!	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.00
21726096	0001	99868	#REF!	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.00
		15022	#REF!	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.00
10064342	0075	92116	#REF!	$0.0	$6.4	$0.0	$0.0	$0.0	$0.0	$0.0	$0.4	$0.0	$4.6	$0.0	$0.0	$11.33
10046626	0008	92053	#REF!	$0.0	$1.9	$0.2	$0.0	$0.3	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$2.39
			TOTAL TRANSMISSION	**$27.68**	**$13.68**	**$34.34**	**$15.59**	**$57.18**	**$0.12**	**$253.82**	**$4.02**	**$2.12**	**$4.55**	**$1.96**	**$11.31**	**$426.36**
			SUBSTATION													
20707502	0001	92736	DEMONSTRATION OF REMOTE BREAKER RACKING SYSTEMS	$63.7	($11.3)	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$52.39
20735742	0001	92749	NERC CIP TOOLS AND TECHNIQUES	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.00
10046626	0080	92637	HIGH & MEDIUM VOLTAGE CIRCUIT BREAKER LIFE CYCLE IMPROVMENTS	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.00
			TOTAL SUBSTATION	**$63.67**	**($11.28)**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$0.00**	**$52.39**
			TOTAL TRANSMISSION & SUBSTATION	**$91.35**	**$2.40**	**$34.34**	**$15.59**	**$57.18**	**$0.12**	**$253.82**	**$4.02**	**$2.12**	**$4.55**	**$1.96**	**$11.31**	**$478.75**
			DISTRIBUTION													
21501320	0001	99920	UNDERGROUND SPLICING MACHINE DEVELOPMENT	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$51.5	$0.0	$51.54
20662498	0001	92474	INTERGRATING CYBER SECURITY MONITORING IN A LEGACY POWER GRID AND EMERGING GRID AND EMERGING SMART GRID ENVIRONMENT	$0.0	$0.0	$40.6	$0.0	$0.0	$0.0	$65.7	$0.0	$0.0	$46.9	$0.0	$0.0	$153.09
20642361	0001	92426	COMPACT SUBMERSIBLE 25kA PRIMARY FAULT INTERRUPTING SWITCH & CONTROL CABINET	$0.0	$0.0	$0.1	$0.9	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.3	$147.3	$148.57
20607929	0001	92319	REMOTE CONTROL OF NETWORK PROTECTOR RELAY	$0.0	$0.0	$7.1	$10.4	$0.8	$1.7	$0.0	$4.1	$5.4	$11.4	$20.8	$14.9	$76.58
21101143	0001	99994	REV - DG QUICK CONNECTOR	$0.0	$0.0	$12.2	$0.0	$0.0	$0.0	$0.0	$0.0	$58.6	$0.0	$0.0	$0.0	$70.83
21380934	0001	99950	IRIS ON THE MOVE BIOMETRIC IDENTIFICATION SYSTEM DEMONSTRATION	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.00
10046626	0001	92014	OBSTRUCTION CLEARANCE USING ROBOTIC TECHNOLOGY FOR ELECTRIC CONDUITS / DUCTS	$0.0	($3.8)	$2.9	$0.0	$0.0	$8.7	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$7.76
21095727	0001	99996	DEMONSTRATE GENER-LINK WI-FI	$0.1	$0.0	$4.6	$0.0	$0.0	$0.0	$0.0	$0.2	$0.0	$0.0	$0.0	$0.0	$4.88
10064342	0273	92385	ARC FAULT DETECTION IN NETWORK PROTECTOR RELAYS FIELD DEMONSTRATION	$0.4	$2.7	$0.0	$0.0	$3.2	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$7.8	$14.07
20601278	0001	92317	DEMONSTRATION OF AT&T LOCATING INFORMATION SYSTEM FOR INTEGRATION OF FOREIGN CREWS	$0.0	$0.0	$0.0	$0.0	$3.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$1.5	$4.50
21181196	0001	99972	ENHANCED VIDEO ALARM	$0.0	$0.0	$3.5	$0.0	$4.2	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$7.63
20401040	0001	92205	MOBILE SITE SAFETY STORM RESPONSE TEAM	$0.0	($0.9)	$0.0	$0.2	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	($0.63)
20915360	0001	90207	USING A MICRO-GRID TO PREVENT A CASCADING EVENT	$0.8	$0.5	$0.0	$0.1	$0.0	$0.0	$0.1	$0.1	$0.0	$0.0	$0.0	$0.0	$1.59
			TOTAL DISTRIBUTION	**$1.26**	**($1.43)**	**$70.88**	**$11.52**	**$11.17**	**$10.45**	**$65.73**	**$4.45**	**$64.07**	**$58.28**	**$72.58**	**$171.46**	**$540.39**
			TOTAL INTERNAL PROGRAMS	**$92.60**	**$0.97**	**$105.21**	**$27.11**	**$68.35**	**$10.57**	**$319.55**	**$8.47**	**$66.19**	**$62.83**	**$74.54**	**$182.76**	**$1,019.15**
			TOTAL PROGRAM	**$509.38**	**$436.01**	**$565.88**	**$415.58**	**$476.76**	**$421.29**	**$861.21**	**$394.04**	**$446.63**	**$452.59**	**$472.86**	**$590.52**	**$6,042.76**

EXHIBIT ___ (SSP-14)
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CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
ELECTRIC RESEARCH AND DEVELOPMENT COSTS (000)
PROJECT COSTS FOR THE PERIODS ASSOCIATED WITH - OCTOBER 2014 THROUGH SEPEMBER 2015 TEST PERIOD - OCTOBE

POET	TASK	CSN	TITLE	15-Oct	Proj 15-Nov	Proj 15-Dec	Test period Plus Oct 15 thru Dec 15
			ADMINISTRATION				
10064342	0024	92032	SALARIES AND WAGES	$143.2	$137.1	$137.1	$1,834.0
10064342	0025	92034	OTHER EXPENSES	$24.7	$12.2	$12.2	$235.6
10064342	0372	92649	PATENT SEARCHES IN CONNECTION WITH COMPANY R&D TECHNOLOGY APPLICATIONS	$0.0	$4.1	$4.1	$55.1
			TOTAL ADMINISTRATION	**$167.94**	**$153.35**	**$153.35**	**$2,124.7**
			INSTITUTIONAL				
10064342	0047	92071	EPRI FOR ELECTRIC DISTRIBUTION AND CUSTOMER R&D	$143.1	$142.8	$142.8	$2,216.0
10064342	0045	92069	EPRI - ELECTRIC TRANSMISSION	$108.8	$108.8	$108.8	$1,653.0
21349807	0001	99957	APPLICATIONS RESEARCH - CEATI	$0.0	$0.0	$0.0	$148.4
10064342	0279	92394	EPRI/NYSERDA/DOE TRAVEL BY ALL OTHER NON-R&D PERSONNEL	$9.8	$3.3	$3.3	$52.0
10064342	0275	92388	EPRI/NYSERDA/DOE TRAVEL BY SYSTEM & TRANSMISSION OPERATIONS PERSONNEL	$5.1	$2.6	$2.6	$36.3
10064342	0313	92439	INTERNATIONAL UTILITY WORK GROUP PARTICIPATION	$0.0	$0.0	$0.0	$25.4
10046626	0036	92255	R&D MANAGEMENT BEST PRACTICES	$0.0	$0.0	$0.0	$13.2
10064342	0263	92374	EPRI/NYSERDA/DOE TRAVEL BY ENVIRONMENTAL AFFAIRS PERSONNEL	$1.6	$0.5	$0.5	$8.7
10064342	0274	92387	EPRI/NYSERDA/DOE TRAVEL BY CUSTOMER SERVICE PERSONNEL	$1.2	$0.3	$0.3	$4.9
20829413	0001	14106	CIGRE MEMBERSHIP	$0.0	$0.0	$0.0	$1.5
			TOTAL INSTITUTIONAL	**$269.62**	**$258.15**	**$258.15**	**$4,159.5**
			INTERNAL PROGRAMS				
			TRANSMISSION				
20281602	0001	92146	#REF!	$0.0	$0.0	$370.0	$598.3
20735515	0001	98890	#REF!	$0.0	$0.0	$135.0	$135.0
21164235	0001	99974	#REF!	$1.3	$0.0	$0.0	$134.3
10046626	0045	92432	#REF!	$0.0	$114.0	$0.0	$106.9
10064342	0071	92111	#REF!	$0.0	$38.5	$0.0	$74.2
10046626	0099	92706	#REF!	$0.0	$45.0	$0.0	$52.3
20683308	0001	92650	#REF!	$0.0	$35.0	$0.0	$50.5
		15020	#REF!	$0.0	$50.0	$0.0	$50.0
21726096	0001	99868	#REF!	$0.0	$45.0	$0.0	$45.0
		15022	#REF!	$0.0	$40.0	$0.0	$40.0
10064342	0075	92116	#REF!	$0.0	$0.0	$0.0	$11.3
10046626	0008	92053	#REF!	$0.0	$0.0	$0.0	$2.4
			TOTAL TRANSMISSION	**$1.30**	**$367.50**	**$505.00**	**$1,300.2**
			SUBSTATION				
20707502	0001	92736	DEMONSTRATION OF REMOTE BREAKER RACKING SYSTEMS	$0.0	$0.0	$0.0	$52.4
20735742	0001	92749	NERC CIP TOOLS AND TECHNIQUES	$0.0	$0.0	$50.0	$50.0
10046626	0080	92637	HIGH & MEDIUM VOLTAGE CIRCUIT BREAKER LIFE CYCLE IMPROVMENTS	$0.0	$25.0	$0.0	$25.0
			TOTAL SUBSTATION	**$0.00**	**$25.00**	**$50.00**	**$127.4**
			TOTAL TRANSMISSION & SUBSTATION	**$1.30**	**$392.50**	**$555.00**	**$1,427.5**
			DISTRIBUTION				
21501320	0001	99920	UNDERGROUND SPLICING MACHINE DEVELOPMENT	$82.6	$79.1	$109.8	$323.0
20662498	0001	92474	INTERGRATING CYBER SECURITY MONITORING IN A LEGACY POWER GRID AND EMERGING GRID AND EMERGING SMART GRID ENVIRONMENT	$33.0	$0.0	$50.3	$236.4
20642361	0001	92426	COMPACT SUBMERSIBLE 25kA PRIMARY FAULT INTERRUPTING SWITCH & CONTROL CABINET	$0.0	$10.0	$10.0	$168.6
20607929	0001	92319	REMOTE CONTROL OF NETWORK PROTECTOR RELAY	$3.5	$0.0	$25.0	$105.1
21101143	0001	99994	REV - DG QUICK CONNECTOR	$0.0	$4.0	$15.0	$89.8
21380934	0001	99950	IRIS ON THE MOVE BIOMETRIC IDENTIFICATION SYSTEM DEMONSTRATION	$0.0	$66.6	$20.0	$86.6
10046626	0001	92014	OBSTRUCTION CLEARANCE USING ROBOTIC TECHNOLOGY FOR ELECTRIC CONDUITS / DUCTS	$23.0	$0.0	$3.0	$33.7
21095727	0001	99996	DEMONSTRATE GENER-LINK WI-FI	$0.0	$0.0	$16.0	$20.9
10064342	0273	92385	ARC FAULT DETECTION IN NETWORK PROTECTOR RELAYS FIELD DEMONSTRATION	$0.8	$0.0	$0.0	$14.9
20601278	0001	92317	DEMONSTRATION OF AT&T LOCATING INFORMATION SYSTEM FOR INTEGRATION OF FOREIGN CREWS	$6.0	$0.0	$3.8	$14.3
21181196	0001	99972	ENHANCED VIDEO ALARM	$0.0	$0.0	$0.0	$7.6
20401040	0001	92205	MOBILE SITE SAFETY STORM RESPONSE TEAM	$0.0	$0.0	$4.0	$3.4
20915360	0001	90207	USING A MICRO-GRID TO PREVENT A CASCADING EVENT	$0.0	$0.0	$0.0	$1.6
			TOTAL DISTRIBUTION	**$148.90**	**$159.71**	**$256.86**	**$1,105.9**
			TOTAL INTERNAL PROGRAMS	**$150.20**	**$552.21**	**$811.86**	**$2,533.4**
			TOTAL PROGRAM	**$587.76**	**$963.71**	**$1,223.36**	**$8,817.6**

EXHIBIT ___ (SSP-14)
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CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
ELECTRIC RESEARCH AND DEVELOPMENT 2016 PROJECTED COSTS (000)

CSN	PROJECT	TASK	Title	2016 Budget	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
			ADMINISTRATION														
92032	10064342	0024	SALARIES AND WAGES	$1,696	$139	$139	$139	$142	$142	$142	$142	$142	$142	$142	$143	$143	**$1,696**
92034	10064342	0025	OTHER EXPENSES	$198	$16	$16	$17	$16	$16	$17	$16	$17	$16	$16	$17	$16	**$198**
92649	10064342	0372	PATENT SEARCHES IN CONNECTION WITH COMPANY R&D TECHNOLOGY APPLICATIONS	$162	$14	$14	$14	$14	$14	$14	$14	$14	$14	$14	$14	$11	**$162**
			TOTAL ADMINISTRATION	**$2,056**	**$169**	**$169**	**$170**	**$172**	**$172**	**$173**	**$172**	**$173**	**$172**	**$172**	**$174**	**$170**	**$2,056**
			INSTITUTIONAL														
92071	10064342	0047	EPRI FOR ELECTRIC DISTRIBUTION AND CUSTOMER R&D	$1,713	$143	$143	$143	$143	$143	$143	$143	$143	$143	$143	$143	$143	**$1,713**
92069	10064342	0045	EPRI - ELECTRIC TRANSMISSION	$1,305	$109	$109	$109	$109	$109	$109	$109	$109	$109	$109	$109	$109	**$1,305**
11544	11544		APPLICATIONS RESEARCH - CEATI	$160											$160		**$160**
92090	10064342	59	APPLICATIONS RESEARCH FOR DISTRIBUTION, SUBSTATIONS AND TRANSMISSION - NEETRAC	$140												$140	**$140**
92204	10064342	142	3G SYSTEM OF THE FUTURE BENCHMARKING	$25											$25		**$25**
92439	10064342	313	INTERNATIONAL UTILITY WORK GROUP PARTICIPATION	$25					$25								**$25**
92388	10064342	0275	EPRI/NYSERDA/DOE TRAVEL BY SYSTEM & TRANSMISSION OPERATIONS PERSONNEL	$20	$2	$2	$2	$2	$2	$2	$2	$2	$2	$2	$2	$2	**$20**
92255	10046626	0036	R&D MANAGEMENT BEST PRACTICES	$15	$1	$1	$1	$2	$1	$1	$1	$2	$1	$1	$1	$2	**$15**
92374	10064342	0263	EPRI/NYSERDA/DOE TRAVEL BY ENVIRONMENTAL AFFAIRS PERSONNEL	$10	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	**$10**
92387	10064342	0274	EPRI/NYSERDA/DOE TRAVEL BY CUSTOMER SERVICE PERSONNEL	$10	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	**$10**
92394	10064342	0279	EPRI/NYSERDA/DOE TRAVEL BY ALL OTHER NON-R&D PERSONNEL	$10	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	**$10**
92719	10046626	101	IEEE XPLORE DIGITAL LIBRARY ACCESS COST SHARING	$5		$5											**$5**
14106	20829413	1	CIGRE MEMBERSHIP	$2			$2										**$2**
			TOTAL INSTITUTIONAL	**$3,440**	**$257**	**$262**	**$259**	**$258**	**$282**	**$257**	**$257**	**$258**	**$257**	**$257**	**$442**	**$398**	**$3,440**
			INTERNAL PROGRAMS														
			TRANSMISSION														
			WATER COOLED EHV CABLE SYSTEM - TRANSITION JOINT DESIGN & TYPE TEST	$250			$50	$50		$50	$50			$50			**$250**
92146	20281602	1	SURFACE WAVE TECHNOLOGY FOR DISBONDED COATING DETECTION	$125					$125								**$125**
13150			NEXT GENERATION OF PFT TECHNOLOGY FOR DIELECTRIC OIL LOCATING	$100		$30			$35			$35					**$100**
92135	10064342	92	SOLID STATE FAULT CURRENT LIMITERS	$100						$25		$25		$25		$25	**$100**
92432	10046626		DISBONDED COATING DETECTION FOR UNDERGROUND PIPE FEASIBILITY STUDY	$100					$100								**$100**
90212	20932457	1	IMPACT OF FLUID FREEZE ON ENERGIZED HPFF SYSTEM	$75						$75							**$75**
			TRANSMISSION MANHOLE OIL MINDER	$75							$75						**$75**
		1	DEVELOPMENT OF FAULT LOCATING SENSOR FOR UNDERGROUND DIELECTRIC CABLING SYSTEM	$70		$70											**$70**
92650	20683308	1	PIPE-TYPE CABLING SYSTEM PD DETECTION DEMONSTRATION	$65						$35				$30			**$65**
92706	10046626	99	EHV TRANSMISSION FEEDERS INSULATOR RISK ASSESSMENT	$60								$60					**$60**
			IDENTIFY & DEVELOP PD MEASURING PLAN FOR 59TH ST AGING HYBRID FEEDERS	$60		$30		$30									**$60**
13152			AUTOMATED FAULT LOCATING FOR EHV FEEDER	$50								$50					**$50**
15022			OVERALL INSPECTION PLAN FOR OVERHEAD TRANSMISSION FEEDERS	$50						$50							**$50**
92765	10046626	109	UNDERGROUND TRANSMISSION FEEDERS ASSESSMENT STUDY	$50				$50									**$50**
98890	20735515	1	AEOLIAN VIBRATION STUDY FOR EHV OVERHEAD FEEDERS	$50				$50									**$50**
			END-WALL CORROSION STUDY	$50					$50								**$50**
		1	MANHOLE COATING INSPECTION TOOL	$50					$50								**$50**
			TRANSITION JOINT TRANSMISSION MANHOLE REAL TIME ASSESSMENT	$50		$50											**$50**
92111	10064342	71	MITIGATION OF GEO AND ELECTRO MAGNETIC EVENTS	$25											$25		**$25**
			DEVELOP AN EARLY SUMMER LOAD FORECASTING TOOL	$25					$5	$5	$5	$5	$5				**$25**
			DEVELOPMENT OF TOOL TO PROVIDE PROBABILISTIC ELECTRICAL FORECAST	$25		$10			$15								**$25**
92053	10046626	8	TRANSPORTABLE ENERGY STORAGE SYSTEM (TESS)	$150							$150						**$150**
			ALTERNATE TO PFT STUDY	$10										$10			**$10**
92116	10064342	75	EXPANDED USE OF PHYSICAL OPERATING MARGIN SOFTWARE	$5			$5										**$5**
			TOTAL TRANSMISSION	**$1,670**	**$0**	**$190**	**$55**	**$180**	**$380**	**$240**	**$280**	**$175**	**$5**	**$115**	**$25**	**$25**	**$1,670**
			SUBSTATION														
92749	20735742	1	NERC CIP TOOLS AND TECHNIQUES	$50									$50				**$50**
92764	20735208	1	SECURE REMOTE SUBSTATION ACCESS SOLUTIONS	$40										$40			**$40**
99928	21444529	0001	DEVELOPMENT OF LINE GROUPS SYSTEM FOR BULK ELECTRIC SYSTEM FAULT ANALYSIS	$125							$60			$65			**$125**
99917	21519907	1	DEMONSTRATION OF NEW SF6 LEAKAGE REDUCTION SYSTEM AT WEST 49TH STREET SUBSTATION	$75					$25			$25			$25		**$75**
99909	21546317	1	SUBSTATION SIMULATOR	$65			$25			$20			$20				**$65**
			ADVANCED SUBSTATION PROJECTS - TBD	$60										$10	$25	$25	**$60**
			CONFER PHASE 2	$60								$30				$30	**$60**
92400	10064342	284	SUBSTATION INFRARED MONITORING DEMONSTRATION	$50								$50					**$50**
			SUBSTATION BUS RATING UPGRADE STUDY	$50							$25				$25		**$50**
92637	10046626	80	HIGH & MEDIUM VOLTAGE CIRCUIT BREAKER LIFE CYCLE IMPROVMENTS	$25							$25						**$25**
92736	20707502	1	DEMONSTRATION OF REMOTE BREAKER RACKING SYSTEMS	$10						$10							**$10**
92027	10064342	22	15KV FAULT CURRENT LIMITER (DEVELOP, DESIGN, ASSEMBLE, TEST & DELIVER PROGRAM)														**$0**
			TOTAL SUBSTATION	**$610**	**$0**	**$0**	**$25**	**$0**	**$25**	**$30**	**$110**	**$105**	**$70**	**$115**	**$75**	**$55**	**$610**
			TOTAL TRANSMISSION & SUBSTATION	**$2,280**	**$0**	**$190**	**$80**	**$180**	**$405**	**$270**	**$390**	**$280**	**$75**	**$230**	**$100**	**$80**	**$2,280**
			DISTRIBUTION														
			ARC FAULT DETECTION IN NETWORK PROTECTOR RELAYS FIELD DEMONSTRATION	$153	$53										$50	$50	**$153**
			MONITORING OF UG PRIMARY FEEDERS DURING A BACKFEED CONDITION USING COMMUNICATING NWP RELAYS	$50										$50			**$50**
			MULTI-COMMODITY WORK COORDINATION ANALYTICS AND MANAGEMENT DECISION SUPPORT TOOL	$50				$30				$10		$10			**$50**
99950	21380934	1	IRIS ON THE MOVE BIOMETRIC IDENTIFICATION SYSTEM DEMONSTRATION	$40				$40									**$40**
			FLAME SHIELD PHENOLIC CONDUIT	$40										$40			**$40**
92474	20662498	1	INTERGRATING CYBER SECURITY MONITORING IN A LEGACY POWER GRID AND EMERGING GRID AND EMERGING SMART GRID ENVIRONMENT	$25			$25										**$25**
			HIGH IMPEDANCE FAULT AND ARCING FAULT DETECTION ON OVERHEAD DISTRIBUTION LINES	$25				$25									**$25**
			TRIAL USAGE OF NEW ELECTRICAL OVERHEAD AND UNDERGROUND DISTRIBUTION EQUIPTMENT	$25			$10				$5			$10			**$25**
99920	21501320		UNDERGROUND SPLICING MACHINE DEVELOPMENT	$150	$35				$15		$50			$50			**$150**
			AUTOMATED DEVELOPMENT OF OVERHEAD ASSET DATABASE	$150			$75		$75								**$150**
			STUDY OF WEATHER PARAMETERS THAT LEAD TO IMPACTFUL STORM EVENTS	$125					$25		$50		$50				**$125**
92014	10046626	1	OBSTRUCTION CLEARANCE USING ROBOTIC TECHNOLOGY FOR ELECTRIC CONDUITS / DUCTS	$100						$50					$50		**$100**
92426	20642361	1	COMPACT SUBMERSIBLE 25kA PRIMARY FAULT INTERRUPTING SWITCH & CONTROL CABINET	$100				$50	$50								**$100**
92456	20652549	1	DEMONSTRATION OF NEW SAFETY TOOLS AND EQUIPMENT FOR ELECTRIC OPERATIONS 2013-2014	$100							$50	$50					**$100**
92272	20486896	0001	EVALUATION OF LONG RANGE ENSEMBLE WEATHER MODELING	$60						$60							**$60**
			DEVELOPMENT OF AN INTELLIGENT AUTOLOOP SYSTEM	$50				$25							$25		**$50**
			PROOF TEST FAULT LOCATION ANALYTIC DEVELOPMENT	$50											$40	$10	**$50**

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
ELECTRIC RESEARCH AND DEVELOPMENT 2016 PROJECTED COSTS (000)

CSN	PROJECT	TASK	Title	2016 Budget	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
			APPLICATION OF INTER CONTROL CENTER COMMUNICATION PROTOCOL (ICCP)	$25	$0	$0	$0	$0	$25	$0	$0	$0	$0	$0	$0	$0	**$25**
			FIELD TEST PROTECTION MEASURES FOR WOODEN UTILITY POLE TOPS	$25							$15		$5		$5		**$25**
92317	20601278	0001	DEMONSTRATION OF AT&T LOCATING INFORMATION SYSTEM FOR INTEGRATION OF FOREIGN CREWS	$5											$5		**$5**
			LIMITER PILOT & SERVICE CABLE TESTING IN HIGH RISK NETWORKS	$60										$10	$50		**$60**
			LOCATE OPEN SECONDARY MAINS VIA SMART METER VOLTAGE READINGS	$40	$0	$0		$0	$0	$0	$0	$0	$40	$0	$0	$0	**$40**
			NETWORK RELAY PROGRAMMING TO AUTOMATICALLY EXERCISE THE NETWORK PROTECTOR RANDOMLY	$100			$25							$25	$25	$25	**$100**
13221			DEVELOP TECHNICAL SOLUTION TO RESOLVE SHARED METERING COMPLAINTS	$40									$25		$15		**$40**
99996	21095727	0001	DEMONSTRATE GENER-LINK WI-FI	$40	$15	$25	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$40**
			BIFURACTED OVERHEAD RECLOSURE COMMUNICATIONS INTERFACE FOR REMOTE SOFTWARE COMMISSIONING	$40	$0		$0	$10	$10	$0	$0	$10	$10	$0	$0	$0	**$40**
			SILVER SPRINGS CAPABLE GRID SENSE PILOT	$40	$0	$0	$0	$15	$25	$0	$0	$0	$0	$0	$0	$0	**$40**
			TEST & EVALUATION OF ALTERNATE WIRELESS TECHNOLOGIES	$40	$0	$0	$0	$0	$0	$0	$0	$40	$0	$0	$0	$0	**$40**
			REV - NEW METER COMMUNICATIONS FOR CHALLENGED ENVIRONMENTS	$25	$0	$0	$0	$10	$15	$0	$0	$0	$0	$0	$0	$0	**$25**
			MOBILE MANHOLE MONITORING SYSTEM	$75	$15	$20	$10	$10	$10	$10	$0	$0	$0	$0	$0	$0	**$75**
99946	**21393884**		VEHICLE MOUNTED DETECTION SYSTEM FOR BURNOUT GASSES DEVELOPMENT	$70							$10		$30			$30	**$70**
			UG STRUCTURE SAND-FILL EXPERIMENT TO EXPLORE VALUE AS MANHOLE EVENT DETERRENT	**$50**			$10	$10	$10		$10		$10				**$50**
			FORENSIC TECHNIQUES FOR ICS DEVICES	$45			$20		$25								**$45**
			OFF GRID SURVEILLANCE SOLUTIONS	$30							$30						**$30**
			WIRELESS IP MESH NETWORK FOR CAMERAS	$25					$25								**$25**
			MANHOLE COVER RESTRAINT SYSTEM DEVELOPMENT	$20				$20									**$20**
99972	21181196	1	ENHANCED VIDEO ALARM	$10						$10							**$10**
			MOBILE PROGRAM OPTIMIZATION THRU TARGETED SCANNING	$25		$15	$10										**$25**
			AUTO MULTI-BANK SWITCH	$90	$0	$0	$0	$0	$0	$15	$0	$0	$0	$65	$0	$10	**$90**
			NETWORK RESISTOR PROJECT	$75	$0	$0	$0	$0	$0	$0	$0	$25	$0	$0	$0	$50	**$75**
			DUAL-FEEDER BREAKER REMOTE G&T	$70											$45	$25	**$70**
90207	20914982	1	USING A MICRO-GRID TO PREVENT A CASCADING EVENT	$50						$25				$25			**$50**
			SOFTWARE INTERGRATION TO ASSIST WITH IMPLIMENTATION OF EO-2150 & 2151	$50				$25	$25								**$50**
99994	21101143	1	REV - DG QUICK CONNECTOR	$25				$25									**$25**
			AUTOMATED TRACING CURRENT SUBSTATION TEST SYSTEM	$50	$0	$0	$0	$0	$0	$0	$0	$0	$50	$0	$0	$0	**$50**
13176			ENHANCED STORM DAMAGE ASSESSMENT CAPTURE AND ANALYTICS DEVELOPMENT	$50						$25						$25	**$50**
92205	20401040	1	MOBILE SITE SAFETY STORM RESPONSE TEAM	$15									$15				**$15**
			DISTRIBUTION LEVEL PMU DEVELOPMENT TO EXPAND AND ENHANCE CAPACITY FOR DISTRIBUTED RESOURCES	$50					$10			$20			$20		**$50**
			OVERHEAD DISTRIBUTION FAULTED CIRCUIT INDICATOR DEVELOPMENT	$50		$15	$15						$20				**$50**
			BUILT-IN SELF-TEST DIAGNOSTIC DEVELOPMENT FOR MEDIUM VOLTAGE JOINTS	**$25**						$15	$10						**$25**
			MICROGRID SYSTEM DESIGN EVALUATION	$15	$0	$0	$0	$0	$0	$15	$0	$0	$0	$0	$0	$0	**$15**
			TOTAL DISTRIBUTION	**$2,738**	**$118**	**$75**	**$200**	**$295**	**$345**	**$225**	**$230**	**$155**	**$255**	**$285**	**$330**	**$225**	**$2,738**
			CUSTOMER														
			DEMONSTRATE ANALYTICS TO PROVIDE INSIGHTS FROM CUSTOMER COMMUNITY DATA	$75			$35			$40							**$75**
			PILOT TEST OF PRE-PAY ELECTRICITY SERVICE FOR CUSTOMER PARTICIPATION AND ENERGY SAVINGS	$50							$50						**$50**
99927	21452375	0001	ENEGRY STORAGE SAFETY AND PROJECT PERMITTING SUPPORT	$70	$30		$40										**$70**
			TOTAL CUSTOMER	**$195**	**$30**	**$0**	**$75**	**$0**	**$0**	**$40**	**$50**	**$0**	**$0**	**$0**	**$0**	**$0**	**$195**
			EH&S														
			NEW TECHNOLOGIES FOR SAFER LIFTING AND HEAVY WORK	$50	$10		$20		$20								**$50**
			UPDATE DESIGN OF RETIEVAL DEVICE	$50	$0	$0	$0	$0	$0	$0	$50	$0	$0	$0	$0	$0	**$50**
			LIFE SIGN DETECTOR	$30										$30			**$30**
92314	20601276	0001	NEW PROGRAM FUNDING FOR THE DEMONSTRATION OF SAFETY	$15		$10			$5								**$15**
			TOTAL EH&S	**$145**	**$10**	**$10**	**$20**	**$0**	**$25**	**$0**	**$50**	**$0**	**$0**	**$30**	**$0**	**$0**	**$145**
			TOTAL INTERNAL PROGRAMS	**$5,358**	**$158**	**$275**	**$375**	**$475**	**$775**	**$535**	**$720**	**$435**	**$330**	**$545**	**$430**	**$305**	**$5,358**
			TOTAL PROGRAM	**$10,854**	**$583**	**$705**	**$803**	**$905**	**$1,229**	**$964**	**$1,149**	**$865**	**$759**	**$974**	**$1,045**	**$872**	**$10,854**

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
GAS RESEARCH AND DEVELOPMENT COSTS (000)
(Please note that Gas Research & Development does not project costs at the Internal Program level past the first 3 years of their annual 5 year budget submission)

CSN	PROJECT	TASK	Title	Test Period Oct 2014 - Sept 2015 plus Oct - Dec 2015 Est with RY1 & RY2 Expend. see exhibit CE G 1A	2016 Forecast - See Exhibit CE G 1B	2017 Budget	2018 Budget	2019 Budget
			NON-MILLENNIUM PROGRAM					
			ADMINISTRATION					
92032	10064342	0024	SALARIES AND WAGES	$299	$276	$284	$293	$301
92034	10064342	0025	OTHER EXPENSES	$34	$32	$32	$32	$32
92649	10064342	0372	PATENT SEARCHES IN CONNECTION WITH COMPANY R&D TECHNOLOGY	$9	$26	$26	$26	$26
			TOTAL ADMINISTRATION	**$342**	**$335**	**$343**	**$352**	**$360**
			INSTITUTIONAL					
			OPERATIONS TECHNOLOGY DEVELOPMENT (OTD) PROGRAM (NON-MILLENNIUM	$346	$50	$50	$50	$50
			TOTAL INSTITUTIONAL	**$346**	**$50**	**$50**	**$50**	**$50**
			INTERNAL PROGRAMS - NON MILLENNIUM					
90388	21076391	1	HIGH TEMPERATURE LIMIT SWITCH & DIAPHRAGM IMPROVEMENTS FOR LNG TURBINE BLEED VALVES - PHASE 2	$89	$55	$50	$25	
99955	21369387	0001	DEVELOP TECHNOLOGY ROADMAP FOR FIELD DATA CAPTURE	$50	$50	$25	$25	
			ROBOTIC CORROSION DETECTION OF FEEDER PIPING	$40	$50	$50	$50	
99975	21164233	1	EVALUATE GENESIS INTERNAL SPRAY LINING SYSTEM	$35	$25	$25	$50	
13132			DESIGN & DEVELOPMENT OF GROUND FROST HEAVE PREDICTION MODEL	$20	$25	$25	$25	
92247	10064342	172	REMOTE MONITORING SYSTEM FOR DRIP POT WATER	$16	$25	$25	$25	
92244	10064342	170	GAS OPERATIONS INNOVATION MONITOR - A SUBSCRIPTION SERVICE	$5	$8	$8	$8	
13133			EVALUATION OF HIGH-TEMP CIPL REHAB OF GAS MAIN IN MGO		$75	$50	$0	
			EMERGENCY MAIN STOP OFF STATION (EMSOS) PHASE 3 - FIELD DEPLOYMENT & TESTING		$75	$50	$75	
92412			DEMONSTRATION OF ADVANCEMENTS TO THE CURED-IN-PLACE-LINING PROCESS FOR GAS MAIN REHABILITATION		$50	$50	$0	
			DEMONSTRATE TRACKING & TRACEABILITY TECHNOLOGY FOR PE FUSIONS		$50	$50	$75	
			DEVELOP A PE REPAIR FITTING		$50	$50	$50	
			DEVELOP METHANE SENSOR		$50	$145	$229	
			DEVELOP TOOL TO SEAL A SEVERED TEE TAP IN AN ELEVATED PRESSURE GAS MAIN		$50	$50	$25	
13130			DESIGN & DEVELOPMENT OF GAS DISTRIBUTION LINE FLOOD PROTECTION DEVICE		$25	$25	$25	
13138			DEVELOP 16" PLASTIC PIPE SQUEEZE-OFF MACHINE		$25	$25	$25	
92082	10046626	16	GAS PIPE WATER EXTRACTION SYSTEM EVALUATION		$25	$50	$0	
92095	10046626	21	DEVELOP A GAS GIS BASEMAP OF MANHATTAN TOWARD AN AUTOMATED GAS LEAK SURVEY LOGGING SYSTEM		$25	$0	$0	
92284	20566057	1	PAVED OVER VALVE BOX LOCATING & REINSTATEMENT - FIELD PLOT		$25	$0	$0	
92286	10064342	194	PROTECTION OF PLASTIC GAS PIPE FROM ELECTRICAL ARCING AND BURN-OUT		$25	$50	$0	
92358	10064342	250	PILOT DEMONSTRATION OF ACOUSTIC LEAK DETECTION SYSTEM FOR TRANSMISSION GAS MAINS		$25	$25	$25	
92397	10064342	281	MICRO-EXCAVATION FOR CP TEST STATION / VALVE BOX INSTALLATION		$25	$0	$0	
			APPROVAL FOR 1.10e ENHANCED DAMAGE PREVENTION IN NY - PHASE 3		$25	$50	$0	
			DEMONSTRATE 12" CONSPLIT		$25	$25	$50	
			DEMONSTRATE WATERPROOFING TECHNOLOGY FOR GAS OPERATIONS INFRASTRUCTURE APPLICATIONS		$25	$25	$75	
			DEVELOP JACKHAMMER SIDE COMPARTMENT FOR UTILITY TRUCKS		$25	$50	$50	
92124	10064342	82	DEVELOPMENT OF A NO-DIG CUT & CAP SYSTEM FOR 2" PLASTIC SERVICES		$20	$0	$0	
13131			VOICE ENABLED APPLICATIONS FOR OPERATIONS		$20	$10	$0	
			TEST AND EVALUATE RECORDING DYNAMIC CONE PENETROMETER (RDCP)		$15	$15	$26	
90209	20915358	1	EVALUATE 3D TOOLBOX NDE SYSTEM		$10	$0	$0	
			RESEARCH INTERNATIONAL PRACTICES OF LOCATING PE PIPES BY STEAM MAINS		$10	$10	$0	
12146			HOUSE PIPE INTEGRITY TEST AUTOMATION		$0	$0	$50	
11536			TECHNOLOGY DEPLOYMENT AND IMPLEMENTATION (TDI) PROGRAM		$50	$50	$75	
92177	10064342	126	DEMONSTRATION OF NEW SAFETY TOOLS AND EQUIPMENT FOR GAS OPERATIONS		$25	$25	$25	
			INTERNAL PROGRAMS - NON MILLENNIUM	**$255**	**$1,088**	**$1,088**	**$1,088**	**$1,088**
			TOTAL NON MILLENNIUM PROGRAM	**$943**	**$1,473**	**$1,481**	**$1,490**	**$1,498**
			MILLLENNIUM PROGRAM					
			COMPOSITE PIPE STUDIES, TESTING AND DEMONSTRATIONS FOR REHABILITATION OF DISTRIBUTION GAS MAINS		$50	$50	$50	
			DEMONSTRATE RESTRAINT AND LOCKING MECHANISMS FOR MANHOLE COVERS		$50	$75	$50	
			DEVELOP, TEST AND DEMO OF NYSEARCH PROJECT TECHNOLOGIES		$100	$125	$125	
			DEVELOP, TEST AND DEMO OF OTD PROJECT TECHNOLOGIES		$100	$125	$125	
92202	10064342	141	EPRI FUNDING FOR MGP SITE REMEDIATION AND HEALTH RISK R&D	$215	$175	$180	$185	
			FIELD DEMONSTRATION OF EXPLORER PIPELINE CLEANING TOOL		$125	$75	$75	
			FIELD DEMONSTRATION OF THE EXPLORER 20/26 CRACK SENSOR		$125	$75	$75	
92163	10064342	114	FIELD TRIAL / DEMO OF BEM INTERNAL INSPECTION TOOL	$145	$25	$25	$20	
new			GAS OUTAGE MANAGEMENT SYSTEM DEVELOPMENT					
92695	10046626	95	IN-LINE INSPECTION OF 8 INCH GAS TRANSMISSION PIPE (M5)		$28	$8	$8	
92158	20886041	1	NYSEARCH FUNDING FOR GAS RESEARCH AND DEVELOP	$1,000	$500	$500	$500	
90206	20886042	1	OPERATIONS TECHNOLOGY DEVELOPMENT (OTD) PROGRAM	$981	$650	$650	$650	
96352	20876526	0001	PHASE III- STRUCTURAL WEAR TESTS OF COMPOSITE COVERS USING ROADWAY PARAMETERS	$233	$35	$0	$0	
12150			SMART GRID APPLICATION FOR GAS		$0	$75	$100	
			TOTAL MILLENNIUM PROGRAM	**$2,574**	**$1,963**	**$1,963**	**$1,963**	**$1,963**

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
GAS RESEARCH AND DEVELOPMENT COSTS (000)
PROJECT COSTS FOR THE PERIODS ASSOCIATED WITH - OCTOBER 2014 THROUGH SEPEMBER 2015 TEST PERIOD - OCTOBER 2015 ACTUAL - NOVEMBER AND DECEMBER 2015 PROJECTIONS - WHICH HAVE RATE YEAR 2017 & 2018 PROJECTED EXPENDITURES

POET	TASK	CSN	TITLE	14-Oct	14-Nov	14-Dec	15-Jan	15-Feb	15-Mar	15-Apr	15-May	15-Jun	15-Jul	15-Aug	15-Sep	Test Year
			NON-MILLENNIUM PROGRAM													
			ADMINISTRATION													
10064342	0024	92032	SALARIES AND WAGES	$18.7	$22.4	$22.3	$18.0	$18.0	$17.9	$18.1	$18.2	$18.2	$19.1	$19.4	$20.3	$230.6
10064342	0025	92034	OTHER EXPENSES	$2.8	$2.1	$2.5	$2.1	$1.7	$2.9	$2.4	$1.8	$0.7	$2.3	$2.6	$2.4	$26.4
10064342	0372	92649	PATENT SEARCHES IN CONNECTION WITH COMPANY R&D TECHNOLOGY APPLICATIONS	($0.0)	$0.2	($0.9)	$1.9	$1.9	$0.3	$0.1	$1.7	$0.0	$0.0	$1.0	$1.6	$7.7
			TOTAL ADMINISTRATION	**$21.5**	**$24.6**	**$23.9**	**$22.1**	**$21.5**	**$21.2**	**$20.5**	**$21.7**	**$18.9**	**$21.4**	**$23.0**	**$24.3**	**$264.6**
			INSTITUTIONAL													
10064342	0143	92206	OPERATIONS TECHNOLOGY DEVELOPMENT NOT FOR PROFIT (OTD) PROGRAM (NON-MILLENNIUM)	$0.0	$0.0	$89.0	$0.0	$0.0	$0.0	$0.0	$0.0	$160.0	$0.0	$0.0	$97.3	$346.3
			TOTAL INSTITUTIONAL	**$0.0**	**$0.0**	**$89.0**	**$0.0**	**$0.0**	**$0.0**	**$0.0**	**$0.0**	**$160.0**	**$0.0**	**$0.0**	**$97.3**	**$346.3**
			INTERNAL PROGRAMS - NON MILLENNIUM													
21076391	0001	90388	HIGH TEMPERATURE LIMIT SWITCH & DIAPHRAGM IMPROVEMENTS FOR LNG TURBINE BLEED VALVES - PHASE 2	$0.0	$0.0	$8.8	$0.0	$34.1	$10.3	$26.5	$0.0	$0.0	$0.0	$0.0	$3.7	$83.4
21369387	0001	99955	DEVELOP TECHNOLOGY ROADMAP FOR FIELD DATA CAPTURE	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$50.0	$0.0	$0.0	$0.0	$50.0
		15001	ROBOTIC CORROSION DETECTION OF FEEDER PIPING	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
21164233	0001	99975	EVALUATE GENESIS INTERNAL SPRAY LINING SYSTEM	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$1.1	$33.6	$0.0	$0.0	$0.0	$0.0	$34.7
		13132	DESIGN & DEVELOPMENT OF GROUND FROST HEAVE PREDICTION MODEL	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
10064342	0172	92247	REMOTE MONITORING SYSTEM FOR DRIP POT WATER	$0.0	($8.9)	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	($8.9)
10064342	0170	92244	GAS OPERATIONS INNOVATION MONITOR - A SUBSCRIPTION SERVICE	$0.0	($2.2)	$0.0	$0.0	$0.0	$0.0	$0.0	$7.4	$0.0	$0.0	$0.0	$0.0	$5.2
			INTERNAL PROGRAMS - NON MILLENNIUM	**$0.0**	**($11.1)**	**$8.8**	**$0.0**	**$34.1**	**$10.3**	**$27.6**	**$41.0**	**$50.0**	**$0.0**	**$0.0**	**$3.7**	**$164.4**
			TOTAL NON MILLENNIUM PROGRAM	**$21.5**	**$13.5**	**$121.7**	**$22.1**	**$55.7**	**$31.5**	**$48.2**	**$62.7**	**$228.9**	**$21.4**	**$23.0**	**$125.3**	**$775.4**

			MILLENNIUM PROGRAM													
10064342	0141	92202	EPRI FUNDING FOR MGP SITE REMEDIATION AND HEALTH RISK R&D	$13.8	$13.8	$13.8	$14.4	$14.4	$14.4	$14.4	$14.4	$14.4	$14.4	$14.4	$14.4	$171.4
10064342	0114	92163	FIELD TRIAL / DEMO OF BEM INTERNAL INSPECTION TOOL	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.6	$4.2	$0.0	$2.7	$0.0	$22.8	$30.2
10064342	0110	92158	NYSEARCH FUNDING FOR GAS RESEARCH AND DEVELOP	$4.3	$0.9	$332.9	$3.3	$1.5	$1.4	$0.8	$0.2	$2.9	$0.6	$0.4	$0.0	$349.2
20886042	0001	90206	NYSEARCH FUNDING FOR GAS RESEARCH AND DEVELOP	$134.4	$1.2	$0.0	$0.2	$60.3	$454.9	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$651.0
20886041	0001	90205	OPERATIONS TECHNOLOGY DEVELOPMENT (OTD)	$550.0	$3.1	$0.0	$0.0	$0.0	$2.5	($2.5)	$0.0	$0.0	$0.0	$0.0	$0.0	$553.1
21435302	0001	99931	OPERATIONS TECHNOLOGY DEVELOPMENT (OTD)	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$550.0	$0.0	$0.0	$0.0	$0.0	$550.0
10064342	0392	92684	OPERATIONS TECHNOLOGY DEVELOPMENT (OTD)	($550.0)	$0.0	$95.6	$0.0	$0.0	$281.3	$0.0	$0.0	$0.0	$0.0	$0.0	$51.4	($121.7)
20876526	0001	96352	PHASE III- STRUCTURAL WEAR TESTS OF COMPOSITE COVERS USING ROADWAY PARAMETERS	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
			TOTAL MILLENNIUM PROGRAM	**$152.5**	**$19.1**	**$442.3**	**$17.9**	**$76.2**	**$754.6**	**$13.3**	**$568.8**	**$17.4**	**$17.7**	**$14.9**	**$88.6**	**$2,183.1**

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
GAS RESEARCH AND DEVELOPMENT COSTS (000)
PROJECT COSTS FOR THE PERIODS ASSOCIATED WITH - OCTOBER 2014 THROUGH SEPEMBER 2015 TEST I

POET	TASK	CSN	TITLE	15-Oct	Proj 15-Nov	Proj 15-Dec	Test period Plus Oct 15 thru Dec 15
			NON-MILLENNIUM PROGRAM				
			ADMINISTRATION				
10064342	0024	92032	SALARIES AND WAGES	$23.0	$22.0	$22.0	$297.6
10064342	0025	92034	OTHER EXPENSES	$4.0	$2.0	$2.0	$34.4
10064342	0372	92649	PATENT SEARCHES IN CONNECTION WITH COMPANY R&D TECHNOLOGY APPLICATIONS	$0.0	$1.0	$1.0	$9.7
			TOTAL ADMINISTRATION	**$27.0**	**$25.0**	**$25.0**	**$341.6**
			INSTITUTIONAL				
10064342	0143	92206	OPERATIONS TECHNOLOGY DEVELOPMENT NOT FOR PROFIT (OTD) PROGRAM (NON-MILLENNIUM)	$0.0	$0.0	$0.0	$346.3
			TOTAL INSTITUTIONAL	**$0.0**	**$0.0**	**$0.0**	**$346.3**
			INTERNAL PROGRAMS - NON MILLENNIUM				
21076391	0001	90388	HIGH TEMPERATURE LIMIT SWITCH & DIAPHRAGM IMPROVEMENTS FOR LNG TURBINE BLEED VALVES - PHASE 2	$0.0	$0.0	$6.0	$89.4
21369387	0001	99955	DEVELOP TECHNOLOGY ROADMAP FOR FIELD DATA CAPTURE	$0.0	$0.0	$0.0	$50.0
		15001	ROBOTIC CORROSION DETECTION OF FEEDER PIPING	$0.0	$30.0	$10.0	$40.0
21164233	0001	99975	EVALUATE GENESIS INTERNAL SPRAY LINING SYSTEM	$0.0	$0.0	$0.0	$34.7
		13132	DESIGN & DEVELOPMENT OF GROUND FROST HEAVE PREDICTION MODEL	$0.0	$20.0	$0.0	$20.0
10064342	0172	92247	REMOTE MONITORING SYSTEM FOR DRIP POT WATER	$0.0	$10.0	$15.0	$16.2
10064342	0170	92244	GAS OPERATIONS INNOVATION MONITOR - A SUBSCRIPTION SERVICE	$0.0	$0.0	$0.0	$5.2
			INTERNAL PROGRAMS - NON MILLENNIUM	**$0.0**	**$60.0**	**$31.0**	**$255.4**
			TOTAL NON MILLENNIUM PROGRAM	**$27.0**	**$85.0**	**$56.0**	**$943.4**

			MILLENNIUM PROGRAM				
10064342	0141	92202	EPRI FUNDING FOR MGP SITE REMEDIATION AND HEALTH RISK R&D	$14.4	$14.4	$14.4	$214.7
10064342	0114	92163	FIELD TRIAL / DEMO OF BEM INTERNAL INSPECTION TOOL	$0.0	$0.0	$115.0	$145.2
10064342	0110	92158	NYSEARCH FUNDING FOR GAS RESEARCH AND DEVELOP	$0.4	$0.0	$0.0	$349.6
20886042	0001	90206	NYSEARCH FUNDING FOR GAS RESEARCH AND DEVELOP	$0.0	$0.0	$0.0	$651.0
20886041	0001	90205	OPERATIONS TECHNOLOGY DEVELOPMENT (OTD)	$0.0	$0.0	$0.0	$553.1
21435302	0001	99931	OPERATIONS TECHNOLOGY DEVELOPMENT (OTD)	$0.0	$0.0	$0.0	$550.0
10064342	0392	92684	OPERATIONS TECHNOLOGY DEVELOPMENT (OTD)	$0.0	$0.0	$0.0	($121.7)
20876526	0001	96352	PHASE III- STRUCTURAL WEAR TESTS OF COMPOSITE COVERS USING ROADWAY PARAMETERS	$133.0	$0.0	$100.0	$233.0
			TOTAL MILLENNIUM PROGRAM	**$147.9**	**$14.4**	**$229.4**	**$2,574.9**

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
GAS RESEARCH AND DEVELOPMENT 2016 PROJECTED COSTS (000)

CSN	PROJECT	TASK	Title	2016 Budget	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
			NON-MILLENNIUM PROGRAM														
			ADMINISTRATION														
92032	10064342	0024	SALARIES AND WAGES	$276	$23	$23	$23	$23	$23	$23	$23	$23	$23	$23	$23	$23	**$276**
92034	10064342	0025	OTHER EXPENSES	$32	$3	$3	$3	$3	$3	$3	$3	$3	$3	$3	$3	$3	**$32**
92649	10064342	0372	PATENT SEARCHES IN CONNECTION WITH COMPANY R&D	$26	$2	$2	$2	$2	$2	$2	$2	$2	$2	$2	$2	$2	**$26**
			TOTAL ADMINISTRATION	**$335**	**$27**	**$27**	**$28**	**$28**	**$28**	**$28**	**$28**	**$28**	**$28**	**$28**	**$28**	**$28**	**$335**
			INSTITUTIONAL														
			OPERATIONS TECHNOLOGY DEVELOPMENT (OTD)	$50						$15	$15	$20					**$50**
			TOTAL INSTITUTIONAL	**$50**	**$0**	**$0**	**$0**	**$0**	**$0**	**$15**	**$15**	**$20**	**$0**	**$0**	**$0**	**$0**	**$50**
			INTERNAL PROGRAMS - NON MILLENNIUM														
13133			EVALUATION OF HIGH-TEMP CIPL REHAB OF GAS MAIN IN	$75	$3	$5	$5	$10	$10	$15	$10	$5	$5	$3	$3	$3	**$75**
			EMERGENCY MAIN STOP OFF STATION (EMSOS) PHASE 3 -	$75	$0	$0	$0	$15	$15	$15	$20	$10	$0	$0	$0	$0	**$75**
90388	21076391	1	HIGH TEMPERATURE LIMIT SWITCH & DIAPHRAGM IMPROVEMENTS FOR LNG TURBINE BLEED VALVES - PHASE 2	$55	$10	$10	$10	$10	$15	$0	$0	$0	$0	$0	$0	$0	**$55**
92412			DEMONSTRATION OF ADVANCEMENTS TO THE CURED-IN-PLACE-LINING PROCESS FOR GAS MAIN REHABILITATION	$50	$3	$5	$3	$3	$5	$10	$5	$5	$5	$3	$3	$3	**$50**
99955	21369387	0001	DEVELOP TECHNOLOGY ROADMAP FOR FIELD DATA	$50	$50	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$50**
			DEMONSTRATE TRACKING & TRACEABILITY TECHNOLOGY	$50	$7	$5	$4	$4	$3	$4	$3	$5	$5	$2	$5	$5	**$50**
			DEVELOP A PE REPAIR FITTING	$50	$0	$0	$0	$0	$10	$10	$0	$0	$10	$10	$10	$0	**$50**
			DEVELOP METHANE SENSOR	$50	$3	$3	$3	$3	$3	$5	$5	$5	$10	$3	$5	$5	**$50**
			DEVELOP TOOL TO SEAL A SEVERED TEE TAP IN AN	$50	$10	$10	$10	$10	$10	$0	$0	$0	$0	$0	$0	$0	**$50**
			ROBOTIC CORROSION DETECTION OF FEEDER PIPING	$50	$6	$6	$4	$2	$2	$3	$3	$5	$6	$5	$4	$4	**$50**
13130			DESIGN & DEVELOPMENT OF GAS DISTRIBUTION LINE	$25	$3	$3	$2	$1	$1	$2	$2	$3	$3	$3	$2	$2	**$25**
13132			DESIGN & DEVELOPMENT OF GROUND FROST HEAVE	$25	$2	$2	$2	$2	$2	$2	$2	$2	$2	$2	$3	$3	**$25**
13138			DEVELOP 16" PLASTIC PIPE SQUEEZE-OFF MACHINE	$25	$10	$10	$5	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$25**
92082	10046626	16	GAS PIPE WATER EXTRACTION SYSTEM EVALUATION	$25	$0	$0	$0	$0	$10	$10	$5	$0	$0	$0	$0	$0	**$25**
92095	10046626	21	DEVELOP A GAS GIS BASEMAP OF MANHATTAN TOWARD AN AUTOMATED GAS LEAK SURVEY LOGGING SYSTEM	$25	$3	$3	$2	$1	$1	$2	$2	$3	$3	$3	$2	$2	**$25**
92247	10064342	172	REMOTE MONITORING SYSTEM FOR DRIP POT WATER	$25	$3	$3	$3	$3	$3	$3	$3	$3	$3	$2	$1	$1	**$25**
92284	20566057	1	PAVED OVER VALVE BOX LOCATING & REINSTATEMENT -	$25	$10	$10	$5	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$25**
92286	10064342	194	PROTECTION OF PLASTIC GAS PIPE FROM ELECTRICAL	$25	$10	$10	$5	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$25**
92358	10064342	250	PILOT DEMONSTRATION OF ACOUSTIC LEAK DETECTION SYSTEM FOR TRANSMISSION GAS MAINS	$25	$2	$2	$2	$2	$2	$2	$2	$2	$2	$2	$3	$3	**$25**
92397	10064342	281	MICRO-EXCAVATION FOR CP TEST STATION / VALVE BOX	$25	$10	$10	$5	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$25**
99975	21164233	1	EVALUATE GENESIS INTERNAL SPRAY LINING SYSTEM	$25	$0	$0	$0	$15	$10	$0	$0	$0	$0	$0	$0	$0	**$25**
			APPROVAL FOR 1.10e ENHANCED DAMAGE PREVENTION IN	$25	$1	$1	$3	$3	$3	$3	$3	$3	$3	$2	$3	$3	**$25**
			DEMONSTRATE 12" CONSPLIT	$25	$3	$1	$3	$3	$3	$3	$3	$3	$3	$2	$1	$3	**$25**
			DEMONSTRATE WATERPROOFING TECHNOLOGY FOR GAS OPERATIONS INFRASTRUCTURE APPLICATIONS	$25	$2	$2	$2	$2	$2	$2	$2	$2	$2	$2	$3	$3	**$25**
			DEVELOP JACKHAMMER SIDE COMPARTMENT FOR UTILITY	$25	$0	$0	$0	$10	$0	$10	$0	$5	$0	$0	$0	$0	**$25**
92124	10064342	82	DEVELOPMENT OF A NO-DIG CUT & CAP SYSTEM FOR 2"	$20	$0	$10	$0	$10	$0	$0	$0	$0	$0	$0	$0	$0	**$20**
13131			VOICE ENABLED APPLICATIONS FOR OPERATIONS	$20	$0	$0	$0	$0	$0	$0	$0	$20	$0	$0	$0	$0	**$20**
			TEST AND EVALUATE RECORDING DYNAMIC CONE	$15	$0	$0	$10	$5	$0	$0	$0	$0	$0	$0	$0	$0	**$15**
90209	20915358	1	EVALUATE 3D TOOLBOX NDE SYSTEM	$10	$0	$0	$0	$5	$5	$0	$0	$0	$0	$0	$0	$0	**$10**
			RESEARCH INTERNATIONAL PRACTICES OF LOCATING PE	$10										$10			**$10**
92244	10064342	170	GAS OPERATIONS INNOVATION MONITOR - A	$8	$0	$0	$8	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$8**
11536			TECHNOLOGY DEPLOYMENT AND IMPLEMENTATION (TDI)	$50	$5	$5	$5	$3	$5	$5	$5	$5	$5	$3	$3	$3	**$50**
92177	10064342	126	DEMONSTRATION OF NEW SAFETY TOOLS AND EQUIPMENT	$25				$25									**$25**
			INTERNAL PROGRAMS - NON MILLENNIUM	**$1,088**	**$153**	**$114**	**$98**	**$144**	**$118**	**$103**	**$73**	**$84**	**$66**	**$52**	**$47**	**$39**	**$1,088**
			TOTAL NON MILLENNIUM PROGRAM	**$1,473**	**$180**	**$141**	**$126**	**$172**	**$146**	**$146**	**$116**	**$132**	**$94**	**$80**	**$75**	**$66**	**$1,473**
			MILLENNIUM PROGRAM														
			DEMONSTRATE RESTRAINT AND LOCKING MECHANISMS	$50												$50	$50
			FIELD DEMONSTRATION OF THE EXPLORER 20/26 CRACK	$125			$95			$30							$125
			COMPOSITE PIPE STUDIES, TESTING, AND DEMONSTRATIONS FOR REHABILITATION OF DISTRIBUTION GAS MAINS	$50												$50	$50
			FIELD DEMONSTRATION OF EXPLORER PIPELINE CLEANING	$125	$20	$50	$55										$125
92158	10064342	110	NYSEARCH FUNDING FOR GAS RESEARCH AND DEVELOP	$500			$300				$100					$100	$500
90206	20886042	1	OPERATIONS TECHNOLOGY DEVELOPMENT (OTD)	$650	$550					$100							$650

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
GAS RESEARCH AND DEVELOPMENT 2016 PROJECTED COSTS (000)

CSN	PROJECT	TASK	Title	2016 Budget	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
96352	20876526	1	PHASE III- STRUCTURAL WEAR TESTS OF COMPOSITE	$35				$25					$10			$0	$35
12150			SMART GRID APPLICATION FOR GAS	$0													$0
92202	10064342	141	EPRI FUNDING FOR MGP SITE REMEDIATION AND HEALTH	$175	$13	$14	$14	$14	$14	$14	$14	$16	$14	$14	$15	$19	$175
			DEVELOP, TEST AND DEMO OF NYSEARCH PROJECT	$100												$100	$100
			DEVELOP, TEST AND DEMO OF OTD PROJECT	$100												$100	$100
92695	10046626	95	IN-LINE INSPECTION OF 8 INCH GAS TRANSMISSION PIPE	$28												$28	$28
92163	10064342	114	FIELD TRIAL / DEMO OF BEM INTERNAL INSPECTION TOOL	$25						$25							$25
			GAS OUTAGE MANAGEMENT SYSTEM DEVELOPMENT														$0
			TOTAL MILLENNIUM PROGRAM	**$1,963**	**$583**	**$64**	**$464**	**$39**	**$14**	**$169**	**$114**	**$16**	**$24**	**$14**	**$15**	**$447**	**$1,963**

	Capital
X	O&M

2017 – Shared Services / Human Resources

Project/Program Title	Gas Infrastructure Support – Human Resource Professional (HRP)
Project Manager	Timothy Indiveri
Hyperion Project Number	N/A
Organization's Project Number	N/A
Status of Project	Planning
Estimated Start Date	January 1, 2017
Estimated Completion Date	On going
Work Plan Category	Operationally Required

Work Description:

Gas Operations has a five year plan to increase the workforce to address increased workload through the addition of employees and contractors. Their staffing plan includes the hiring of over 1,000 employees over the next 5 years. Hiring is currently on schedule for 2015 to:

- Increase Gas Ops mechanics from 421 to 526
- Increase Construction Services from 32 to 80
- Increase Gas Construction Contractors from 667 to 692

Justification Summary:

The Human Resources (HR) Team supporting Gas Operations performs a multitude of tasks within Gas Operations. One of the critical work activities they handle is to help Gas Operations meet the staffing increase they propose over the next 5 years. It is necessary to ensure HR meets the needs of their internal customer by continuing to be a strategic partner. HR needs to hire and train one additional HRP who will be responsive and knowledgeable in all aspects of the customer inquiries and capable of sourcing and selecting skilled employees, both union and management to address the increased workload.

Supplemental Information:

- Alternatives: None
- Risk of No Action: Gas Operations will not have sufficient staff to meet their operation needs
- Non-financial Benefits: N/A
- Summary of Financial Benefits (if applicable) and Costs: N/A
- Technical Evaluation/Analysis: N/A
- Project Relationships (if applicable): N/A

- Basis for Estimate: Estimated salary of a Band 1H employee

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
	115	**115**	**115**	**115**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor		115	115	115	115
M&S					
A/P					
Other					
Overheads					
Total		**115**	**115**	**115**	**115**

	Capital
x	O&M

2017 – Shared Services / Learning & Inclusion

Project/Program Title	Gas Training Resources
Project Manager	Victor Faster
Hyperion Project Number	N/A
Organization's Project Number	N/A
Status of Project	Not started
Estimated Start Date	1/1/2017
Estimated Completion Date	Ongoing
Work Plan Category	Common

Work Description:

The workload in Gas Operations is expected to grow significantly over the next several years, dictating the need to increase staffing by roughly twenty-five percent (500 new headcount). In addition, Gas Operations plans to accelerate the replacement of gas main piping from 50 to 100 miles per year which will enhance safety and improve system reliability. Projected Gas Operations growth is also due to the increase in customer outreach and annual scans of the gas system which has doubled the number of leak calls and leak repairs as compared to years prior. Another contributing factor is oil-to-gas conversions which continue to grow due to the NYC Clean Heat Act which phases out use of No. 6 Oil by 2015 and No. 4 oil by 2030. Twenty-seven percent of the affected buildings (2,000 out of 7,500) have converted to date. Additionally, favorable gas prices continue to contribute to the company's new business work as gas plays a role in customer-sided solutions for cleaner air, energy efficiency and the New York State Public Service Commission's Reforming the Energy Vision (REV) proceedings.

The company has developed a multi-year strategy that includes a gas workforce staffing plan to ensure the organization has the right number of people with the right skills to meet the growing level of gas-related work.

The Gas Operations staffing plan contemplates meeting workload demands with three categories of workers: (i) existing employees, (ii) new hires, and (iii) contractors. This development has implications for the training function, as extensive training is required for each group of workers in order to ensure they have the skills, knowledge and abilities to operate and maintain our gas system in a safe, reliable and customer-focused manner. Existing staff levels at The Learning Center (TLC) are insufficient to keep pace with increasing demand for gas training and testing activities. Increased training staff is needed to address these training challenges.

Justification Summary:

The Learning Center requires eight new full-time permanent training resources to meet gas training, evaluation and operator qualification testing in support of the increased work force needs.

The company's gas expansion plan includes a gas staffing plan reflecting increased resources that are required to maintain and operate the gas system. The Learning Center's gas training plan consists of a series of training, testing and qualifying activities designed to enhance the knowledge and skills of our employees to maximize productivity, prevent incidents, and prepare our employees to safely perform their job duties. Existing employees require ongoing operator qualification and career path training, as well as periodic testing to evaluate and assess their competence levels. New employees and contractors receive training to build skills, knowledge and abilities.

Risks associated with work in the gas industry are well known, with failures having the potential for severe consequences. This reinforces the need for effective, quality training for frontline workers. In this context, having a full complement of experienced and effective training staff capable of providing comprehensive training to gas operations personnel becomes even more important. A competent, well-trained workforce ultimately benefits the company, its employees and the communities we serve.

Currently, The Learning Center's gas training staff consists of just ten employees. The company's future demand for gas training and testing activities far exceeds the volume that can be conducted with our current level of gas training resources. For example, in 2015, the current gas training staff is expected to provide approximately 1,800 days of training. The amount of effort workers put in on a regular basis is unsustainable, as we remain mindful of issues related to employee burnout and impact to the quality of instruction. In addition to working overtime, we have needed to supplement core staff with retirees and on-loan field resources. However, these resources are limited, and therefore such mitigation efforts are not viable long-term solutions for the increased training demand forecasted.

Gas training is continuous and does not end after a person is hired. On an ongoing basis, current and new instructors will train 1,200 employees on average each year in a wide variety of introductory and career path courses ranging from gas construction to gas safety procedures. Increasing our permanent headcount will ensure that critical training required for existing employees, new employees, and contractors will be conducted timely, safely and effectively. Retention and morale issues associated with overload will also be eliminated.

The chart below reflects the number of required training instructor days needed each year to meet the projected gas training demand in 2016-2019, based on the career path technical training requirements, evaluation and ongoing gas operator qualification testing that are essential for gas operations resources:

Years:	2016	2017	2018	2019
Required Training Days:	2941	2523	2276	2485

The following is a breakdown by year of the number of students who will require training, evaluation and operator qualification testing, representing an approximate extra 50 percent over prior years:

2016	2017	2018	2019
Students	Students	Students	Students
1294	1154	1000	1373

Future gas training demand far exceeds the level of training the company can provide with our current level of gas training resources. Given the estimated efforts required per full time days and the volume of students assigned for each gas training staff resource, it is clear that current staffing levels are insufficient to handle increasing demands. To bridge the gap between the volume of training needed to meet

operational needs for the next several years and the capacity of current team, the requirement is for an increase of eight full time permanent training staff members to meet the level of gas training, evaluation and operator qualification testing required to support the increased workforce that will support the gas system.

Supplemental Information:

- Alternatives: An alternative to this request would be to augment existing TLC staff with the use of contractor retiree instructors and field resources to work with existing instructors. This is not a viable long-term solution due to the limited availability of these resources. In addition, there are restrictions that limit our use of retiree instructors, and drawing on field resources could negatively impact the company's ability to operate and maintain the gas system and respond to customer needs.

- Risk of No Action: There are specific technical training requirements for the gas workforce including gas operator qualification requirements that are prescribed by regulation. If additional training resources are not obtained, the company would be unable to train, test and qualify the required number of gas resources needed to conduct the increased volume of gas-related work on the system. This could present adverse impacts to the company, customers and the public in several key areas including safety, system reliability, operational efficiency, and the customer experience.

- Non-financial Benefits: The non-financial benefits associated with maintaining the necessary level of training resources to train and test the gas workforce include the development of a highly skilled and qualified workforce, able to provide reliable gas service in a safe, efficient, and customer focused manner.

- Summary of Financial Benefits (if applicable) and Costs: N/A

- Technical Evaluation/Analysis: N/A

- Project Relationships (if applicable): This project is related to the company's gas expansion plan.

- Basis for Estimate: The basis for the estimated request below is an assumed annual salary of $115,000 per Instructor position.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Overheads						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
1,090	**1,090**	**1,090**	**1,090**	**1,090**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor	920	920	920	920	920
M&S	50	50	50	50	50
A/P	120	120	120	120	120
Other					
Overheads					
Total	**1,090**	**1,090**	**1,090**	**1,090**	**1,090**

	Capital
X	O&M

2017 – Shared Services / Supply Chain

Project/Program Title	Gas Expansion Support – Supply Chain
Project Manager	Jason Henry
Hyperion Project Number	N/A
Organization's Project Number	N/A
Status of Project	Planning
Estimated Start Date	2017
Estimated Completion Date	Ongoing
Work Plan Category	Operationally Required

Work Description:

Supply chain must address O&M needs to support the increase in the procurement of additional materials and services to support Con Edison's expanded gas work.

Supply Chain needs two additional full-time equivalent (FTE) employees in order to meet the growing demands of Gas. Supply Chain primarily supports Gas by procuring construction services and pipe/values/fitting (PVF) items, as well as inventory management of about 2,000 stock gas items.

Justification Summary:

Supply Chain needs additional resources to support the purchase and handling of additional materials and services for the support of expanded gas work.

Supply Chain (Procurement) has experienced and is projecting increased procurement and transactional activity based on the following analysis:

- Annual contract spend for Gas construction services (Construction Management and Gas Operations) has increased about 20 percent in 2013 and 2014, and is on-track to meet/exceed in 2015. Primary drivers are increased main replacement goals (about five new miles each year), oil-to-gas conversions, leak repairs and load relief.
- Con Edison is increasing the requirement to replace high risk pipe each year. Gas will increase its main replacement to 70 miles annually in 2016, 80 miles in 2017, 85 miles in 2018, 90 miles in 2019, 95 miles in 2020 and finally 100 miles by 2021. Supply Chain, Construction Management and Gas Operations have been negotiating with new contractors in order to meet the goal of up to 100 miles per year. The 40+ existing construction contractors will not be able to meet this mileage increase, rather Supply Chain will have to recruit and negotiate with new contractors.
- Spend on the 2,000 gas PVF items is surging. Analysis of 2014 actual spend, YTD 2015 spend and projected 2016 spend – Supply Chain is projecting a 100 percent increase in spend on these items over this time period.
- There were over 250,000 orders or internal requisitions for all types of class/stock material, with over 30 percent of the transactions made in support of Gas. Based on the Supply Chain

Performance Index which calculates on-time delivery, fill rate accuracy and material availability – about five percent of transactions fall short of target and some other number of transactions also require expediting, coordination with manufacturer, special freight arrangements, etc. Assuming 30 percent of the 250,000 transactions support Gas and that the 2014-2016 projection that spend on gas items will increase by 100 percent, the number of transactions to support Gas could grow by at least ten percent. This equates to an additional 7,500 annual transactions that need to be managed by Supply Chain.

Supplemental Information:

- Alternatives: Utilize current workforce.
- Risk of No Action: Inability to support the needs of Gas Operations.
- Non-financial Benefits: Increased reliability and efficiency in supporting additional Gas Operations requests.
- Summary of Financial Benefits (if applicable) and Costs: Additional work force will allow Supply Chain to properly manage the additional 7,500 annual transactions.
- Technical Evaluation/Analysis: n/a
- Project Relationships (if applicable): n/a
- Basis for Estimate: Two additional full time employees with an average salary of $100k per year.

Total Funding Level ($000):

Historical Spend

Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015

Historical Elements of Expense

(Historical EOE breakout will only be completed for Steam projects/programs of $500 thousand or more and, for all other organizations, projects/programs of $1million or more.)

EOE	Actual 2011	Actual 2012	Actual 2013	Actual 2014	Historic Year (O&M only)	Forecast 2015
Labor						
M&S						
A/P						
Other						
Total						

Request ($000):

Request 2016	Request 2017	Request 2018	Request 2019	Request 2020
	200	**200**	**200**	**200**

Request by Elements of Expense

EOE	2016	2017	2018	2019	2020
Labor		200	200	200	200
M&S					
A/P					
Other					
Overheads					
Total		**200**	**200**	**200**	**200**