

Niagara Mohawk Power Corporation d/b/a National Grid

Cases 17-E-0238 and 17-G-0239

INFORMATION TECHNOLOGY CAPITAL INVESTMENT REPORT FOR QUARTER ENDED MARCH 31, 2019

SUBMITTED TO:
NEW YORK STATE DEPARTMENT OF PUBLIC SERVICE STAFF

May 30, 2019

nationalgrid

Information Technology Capital Investment Report for Quarter Ended March 31, 2019

I. Introduction

Niagara Mohawk Power Corporation d/b/a National Grid (“Niagara Mohawk” or the “Company”) submits this Information Technology (“IT”) Capital Investment Quarterly Report (“IT Quarterly Report”) for the fourth quarter of fiscal year 2019 (“FY19”).¹ Pursuant to the Public Service Commission’s (“Commission” or “PSC”) March 15, 2018 Order in Cases 17-E-0238 and 17-G-0239,² the Company is to provide quarterly variance reports to Department of Public Service Staff regarding IT capital projects and investments. The IT Quarterly Report provides an explanation of the Company’s overall IT investment plan approach; descriptions of program investment categories; a comparison of budgeted to actual spending, including variance explanations; identification of allocations to Niagara Mohawk; and a report on any budget exceptions.

IT capital projects and investments that are shared investments across National Grid’s operating companies are implemented and owned by National Grid USA Service Company, Inc. (“Service Company”) and allocated to the benefiting US operating companies, including Niagara Mohawk, in the form of Service Company rent expense once the investments are in-service. The Service Company rent expense includes a return on the capital investment (net of deferred taxes) plus booked depreciation expense.

In total, for FY19, National Grid’s IT capital expenditures across all US operating companies was approximately \$115.2 million, compared to a revised FY19 budget of \$121 million.³

II. Development and Approach of the IT Capital Investment Plan

The FY19 Plan was developed based on the Company’s assessment of the overall benefit/value of the proposed investments, resource availability and capability, and project dependencies.⁴ The list of projects was further refined and prioritized through a series of workshops between IT and representatives from the Company’s jurisdictional teams and functional business areas (e.g., Operations, Customer, Capital Delivery, Finance and Business Services). Budgetary targets and resourcing were then taken into consideration prior to the final selection and inclusion of projects within the FY19 Plan. The selection process considered:

¹ The fourth quarter of FY19 is January 1, 2019 through March 31, 2019 (“Q4 FY19”).

² Cases 17-E-0238 and 17-G-0239, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Niagara Mohawk Power Corporation d/b/a National Grid for Electric and Gas Service*, “Order Adopting Terms of Joint Proposal and Establishing Electric and Gas Rate Plans” (issued and effective March 15, 2018), Joint Proposal, Section 8.6.

³ The FY19 Service Company budget had been \$130.0 million; however, during the year \$9 million was transferred out of the IT capital budget to support other investment priorities. Therefore, actual FY19 IT spend was approximately 95 percent of the revised budget of \$121 million.

⁴ The Company’s FY19 Plan Report was filed on May 14, 2018 in Cases 17-E-0238 and 17-G-0239.

1. **In-Flight Projects** – IT identified the amount of work remaining and delivery timeline for in-flight multi-year investments already sanctioned and funded through the IT capital process.
2. **New Investments** – Compliance items resulting from legal or regulatory requirements and mandates, or investments needed to address potential internal risks and issues were added to the plan.
3. **Infrastructure Investments** – Investments to upgrade/replace/add functionality to address systems reliability and fix foundational capabilities required for present and future business operations, including ensuring digital security, were included in the plan.
4. **Other Projects** – The IT team worked closely with jurisdictional and business executive sponsors to focus on the top project requests of those groups, and, to the extent possible, those projects were added to the plan.

Development of the FY19 Plan was aligned to the Company's corporate budgeting process. The Company's FY19 Plan Report, filed May 14, 2018 in Cases 17-E-0238 and 17-G-0239, included further details on the review and approval of the FY19 Plan as part of the corporate budget.

III. Program Categories/Spending Rationales

The Company classifies IT capital projects into the following program categories/spending rationales based on their primary investment driver:

- (1) Regulatory, Legal and Compliance Mandates;
- (2) Business Programs and Projects; and
- (3) Technology/Infrastructure Foundation and Reliability.

Descriptions of each program category/spending rationale are provided below.

Regulatory, Legal and Compliance Mandates

This program category/spending rationale includes IT projects that are initiated annually as a direct result of, or are driven by, the need to comply with regulations, laws, tariffs, orders, agreements, or other matters promulgated by federal, state, or local governmental agencies.

Business Programs and Projects

This program category/spending rationale includes internally identified investments required to meet the needs of the business to provide service to its customers. IT Business Partners work closely with the Jurisdictional Presidents and functional leadership on an ongoing basis to determine the IT needs of the business and the costs and timing for the required investments. The investments are then prioritized against overall expenditure targets.

Technology/Infrastructure Foundation and Reliability

This program category/spending rationale includes investments in the replacement and upgrade of aged applications and infrastructure components to ensure the Company's ability to effectively operate the electric and gas distribution systems and respond to evolving business and market demands. The investments will modernize the technology and infrastructure to support day-to-

day business requirements, enable the delivery of new business programs, and ensure the platforms are resilient to cyber security threats.

IV. Overview of Budget to Actual Spending for Q4 FY19

Attachment 1 includes detail on budgets and actual spending for each of the major program spending categories and for the top ten projects (based on allocation to Niagara Mohawk) by budget within the program categories, including explanations of variances between budgets and actual spending through Q4 FY19.

Attachment 2 includes projects placed in-service in Q4 FY19 along with the associated rent expense charged to Niagara Mohawk. As explained above, while project actuals reflect capital investment for the respective projects to date, allocation of rent expense to Niagara Mohawk is based on a return on, and depreciation of, the cumulative capital investment that benefits the Company, and does not occur until an investment is placed in-service.

In Q4 FY19, National Grid spent \$36.2 million compared to a total Service Company budget of \$40.0 million, representing a \$3.85 million underspend. For FY19, National Grid spent \$115.2 million compared to a total Service Company budget of \$130.0, representing an underspend of \$14.8 million.⁵ The FY19 underspend is primarily due to delays in commercial negotiations and mobilization for the Customer Experience Transformation (INVP 475 0), US SAP FERC on HANA (FOH) Upgrade (INVP 4563) and Document Management System Replacement Delivery (INVP 4408) projects as well as cost reductions resulting from project scope changes and contract re-negotiations for the Gateway Upgrades (INVP 4975USG), DRS Future Program (INVP 3683) and Contract Management Solutions for CCDI (INVP 4771A) projects discussed in further detail below. These results were partially offset by project overspends primarily due to scope and complexity increases for the Capitalized Equipment Installs/Replacement (INVP 3617), EMS Lifecycle Hardware and Software Upgrade (INVP 4914), ICE replacement – Office 365 Implementation (INVP 4491) and Storms-I Scheduler Upgrade Stabilization (INVP 4398) projects discussed below.

Detail regarding activity in key programs and projects is included below.

A. Regulatory, Legal, and Compliance Mandates

DRS Future Program (INVP 3683) – The DRS Future Program and Gateway Upgrades are cyber security initiatives that are part of National Grid's overall multi-year Cyber Security Program of investment. The Company conducted a review of its cyber strategy and roadmap to ensure the proper cyber capabilities were being delivered to keep pace with the evolving threat and the most pertinent areas of cyber risk were being addressed. The review resulted in a reprioritization of the DRS program, with several new initiatives being identified to address emerging critical cyber risks, and in some cases, delays to a subset of projects to future years of the program. This reprioritization has resulted in less spend to-date compared to budget. Through March 2019, there are 30 projects in flight in various

⁵ The annual budget was subsequently revised to \$121 million. See note 3, *supra*.

phases. DRS Future Program line item consists of 12 reprioritized initiatives that does not give visibility to the full scope of work for the program.

Physical Security Equipment Installation/Replacement (INVP 3617) – This investment represents the annual capital replacement program for Physical Security. Physical Security is responsible for protecting National Grid’s personnel and assets and incorporates a security system as part of the overall security plan. To fulfill this responsibility, it is necessary to ensure that all security-related equipment and assets in New York are in good condition. This project replaces assets that are at or near end of life and/or assets that are no longer under vendor warranty. This annual blanket project will be placed in-service at the end of the fiscal year.

FY19 spending was higher than budgeted for the following reasons: an increased volume for break/fix activity and accelerated upgrades to system-related equipment that is at end-of-life and no-longer supported by the manufacturers.

US SAP: Infrastructure Landscape- FY19 (INVP 4970) – This project will create/refresh non-production environments used for project development in support of initiatives pertaining to the Systems, Applications and Products (SAP) portfolio. INVP 4970 is a funding source for hosting charges allocated to benefitting projects quarterly. Projects incurring the capital expense include INVP 4662, Concur and INVP 4779, Time Transformation Mobility.

The hosting charges are higher than budgeted for FY19 because the migration to a new vendor (FIT) being performed as part of INVP 4563 has been delayed until FY20. Consequently, costs previously charged to this INVP have been transferred to the projects that utilized these hosted environments.

Gateway Upgrades (vStig Scaling Upgrades (INVP 4975USG)) – Traffic through National Grid’s network gateway continues to grow with the expansion of remote access capabilities and mobile devices. This growth can increase vulnerability to cyber threats. This initiative will upgrade the existing cyber security capabilities for better traffic monitoring and inspection for potential threats. It will secure National Grid’s critical applications by reducing the risk of failure due to unauthorized access or introduction of malicious code.

The variance is due to refined project scope, which reduced overall project cost. Rather than replacing Cisco AnyConnect, it was upgraded and the DLP component was removed. AnyConnect has been installed on nearly 100 devices. Work will continue into Q1 FY20.

US SAP: FERC on HANA (FOH) Upgrade (INVP 4563) – This project delivers an upgrade for National Grid’s FERC on HANA tool. This project will ensure that FERC on HANA follows the required level of updates provided by SAP to stay in support from the vendor to ensure that National Grid will leverage the latest SAP corrections and notes that have been released. Electric and gas utilities must comply with the Uniform System of Accounts from the Federal Energy Regulatory Commission (FERC) or the National

Association of Regulatory Utility Commissioners (NARUC). National Grid uses FERC on HANA to meet these compliance requirements, such as filing reports and responding to data requests.

This project was reprioritized to start later in the fiscal year, and total spend will align with initial estimates, currently running under budget due to delayed start.

US MDS-Energy Accounting System (EAS) migration to Wholesale Settlement Application (WSA) (INVP 4481) – This project will consolidate the two existing wholesale settlement processing applications into a single application. EAS is used in New York and contains the data required for the completion of the wholesale settlement process while WSA is the application used in New England. The functionalities of EAS will be migrated into the WSA to improve upon the wholesale settlement market reporting and existing business processes. This project will combine the two platforms and upgrade WSA, providing functionality and reliability improvements for the wholesale settlement process.

Vendor availability caused delays that impacted timing of project startup activities and associated cost in currency. The project is expected to be delivered within sanctioned amount, however, the schedule will be impacted by this delay.

NY VDER Stack and Portal Integration (INVP 5160) - This project will integrate NY Value of Distributed Energy Resources (VDER) mandated requirements into the National Grid nCAP interconnection portal. This requires National Grid to change the billing methodology for calculating the net meter credit given to accounts with renewable generation that produce excess kWh. The new methodology is calculated by looking at how much an account sends (injects) into the grid on an hourly basis. Each VDER account must be interval metered to calculate hourly data. The VDER satellite relationship is monetary, not volumetric.

Project start pushed to September 2019 to leverage resources from other projects to this project due to their subject matter expertise. Because there are only a small number of customers on this new rate currently, manual billing can feasibly continue until it can be automated.

NY Gas Service Line Inspection (INVP 5175) – The Commission issued an Order April 20, 2017 in Case 15-G-0244 requiring all Local Distribution Companies to inspect all inside jurisdictional piping (Gas Service Line) to the outlet of the meter for leaks and substandard conditions and confirm that all meter/services are authorized. As a result, National Grid needs to complete approximately 74,000 annual inspections for Niagara Mohawk, 153,000 for The Brooklyn Union Gas Company and 106,000 for KeySpan Gas East Corporation. This project will implement a solution from The Sequel Group (TSG) that provides the capability for the Customer Meter Services (CMS) function to complete Gas Service Line inspections in the field. The solution also provides the capability to schedule appointments and collect and report appointment and inspection data to the PSC.

The solution will be used by National Grid employees and contractors and will comply with Digital Risk & Security requirements.

Sanctioning delays resulted in commercial negotiation delays on vendor Statement of Work (SOW) and resource ramp up of project. Solution is identified as SaaS (Software as a Service). SaaS costs are not capitalized and are billed monthly resulting in a decrease from originally estimated project capital costs. This project is now on track and resources have ramped up. Capital charges are anticipated to be \$0.7 million less than originally estimated due to successful negotiation of the SaaS contract. This project was put in-service on April 8, 2019.

Annual HR & Payroll Mandatory Service Pack Upgrade (HRSP) - FY19 (4965) - This project funds a budget for FY19 managed by the Project Delivery Team and Business Process Support (BPS) to ensure timely delivery of upgrade components for the Human Resources modules, which include the required tax, payroll, legal, and regulatory reporting changes throughout the year.

The project was delayed at the beginning of the year because of competing priorities delaying associated project costs. The project was put in to service December 10, 2018, and once all invoices have been processed, the forecasted project spend is expected to be in line with budget.

Identity Access Management (IAM) - Privilege Access Management (PAM) – Phase 2 (3683 USAP) – One of the key themes of safeguarding the business relates to Robust Identity & Controls, which seeks to improve and simplify identity and access management across the enterprise; protect the organization from threat actors; safeguard cloud and application access; and deliver identity intelligence of user access and activity. Privilege Access Management (PAM) is one of the key components of IAM capability.

Compromised privileged access is one of the main reasons for many cybersecurity breaches. Privileged users present a greater security risk due to elevated access levels. The Phase 2 delivery approach will be driven by the SOX in-scope applications and infrastructure that have been provided to the project team to inform the risk assessment of business criticality, exposure and vulnerability across the business and IT estate.

Due to the large number of databases, applications, and server accounts, PAM phase 2 will take a risk-based approach to prioritize high risk and SOX in-scope servers, databases, application and service accounts. The project was delayed due to work required to complete SOX audit and resource constraints that required project workshops to be held in Jan 2019. Therefore, project costs will be delayed accordingly.

B. Business Programs and Projects

Customer Experience Transformation Technology Program (INVP 4750) – National Grid has embarked on a comprehensive Customer Experience Transformation (CXT) program to change how we interact, serve, and communicate with customers. This

program will replace out-of-support platforms to mitigate existing risk to National Grid's self-service billing, payment, and communications portals. It will set the foundation for the processes and technology changes needed to drive step improvements to the customer experience. The program will focus on re-engineering the customer's digital interactions to create a universal and seamless customer experience through multiple service options: Web, Mobile, Text, Email, and future emerging channels.

The Customer Experience program⁶ project start-up experienced delays in requirements identification, commercial negotiations and vendor onboarding resulting in project delays and reduced project spend. There was no change in work scope, and the overall estimate has not changed.

Customer Contact Center Technology Upgrade Implement Solution (INVP 3932) –

This project will replace core call center technologies, hardware, and software that currently are being utilized by National Grid's U.S. Customer Contact Centers or shared among other business units, such as Dispatch, Accounts Processing, Payroll, Procurement, Human Resources, and Collections. These technologies are either no longer supported by the vendor or are unavailable in the market. Some of the technologies that will be replaced with upgraded offerings and transitioned to a single vendor support model include the Automatic Call Distribution system, Interactive Voice Response (IVR), Computer Telephony Integration (CTI), Call Center Workforce Management (WFM), and Call Recording/Quality Monitoring.

The original scope of the project included an upgrade to call centers administered internally by National Grid; however, the scope of the project was expanded to include call centers administered by third party vendors to ensure that all customers had the same experience regardless of the call center they were directed to. The project delays have resulted in costs shifting from FY19 Q3 to FY19 Q4 and FY20 Q1. This project is being phased in. The internal call center was migrated during Q4 and the Syracuse Contact Center was migrated in May 2019. The Downstate and Northborough Contact Centers will be migrated in June.

US CNI GMS SCADA Upgrade and Consolidation (INVP 3737) – This project replaces the end-of-life US Gas Management System (GMS), with a new modern platform that meets the need of the US Gas Control function and is compliant with IT Digital Risk and Security Cyber Security standards. The project will upgrade the existing SCADA system used to monitor and control National Grid's various Gas Systems throughout the US territory. The current system is considered end-of-life because the hardware is obsolete, and the operating system is no longer commercially supported.

⁶ The two projects are: (1) CXT "My Account" MVP Project (INVP 4750D), which will implement a series of customer experience improvements to customer-related web platforms; and (2) New Electric Connections (INVP 4411C), which will deliver near real-time information to trade allies and customers on the status of their electric connections. The New Electric Connections project will build upon the previously delivered Distributed Generation portal by adding additional templates and workflows for electric connections.

This project was managed and ready to Go-Live in mid-November 2018. As a precaution, National Grid delayed the Go-Live date to coincide with the end of the heating and storm season. Variance due to higher corporate charges and lower labor expenditures than originally estimated. This project was placed into service on March 21, 2019.

Contract Management Solution for CCDI (INVP 4771A) – This project leveraged IT automation and system enhancements to deliver a tool to manage electric capital project contracts and invoices and supporting change order management processes.

The project scope related to SAP integrations was reduced and there was a delay in purchase of some Unifier licenses. In addition, all Verizon firewall changes have been accepted as a part of business as usual contract and not charged as a cost of the project. The Commercial Management team also negotiated cost savings with Oracle including the inclusion of training materials from Oracle resulting in further savings. This project was placed in-service on November 30, 2018.

Reporting & Analytics for CCDI (INVP 4771C) – This project is part of the CCDI, which will leverage IT automation and enhancements to improve the delivery of major electric and gas capital projects. Specifically, this project will develop a series of dashboard reports, including Earned Value, Finance Forecast, and Milestones, that will aid in the delivery of electric and gas capital projects. The dashboard information will increase the visibility of project risks and costs so they can be managed more effectively and enable improved decision-making. The project was placed in-service on January 28, 2019.

Storms-IScheduler Upgrade Stabilization (INVP 4398) – As the primary work management and scheduling tools for the legacy National Grid service territories, STORMS and IScheduler are critical applications that support electric and gas operations. The applications have become increasingly unstable, experiencing multiple outages over the past several years and lacking vendor support. The project will upgrade STORMS to the latest version of technology including server hardware, system and database software, and standard and custom applications. The investment will also replace the aged middleware (software between business applications and systems) components with new, supported components. As part of the project, IScheduler will be replaced with the vendor's latest scheduling tool and integrated with the STORMS product. The project incurred increased spending over original budget because of (1) the technical complexity of the solution across 80 system interfaces requiring additional vendor resources; and (2) issues identified in the user acceptance testing for resolution prior to end-to-end testing and solution go-live. The upgrades are planned to be implemented in June 2019.

Gas Capacity Review Database (INVP 4468) – The Gas Capacity Review (GCR) Application is a critical application for daily gas operations for gas sales models, engineering analyses on gas capacity, and customer gas load requests. The current GCR application and supporting database does not satisfy business scalability and reliability standards. This project will migrate the GCR database to an enterprise level solution, provide additional automated monitoring tools for production assets, and enhance support and application availability.

The project costs increased in FY19 due to a scope expansion to include additional users for the technology solution. The increased scope resulted in additional vendor costs and a shift of dollars from FY18 to FY19. This project was placed in-service February 12, 2019.

Time Entry and Approval Mobility Enablement (INVP 4779) - This project allowed National Grid to improve its end-to-end time entry and time approval process across the US organization. Through the deployment of mobile technology, National Grid was able to eliminate its current manual time capture processes and enable supervisors to efficiently review and approve employee time entry. In addition, this project benefitted National Grid operating companies including Niagara Mohawk by improving the quality of data; the timeliness of time entry by eliminating the lag inherent in paper-based time entry process; efficiency of time approval process and improving overall payroll processing time by reducing data entry errors. Storm response activities in the winter of 2018 delayed rollout of the program to FY19. The project was placed in-service on April 23, 2018.

US SAP: Concur Licenses (INVP 4662) - This project implemented an end-to-end corporate travel booking and expense process. Concur allows setup of customizable audit rules which facilitate review of expense items. This is the second phase of the investment, following last year's license agreement which was completed as part of a broader negotiation with SAP, via a discounted pricing model. The project was placed in-service on April 23, 2018.

Supervisor Enablement iPad Rollout (INVP 4811) – This project will deliver tools and capabilities that will enable field supervisors to spend more time in the field supervising their crews. Many of the systems and capabilities in use today require field supervisors to spend a portion of their day in the office where they have access to the information and applications needed to do their jobs. This investment will extend the office out to the field, providing access to many of the systems and capabilities so supervisors can perform the work remotely while working in the field with their crews. This will be done utilizing iPads with new applications and capabilities that will provide remote access to the National Grid network in addition to remote application functionality. This functionality includes access to Standard Operating Procedures, Policies and documents, safety information and assessments, network diagrams and asset information, time entry and approval, expense review and approval, crew locations, and job information.

Project activities commenced later than originally planned. This project originally was planned for April; however, the project did not begin until June 2018. In January 2019, a decision was made to descope the complex capabilities running on the CITRIX platform. These will need a broader strategy and will not be completed in this project. Therefore, the year-to-date spend is below the planned budget.

C. **Technology/Infrastructure Foundation and Reliability**

EMS Lifecycle Hardware and Software Upgrade (INVP 4914) – This project is an initiative to upgrade the current Energy Management System (EMS) and requires

replacement of the application and networking hardware. The hardware and software supporting EMS and related networks is no longer supported by vendors and increases risk to National Grid of not being able to recover from a system failure, resulting in the inability of operations to monitor and control the electric transmission and distribution systems, and the potential for customer service interruptions.

Spending increases that have been incurred year-to-date reflect increased complexity, scope, and regulatory/compliance requirements that required additional hardware, software, and labor costs.

Document Management Systems Replacement-Delivery (INVP 4408) – The Document Management Systems used to store, retrieve, and update electric, gas, and power plant engineering drawings and documents at National Grid are beyond their useful lives and are creating an unacceptable risk. This investment will deploy the Open Text Document Management System. The new Document Management System will provide a secure and reliable storage solution to serve the needs of the gas and electric business units. Project underspend year to date primarily was caused by commercial negotiation delays with the vendor. Therefore, costs budgeted for FY19 will be incurred in FY20.

US Foundation Hosting Renewal (INVP 4761) – This project will consolidate datacenters for SAP and HANA under one platform for both primary and Disaster Recovery (DR) in the US with the newly selected service provider, Freudenberg Information Technology (FIT). Increased complexity has led to the year-to-date overspend. Further, to reduce the risk of Sarbanes-Oxley compliance sensitivity at calendar and fiscal year end, the project has been split into two phases and the completion date has been moved to the June 2019 timeframe. The added complexity and timeline extension will result in the project exceeding its budget and timeline.

Data Visualization Evolution (INVP 4768) – The investment will further advance data analytic capabilities within National Grid to include: advanced analytics and reporting, providing access and storage to data types that are currently not accessible within the platform and utilizing the technology to assist in determining electric and gas load growth and predicting system failures. The project is the next phase of a strategic initiative to utilize data analytics to enhance overall decision making.

The project was completed ahead of schedule and under budget with an actual go live date in January 2019. To meet this schedule more work was performed in FY19 than originally planned. As a result, this project was over budget in FY19 but about \$0.500 million under budget for the overall project. This project was placed in-service on January 25, 2019.

Data Visualization Expansion (INVP 4606) – This investment will advance the capabilities and use of visualization and data analytics within National Grid. The new capabilities will: (1) Allow access to additional types of data; (2) Cleanse and store data; and (3) Provide advanced analysis and reporting of data. Further, this investment will advance and build on the foundation created as part of the Data Visualization core project.

The project is complete. Underspend of \$0.390 million is primarily due to licensing discounts and revised plan on additional Data Analytics tools. This project was placed in-service on July 12, 2018.

Active Directory Improvements (INVP 4489) – This initiative will implement a refreshed Active Directory (AD) infrastructure and support services. AD is a key service that supports authentication for all National Grid computers and servers logging into the corporate network. The new AD environment will also unify all global applications that use the AD service. It is critical that National Grid can ensure that the AD service is reliable and supports core authentication requirements to all current and proposed applications. Slower than anticipated progress on partner engagements has resulted in lower than forecast spend.

SOE (Windows) Upgrade and Device Refresh (INVP 4987) – This project will upgrade the standard operating environment (SOE) from Windows 7 to Windows 10 because Microsoft will not support or provide security patches for Windows 7 beginning in January 2020. To ensure that the end-user device estate continues to be reliable, secure, and can meet new business demands, it is important that the operating system provides good performance and is fully supported by the software vendor. The project will perform an analysis of the current environment, gather requirements, and develop a design to roll out Windows 10 to all end users. The result will be provision of enhanced operating system capabilities, better security and management of devices, and an improved user experience. The project has been delayed because it was reprioritized by the business.

IOAP Phase 2 Screens CDEF (INVP 5037) – In the September 2016 New York Interconnection Online Application Portal (IOAP) Functional Requirements report, utilities were given a recommended deadline of “end of 2017” to automate New York Standard Interconnection Requirements (NY SIR) technical screenings in the IOAP Phase 2. Final requirements for screens C-F were published by the PSC in April 2018. Automation of preliminary technical screens A and B was delivered in January 2018. This project will deliver on automating the preliminary technical screens C-F, including upgrading the Company’s CYME power system engineering software to a server-based platform to support the automation. The upgraded system will eliminate multiple manual processes and workarounds for distribution planning engineers across the National Grid US service territories.

Underspend on the project through FY19 is due to: 1) Project schedule shift; 2) internal and external resource optimization; and 3) unused risk. The project is still forecast within the project sanction.

ICE Replacement - Office 365 Implementation (INVP 4491) – This investment is required to replace the current Instant Messaging, Collaboration, and Email (ICE) services with a set of similar, or enhanced, services provided by Office 365. Office 365 will provide a more effective collaboration and email service (Microsoft Office 365) to meet business demand for additional capabilities (e.g., collaboration with customers and external parties)

and provide any enabling infrastructure technology necessary before the ICE service contract expires.

Spending increases incurred year-to-date reflect unexpected application integration issues with Active Directory, which is utilized to authenticate user access to networks and system applications. Also, the Microsoft System Center Configuration Manager (SCCM) version within the environment utilized to install software packages on end user devices required an upgrade to deploy Office 365 applications. Additionally, external internet gateway equipment required alternative and secure routing of communications to support the traffic required for Office 365 applications. The project is expected to be in-service in June 2019.

Apps Interface Remediation (INVP 4706) – This project will upgrade 76 Java Composite Application Platform Suite (JCAPS) interfaces residing on unsupported legacy middleware infrastructure to the current National Grid strategic middleware platform using the Comprehensive Integration Services Framework (CISF). These interfaces support critical operational applications, such as Mobile Work Management (MWORK), SAP Supply Chain Management (SCM), Customer Service System (CSS), and Supervisory Control and Data Acquisition (SCADA) at National Grid. Many of these applications support key operations that would be impacted if one of the JCAPS interfaces were to fail. Unsupported middleware infrastructure poses security risks and can affect National Grid Service Level Agreements (SLAs) in the event of a failure.

The project was completed ahead of schedule and under budget with a go-live date of December 11, 2018.

Attachments 3 and 4 provide, respectively, details on discontinued investments that are no longer being pursued in the current fiscal year and emerging projects (*i.e.*, walk-ins) approved for inclusion in the FY19 Plan as part of the Portfolio Calibration Management process discussed below.

V. Portfolio Calibration

IT utilizes a formal monthly process referred to as the “Portfolio Calibration Management” process to manage requests for new or additional project funding beyond the FY19 IT Investment Plan budget. Each proposed project or existing project that is seeking incremental funding submits a budget exception request (“BER”), which is confirmed by the business sponsor and the IT Finance team with a final approval made by either the Head of Program Delivery or the US Chief Information Officer (“CIO”). The requests for new project funding (*i.e.* walk-ins) occur for various reasons including, but not limited to, business priority changes and emerging regulatory mandates. Requests for additional funding on an existing project are generally driven by a project scope change, increase in project complexity, or acceleration of a multi-year project. A BER is also required to transfer funding from a program within the Plan that incorporates several IT projects or investments (*e.g.*, DRS Future Program, Customer Experience Transformation Technology Program, and FY19 Unplanned Mandates) to the individual projects that will utilize the funding. BERs can utilize underspend from other IT projects or programs in whole or in part and can also be funded incrementally by a sponsoring business area budget.

Attachment 5 includes a report on budget exception requests by program category and top ten projects based on allocation to Niagara Mohawk.

VI. Annual Reporting Requirements

Pursuant to the Commission's March 15, 2018 Order in Cases 17-E-0238 and 17-G-0239, the Company is required to file the following additional information with the fourth quarter report: (i) an explanation of any cost or timeline difference exceeding ten percent for projects completed; (ii) the latest partial, full, re-sanction or closure paper for any projects exceeding \$1 million that were authorized during the rate year; and (iii) performance on the IT capital cost incentive.

Cost or Timeline Variance

Attachment 6 provides a summary explanation for all projects completed in FY19 where there is a cost or timeline difference exceeding ten percent.

Sanction Papers for Projects exceeding \$1 million

Attachment 7 includes a list of investments and the corresponding sanction papers authorized during the rate year for projects greater than \$1 million. These include the latest partial, full, re-sanction or closure paper.

IT Capital Investment Cost Incentive

Joint Proposal section IV.8.3 includes an IT Capital Investment Cost Incentive that allows the Company to retain 20 percent of any savings on the Company's capital costs for identified IT projects. This incentive applies to the Green Button Connect project. The Green Button Connect project is scheduled to begin in FY20. A "Feasibility and Assessment" study will be completed to determine project requirements. The planned in-service date is March 31, 2021.

ATTACHMENT 1

Niagara Mohawk Power Corporation d/b/a National Grid
 Q4 FY19 Report
 Attachment 1
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Niagara Mohawk Power Corporation d/b/a National Grid
 Fiscal Year 2019 Quarter 4
 QTD and YTD Actuals vs FY19 IT Investment
 Plan Budget
 Amounts in Millions of USD

Project Name	INVP #	Forecasted In Service Date	Allocation Code	NMPC Total Percent	Total Service Company Capital Spending							YTD Absolute Variance %	YTD Variance Driver	Commentary	
					Quarter 4 Budget	Quarter 4 Actual	Quarter 4 Variance	YTD Budget	YTD Actual	YTD Variance	Annual Budget				
Customer Experience Transformation technology program **	4750	2/6/2020	C175	32.0%	\$ 5.5	\$ 2.1	\$ 3.4	\$ 11.4	\$ 4.6	\$ 6.8	\$ 11.4	60%	Commercial Negotiation Delays	The Customer Experience program project start-up experienced delays in requirements identification, commercial negotiations and vendor onboarding resulting in both project delays and project spend. There was no change in work scope, and the overall estimate has not changed. As expected, the project spend has increased in the most recent quarter with on-boarding of the design vendor and developmental resources.	
Customer Contact Center Technology Upgrade Implement Solution	3932	10/18/2019	C175	32.0%	0.0	0.6	(0.6)	9.1	10.0	(0.9)	9.1	9%	N/A +/- 10%	The original scope of project included upgrade to Call Centers administered internally by National Grid; however the scope of the project was expanded to include call centers administered by 3rd party vendors to ensure that all customers had the same experience regardless of the call center they get directed to. The project delays have resulted in costs shifting from FY19 Q3 to FY19 Q4 and FY20 Q1. This project is being phased in. The internal call center was migrated during Q4 and the Syracuse Contact Center was migrated in May 2019. The Downstate and Northborough Contact Centers will be migrated in June.	
US CNI GMS SCADA Upgrade and Consolidation	3737	6/30/2019	C210	16.9%	1.0	0.1	1.0	5.3	3.6	1.7	5.3	32%	Reprioritized by business to start later in FY	Project was managed and ready to Go-Live mid-November 2018. As a precaution, a decision was made by management to delay the Go-Live date to coincide with the end of the heating and storm season. Variance due to higher than expected corporate charges and lower labor expenditures than originally estimated. This project was placed into service on March 21, 2019.	
Contract Management Solution for CCDI	4771A	11/30/2018	G148	27.5%	0.2	0.1	0.1	2.9	1.6	1.2	2.9	43%	Complexity Decrease	Project is complete. The project scope related to SAP integrations was reduced and in addition there was a delay in purchase of last batch of Unifier licenses. In addition, all Verizon firewall changes have been accepted as a part of our business as usual contract and not charged as a cost of the project. The Commercial Management team also negotiated cost savings with Oracle including the inclusion of Training materials from Oracle resulting in further savings. This project was placed in-service on 11/30/18.	
Reporting & Analytics for CCDI	4771C	1/28/2019	G148	27.5%	0.2	0.1	0.0	2.0	1.9	0.1	2.0	5%	N/A +/- 10%	Increased support for best practice development, creating templates and training materials. All delivered post go-live. This project was placed in-service on 1/28/19.	
Storms-IScheduler Upgrade Stabilization	4398	7/15/2019	G160	41.9%	0.0	0.4	(0.4)	1.3	2.9	(1.6)	1.3	119%	Complexity Increase	Cost increase due to increase technology complexity. The schedule has been extended with dedicated resources including project manager, integration lead and test lead. Additional infrastructure has been added (space, servers, environments).	
Gas Capacity Review Database	4468	2/12/2019	C210	16.9%	0.0	0.6	(0.6)	1.0	1.4	(0.5)	1.0	50%	N/A +/- 10%	The project costs increased in FY19 due to an approved expansion in scope to include additional users for the technology solution. The increased scope resulted in additional vendor costs and a shift of dollars from FY18 to FY19. This project was placed in-service on 2/12/19.	
Time Entry and Approval Mobility Enablement	4779	4/23/2018	G020	26.1%	0.0	0.1	(0.1)	0.9	1.0	(0.1)	0.9	16%	N/A +/- 10%	February 2018 storm delayed rollout of program in FY18 - these costs were subsequently incurred in FY19. This project was placed into service on April 23, 2018.	
US SAP: Concur Licenses	4662	4/23/2018	G020	26.1%	0.0	0.2	(0.2)	0.7	0.6	0.1	0.7	13%	Accounting Changes - Reclass to/from Other INVP	This project is complete. Accrual re-class to INVP 4970- hosting. This project was placed into service on April 23, 2018.	
Supervisor Enablement iPad Rollout	4811	9/30/2019	N012	40.2%	0.4	0.2	0.2	0.7	0.4	0.3	0.7	44%	Reprioritized by business to start later in FY	Project activities commenced later than originally planned. This project originally was planned for April; however, the project did not begin until June 2018. In January, a decision was made to descope the complex capabilities running on the CITRIX platform. These will need a broader strategy and will not be completed in this project. Therefore, the year-to-date spend is below the planned budget.	
Other Business Programs and Projects					0.3	2.7	(2.3)	5.1	7.0	(1.9)	5.1				
Total Business Programs and Projects					7.6	7.2	0.4	40.4	39.1	1.3	40.4	3%			

Niagara Mohawk Power Corporation d/b/a National Grid
 Q4 FY19 Report
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Niagara Mohawk Power Corporation d/b/a National Grid
 Fiscal Year 2019 Quarter 4
 QTD and YTD Actuals vs FY19 IT Investment
 Plan Budget
 Amounts in Millions of USD

Project Name	INVP #	Forecasted In Service Date	Allocation Code	NMPC Total Percent	Total Service Company Capital Spending							YTD Absolute Variance %	YTD Variance Driver	Commentary
					Quarter 4 Budget	Quarter 4 Actual	Quarter 4 Variance	YTD Budget	YTD Actual	YTD Variance	Annual Budget			
DRS future programme **	3683	4/30/2020	G020	26.1%	4.2	1.9	2.3	8.6	2.9	5.8	8.6	67%	Scope Refinement	The Company conducted a review of its cyber strategy and roadmap to ensure the proper cyber capabilities were being delivered to keep pace with the evolving threat and the most pertinent areas of cyber risk were being addressed. The review resulted in a reprioritization of the DRS program, with several new initiatives being identified to address emerging critical cyber risks, and in some cases, delays to a subset of projects to future years of the program. This reprioritization has resulted in less spend, year-to-date, compared to budget. There are 30 projects in flight in various phases. DRS future program line item consists of 12 pre-prioritized initiatives that does not give visibility to the full scope of work for the program.
Capitalized equipment installs/replacement	3617	3/31/2019	G020	26.1%	0.8	2.9	(2.1)	3.3	7.2	(3.9)	3.3	118%	Other	This is a blanket order for physical security changes. Increase in spend due to acceleration of upgrades for system related equipment that is at "end-of-life" and no-longer supported by manufacturers as well as an increase in break/fix activity.
US SAP: Infrastructure Landscape- FY19	4970	3/31/2019	G020	26.1%	1.3	(3.1)	4.4	2.6	(0.8)	3.5	2.6	132%	Other	INVP 4970 is a funding source for hosting charges which are allocated to benefitting projects quarterly. Projects incurring the capital expense include INVP 4662, Concur and INVP 4779, Time transformation Mobility. The hosting charges are higher than budgeted for FY19 because the migration to a new vendor (FIT) that is being performed as part of INVP 4563 has been delayed until FY20. Consequently, the Company will continue to incur the higher rates charged by the current provider. Consequently, costs previously charged to this INVP have been transferred to the projects that utilized these hosted environments.
Gateway Upgrades (vStig Scaling Upgrades)	4975USG	6/30/2019	G020	26.1%	0.0	0.2	(0.2)	2.2	0.4	1.8	2.2	82%	Scope Change Decrease	The variance is due to project scope was refined which reduced overall cost of project. Rather than replacing CISCO Anyconnect, it was upgraded and the DLP component was removed. Anyconnect has been installed on nearly 100 devices. Work will continue into Q1 FY20.
US SAP: FERC on HANA (FOH) Upgrade	4563	8/7/2019	G020	26.1%	1.0	1.3	(0.4)	1.9	1.5	0.4	1.9	22%	Commercial Negotiation Delays	This project was reprioritized by the business to start later in the fiscal year. The total spend will align with initial estimates, currently running under budget due to delayed start.
US MDS-Energy Accounting System (EAS) migration to Wholesale Settlement Application (WSA)	4481	10/1/2020	521T/541T	50.0%	1.1	0.3	0.8	1.9	0.5	1.5	1.9	76%	Commercial Negotiation Delays	Vendor availability caused delays that impacted timing of project startup activities and associated cost incurrence. Project is expected to be delivered within sanctioned amount, however, the schedule will be impacted by this delay.
NY Stack VDER and Portal Integration	5160	12/31/2020	521E	100.0%	0.7	-	0.7	1.5	0.0	1.5	1.5	100%	Reprioritized by business to start later in FY	Project start pushed to September 2019 in order for resources assigned to 2 other active projects to be leveraged for this project due to their subject matter expertise. Additionally, there are only 6 customers on this new rate, therefore, manual billing can continue in the business with no problems.
NY Gas Service Line Inspection	5175	4/8/2019	G116	55.7%	0.7	0.5	0.2	1.5	0.9	0.6	1.5	40%	Accounting Changes - Reclass to/from OPEX/CAPEX	Sanctioning delays resulted in commercial negotiation delays on vendor Statement of Work (SOW) and resource ramp up of project. Partial Sanction provided in August. Solution is identified as SaaS (Software as a Service). SaaS costs are not capitalized and are billed monthly resulting in a decrease from originally estimated project costs. This project is now on track and resources have ramped up. In-Service date of April 2019 is still applicable. Capital charges are anticipated to be \$0.7M less than originally estimated due to successful negotiation of the SAAS contract.
Annual HR & Payroll Mandatory Service Pack Upgrade (HRSP) - FY19	4965	12/10/2018	G020	26.1%	0.0	0.3	(0.3)	1.0	1.1	(0.1)	1.0	6%	Reprioritized by business to start later in FY	The project was delayed at the beginning of the year because of competing priorities delaying associated project costs. While the project was put into service in December, once all invoices have been processed, the forecasted project spend is expected to be in line with budget. This project was placed in service on December 10, 2018.
IAM- Privilege Access Management (PAM) - Ph2	3683USAP	5/31/2019	C175	32.0%	0.4	0.2	0.2	0.8	0.6	0.3	0.8	32%	Internal Resource Constraints	Project delayed due to work required to complete SOX audit and resource constraints that required project workshops to be scheduled in Jan 2019. Therefore, project costs will be delayed accordingly.
Other Regulatory, Legal and Compliance Mandates					9.0	7.6	1.4	23.8	14.1	9.7	23.8			
Total Regulatory, Legal and Compliance Mandates					19.2	12.0	7.1	49.3	32.3	17.0	49.3	34%		

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Niagara Mohawk Power Corporation d/b/a National Grid
 Fiscal Year 2019 Quarter 4
 QTD and YTD Actuals vs FY19 IT Investment
 Plan Budget
 Amounts in Millions of USD

Project Name	INVP #	Forecasted In Service Date	Allocation Code	NMPC Total Percent	Total Service Company Capital Spending							YTD Absolute Variance %	YTD Variance Driver	Commentary
					Quarter 4 Budget	Quarter 4 Actual	Quarter 4 Variance	YTD Budget	YTD Actual	YTD Variance	Annual Budget			
EMS Lifecycle Hardware and Software Upgrade	4914	5/15/2020	T186	34.2%	3.7	2.7	1.0	8.4	9.7	(1.3)	8.4	16%	Scope Refinement	The hardware and software supporting EMS and related networks is no longer supported by vendors and is creating risk to National Grid of not being able to recover from a system failure, resulting in the inability of operations to monitor and control the transmission and distribution electric systems, and the potential for customer service interruptions. Spending increases incurred YTD reflect increased complexity, scope, and regulatory /compliance requirements that required additional hardware costs, software, and labor.
Document Management System Replacement Delivery	4408	11/22/2019	G149	26.3%	2.2	1.0	1.2	5.2	3.1	2.1	5.2	40%	Commercial Negotiation Delays	Delays incurred previously have pushed expenditures into FY20, thereby reducing the FY19 forecast.
US Foundation Hosting Renewal	4761	6/23/2019	G020	26.1%	0.0	2.0	(2.0)	2.4	5.9	(3.5)	2.4	147%	Other	Increased project complexity has led to the YTD overspend. Management decision made in Nov. 2018 to break project into two phases to reduce risk against SOX-Compliance sensitivity at calendar and fiscal year-end: HEC HANA move to FIT Dec 2018 and T-Systems move to FIT 2nd Qtr. 2019. Given the contention of other SAP activity -- the first available window for our 2nd phase go-live is June 20-23rd. Project will be going for resanction approval May 8th at the USSC meeting
Data Visualization Evolution	4768	1/25/2019	G020	26.1%	1.0	0.7	0.3	2.1	2.4	(0.3)	2.1	12%	Other	The total sanctioned amount for the project is 2.868M with an original go live date at the end of the first quarter in FY20. The project was completed ahead of schedule and under budget with an actual go live date in January 2019. To meet this schedule more work was performed in FY19 than originally planned for. As a result, we were over budget in FY19 but about 500K under budget for the project. This project was placed in-service on January 25, 2019.
Data Visualization Expansion	4606	7/12/2018	G020	26.1%	0.0	0.0	(0.0)	2.1	1.5	0.6	2.1	28%	Other	Project is complete. \$390k of underspend primarily due to licensing discounts and revised plan on additional Data Analytics tools. This project was placed in-service on July 12, 2018.
Active Directory Improvements	4489	6/13/2019	G020	26.1%	1.0	0.2	0.7	2.0	0.6	1.4	2.0	71%	Internal Resource Constraints	Slower than anticipated progress on partner engagements due to project manager resource constraints in the US has resulted in lower spend than forecast.
SOE (Windows) Upgrade and Device Refresh	4987	1/6/2020	G020	26.1%	0.9	0.4	0.5	1.8	0.5	1.3	1.8	73%	Reprioritized by business to start later in FY	Project has been delayed as it was reprioritized by the business.
IOAP Phase 2 Screens CDEF	5037	11/18/2019	521E	100.0%	0.6	0.2	0.4	1.6	0.6	1.0	1.6	65%	Internal Resource Constraints	Underspend is due to: 1) Project schedule shift as compared to the originally budgeted schedule; 2) internal & external resource optimization; 3) unused risk. Project is still forecasted within the project sanction despite the delay in startup as project plans were finalized, efficiencies were found and refinements made to project cost which mitigates the impact of the delayed start.
ICE replacement - Office 365 Implementation	4491	6/28/2019	G020	26.1%	0.0	3.0	(3.0)	1.1	6.5	(5.4)	1.1	490%	Complexity Increase	Spending increases incurred YTD reflect unexpected application integration issues with Active Directory. Also, the Microsoft System Center Configuration Manager (SCCM) version within the environment is not compatible with upgrade pushes to Office365 applications and users cannot manually pull installations of the file which required remediation. Finally, external internet gateway equipment could not handle the amount of traffic required for Office365 applications and required alternative and secure routing of communications.
Apps Interface Remediation	4706	12/11/2018	G020	26.1%	0.1	0.0	0.0	1.1	0.8	0.3	1.1	29%	Business Resources Unavailable	The project was completed ahead of schedule and under overall budget with a go live date of December 11, 2018.
Other Technology/Infrastructure Foundation and Reliability					3.8	6.8	(3.0)	12.6	8.9	3.7	12.6			
Total Technology/Infrastructure Foundation and Reliability					13.2	17.0	(3.7)	40.3	43.8	(3.5)	40.3	9%		
FY19 CAPITAL INVESTMENT TOTALS					\$ 40.0	\$ 36.2	\$ 3.9	\$ 130.0	\$ 115.2	\$ 14.8	\$ 130.0			
Programs with ** consist of several individual projects.														

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Niagara Mohawk Power Corporation d/b/a National Grid
 Q4 FY19 Report
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Niagara Mohawk Power Corporation d/b/a National Grid
 IT Service Company Capital allocated to Operating Companies as Rent Expense
 Fiscal Year 2019
 Quarter 4

Work Order	SAP Project Name	INVP #	Actual In Service Date	Allocation Code	Project To Date Cost	G Allocation	G Rent-Return	G Rent - Depn	E Allocation	E Rent-Return	E Rent - Depn	T Allocation	T Rent-Return	T Rent - Depn
90000150067	US CNI GMS SCADA Upgrade & Consolidation	3737	3/21/2019	C210	16,141,563	16.95%	50,083	-	0.00%	-	-	0.00%	-	-
90000188992	Enterprise Mobility Management Services - Phase 2	4714	2/28/2019	G020	1,339,700	4.53%	1,090	723	15.59%	3,749	2,486	5.54%	1,334	884
90000189698	Gas Service Database (DNY)	3948	3/10/2019	G225	403,531	0.00%	-	-	0.00%	-	-	0.00%	-	-
90000201199	Gas Service Database (UNY)	3949	3/10/2019	521G	251,162	100.00%	4,510	2,990	0.00%	-	-	0.00%	-	-
90000189730	New Electric Connections	4411C	1/28/2019	C198	1,245,766	0.00%	-	-	47.63%	10,447	14,128	0.00%	-	-
90000190837	Gas Capacity Request Database	4468	2/12/2019	C210	1,008,520	16.95%	3,010	4,070	0.00%	-	-	0.00%	-	-
90000192346	CRIS Transactional Email	5180	1/28/2019	C343	420,303	0.00%	-	-	0.00%	-	-	0.00%	-	-
90000192499	US End Point Security	3683USA	2/28/2019	G020	1,521,309	4.53%	1,238	821	15.59%	4,257	2,823	5.54%	1,514	1,004
90000194041	US Perimeter Enhancements	4975USA	2/28/2019	G020	144,212	4.53%	117	78	15.59%	404	268	5.54%	144	95
90000194844	NE IPC Phone Upgrade	5120	2/15/2019	G272	209,997	0.00%	-	-	0.00%	-	-	0.00%	-	-
90000195204	Data Visualization Evolution	4768	1/25/2019	G020	2,574,349	4.53%	2,054	2,777	15.59%	7,064	9,553	5.54%	2,513	3,398
90000197308	New Electric Connections	4411C	3/25/2019	C284	425,769	8.67%	-	-	23.28%	-	-	0.00%	-	-
90000198522	UPS Replacement for Data Communications Closets	4003	2/5/2019	G020	154,686	4.53%	123	167	15.59%	424	574	5.54%	151	204
90000182375	UNIX51 Interface migration	4461	3/22/2019	G020	1,478,719	4.53%	1,226	-	15.59%	4,219	-	5.54%	1,501	-
90000201086	Data Visualization tools = Licenses	5582	1/31/2019	G020	319,469	4.53%	255	345	15.59%	877	1,186	5.54%	312	422
90000192076	Gateway Upgrades	4975USG	3/31/2019	G020	402,097	4.53%	334	-	15.59%	1,147	-	5.54%	408	-
FY19 IT Actuals					28,041,151		64,039	11,970		32,589	31,016		7,876	6,007

NMPC Gas Rent Expense \$ 76,009 NMPC Electric & Transmission Rent Expense \$ 77,488

SAP Alloc. Code	Description	Allocation Basis	NMPC - ELEC	NMPC - GAS	NMPC - TRANS	NMPC Total	ALL OTHER CO's	TOTAL
521G	Niagara Mohawk Gas	DIRECT	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%
G020	Generation, GW, Port Jefferson, Metrowest Realty,	G - General Allocator, 3-Point Allocation - Net Margin, Net Plant, and Net O&M.	15.59%	4.53%	5.54%	25.66%	74.34%	100.00%
G225	Keyspan KEDNY, KEDLI	G - General Allocator, 3-Point Allocation - Net Margin, Net Plant, and Net O&M.	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
G272	MA Electric and Trans, RI Electric and Trans	G - General Allocator, 3-Point Allocation - Net Margin, Net Plant, and Net O&M.	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
C198	NY, MA, RI Electric Distribution	C - Number of Customers	47.63%	0.00%	0.00%	47.63%	52.37%	100.00%
C210	NY, MA, RI Gas Distribution	C - Number of Customers	0.00%	16.95%	0.00%	16.95%	83.05%	100.00%
C284	NY, MA, RI Electric & Gas Distribution	C - Number of Customers	23.28%	8.67%	0.00%	31.95%	68.05%	100.00%
C343	MA + KEDNY Gas Distribution	C - Number of Customers	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%

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ATTACHMENT 4

Niagara Mohawk Power Corporation d/b/a National Grid
 New Capital Investment Demand not on FY19 Plan
 Fiscal Year 2019 Quarter 4
 Amounts in Millions of USD

Project Name	INVP #	Forecasted In Service Date	Allocation Code	NMPC Total Percent	TOTAL SERVICE COMPANY SPENDING							Q4 FY19 Variance Driver
					Q4 FY19 Budget	Q4 FY19 Actual	Q4 FY19 Variance	FYTD Budget	FYTD Actual	FYTD Variance	FY19 Budget	
EPA Portfolio Manager Integration Phase 2	5099	5/31/2019	C175	32.0%		0.2	(0.2)		0.3	(0.3)		New demand
AVLS - Old 3G Modem Replacement	5226	8/31/2019	G434	35.3%		0.8	(0.8)		1.9	(1.9)		New demand
East Pulaski Energy Storage System IS Network	5241	6/6/2019	521E	100.0%		0.1	(0.1)		0.1	(0.1)		New demand
Buffalo Energy Storage System IS Network	5242	12/13/2019	521E	100.0%		(0.0)	0.0		0.1	(0.1)		New demand
Rubber Goods Testing/Tracking System Replacement	5260	9/23/2019	G020	26.1%		0.0	(0.0)		0.0	(0.0)		New demand
Identity and Access Management Business Change Programme	5278	7/30/2019	G020	26.1%		0.4	(0.4)		0.4	(0.4)		New demand
Data Visualization tools = Licenses	5582	1/31/2019	G020	26.1%		0.3	(0.3)		0.3	(0.3)		New demand
Total Business Programs and Projects					0.0	1.8	(1.8)	0.0	3.2	(3.2)	0.0	
Lease Accounting Updates and Contract Management	5360	5/31/2019	G020	26.1%		3.6	(3.6)		3.6	(3.6)		New demand
GRC Archer - Risk and Migration	5472	9/29/2019	G020	26.1%		0.1	(0.1)		0.1	(0.1)		New demand
Total Regulatory, Legal and Compliance Mandates					0.0	5.5	(5.5)	0.0	6.9	(6.9)	0.0	
Primavera Upgrade/Stabilization	4990	2/27/2020	G020	26.1%		0.0	(0.0)		0.0	(0.0)		New demand
Network Modernization	5309	9/30/2019	G020	26.1%		0.0	(0.0)		0.0	(0.0)		New demand
Netmod Governance	5310	9/17/2019	G020	26.1%		0.3	(0.3)		0.4	(0.4)		New demand
NetMod Infoblox	5311	9/3/2019	G020	26.1%		0.5	(0.5)		2.3	(2.3)		New demand
NetMod Ethernet/SD WAN Upgrade	5312	9/11/2019	G020	26.1%		0.8	(0.8)		1.0	(1.0)		New demand
NetMod Zscaler Cloud Security Gateway	5313	5/4/2019	G020	26.1%		0.1	(0.1)		0.4	(0.4)		New demand
NetMod eBond/NSSR/SVC Catalog	5314	4/26/2019	G020	26.1%		(0.0)	0.0		0.3	(0.3)		New demand
End User - US T430 Refresh	5316	5/1/2019	N012	40.2%		0.7	(0.7)		2.4	(2.4)		New demand
Storage Purchase	5636	3/20/2020	G020	26.1%		3.7	(3.7)		3.7	(3.7)		New demand
Total Technology/Infrastructure Foundation and Reliability					0.0	6.0	(6.0)	0.0	10.3	(10.3)	0.0	
FY19 NEW DEMAND CAPITAL INVESTMENT TOTALS					\$ 0.0	\$ 13.4	\$ (13.4)	\$ 0.0	\$ 20.3	\$ (20.3)	\$ 0.0	

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Impact of Budget Exceptions on FY19 Capital Plan Categories

Investment Category	Budget Exception Amt \$M
Business Programs and Projects	1.363
Regulatory, Legal, and Compliance Mandates	-3.86
Technology/Infrastructure Foundation and Reliability	2.497
Total	(0)

Top 10 Projects in each Investment Plan Category Impacted by Budget Exceptions

Investment Category	INVP #	INVP# of Projects within a program	Project Name	Budget Exception Amt \$M	% change to FY19 Budget	Driver for Budget Exception Request
<i>Business Programs and Projects</i>						
	3737		US CNI GMS SCADA Upgrade and Consolidation	-0.783	14%	Reduced Shared Overhead cost
	3932		Customer Contact Center Technology Upgrade Implement Solution	0.206	2%	Increased scope
	4398		Storms-IScheduler Upgrade Stabilization	1.064	74%	Unexpeced technical complexity
	4468		Gas Capacity Request Database	0.536	51%	Reduced contingency costs
	4662		US SAP: Concur Expenses	-0.478	58%	Scope change - fewer licenses
		4750A	CXT-Strategic Alignment F&A	-0.18		
		4750B	CXT-MyAccount Service and Billing Functions F&A	0.196		
		4750D	CXT-MyAccount MVP	9.085		
		4750G	CXT MyAccount - Two way Outage SMS Communications	0.589		
		4411C	New Electric Connections	2.773		
	4750		Customer Experience Transformation technology program	-12.463	100%	Allocated to specific program projects
			Other Business Programs and Projects	0.818		Various
				1.363		Net Category Impact
<i>Regulatory, Legal and Compliance Mandates</i>						
	3617		Capitalized Equipment - installations / replacements	2.727	76%	Security equipment at end of life
		3683USAN	DNS Resolution & Protection	0.378		
		3683USAP	IAM-Privilege Access Management (PAM) - Ph2	0.69		
		3683USD	Develop Robust Incident Response	0.951		
		3683USO	Network Segregation	0.977		
		3683USX	Application Security As a Service	0.174		
		3683USF	Enterprise Centralized Patch Management	0.17		
		3683USH	Firewall Rule Clean up	0.118		
		5571	Gas Business Enablement Cyber Security Enhancements	0.37		
	3683		DRS future programme	-3.828	32%	Allocated to specific program projects
	4481		US MDS-Energy Accounting System (EAS) migration to Wholesale Settler	-0.157	7%	Scope reduction
	5156		Mandated IT Projects FY19	-4.903	94%	Allocated to specific program projects
	5160		NY Stack VDER and Portal Integration	-1.566	94%	Schedule change - move to FY20
			Other Regulatory, Legal and Compliance Mandates	0.04		Various
				-3.86		Net Category Impact
<i>Technology/Infrastructure Foundation and Reliability</i>						
	4408		Document Management System Replacement Delivery	-0.924	16%	Schedule change - move to FY20
	4606		Data Visualisation Expansion	-0.609	27%	Scope reduction - fewer licenses
	4914		EMS Lifecycle Hardware and Software Upgrade	6.778	74%	Scope Increase
			Other Technology/Infrastructure Foundation and Reliability Projects	-2.748		Various
				2.497		Net Category Impact
Total						(0)

ATTACHMENT 6

Niagara Mohawk Power Corporation d/b/a National Grid
 Delivered Investments in FY19 with Schedule Variance +/- 10%
 April 1, 2018 - March 31, 2019

Project Name	INVP #	Forecasted In-Service Date	Actual In Service Date	Variance in Schedule	Schedule Variation Commentary
Business Programs and Projects					
Gas Capacity Review Database	4468	2018 Sep 30	2019 Feb 12	32%	The project was put into service on February 12th, 2019. The project timeline increased due to an approved expansion in scope to include additional users in the Upstate New York region for the technology solution, and additional time needed to engage with our vendor partner on the additional scope and the need for additional contractual agreements based on the increased scope. The increased scope resulted in shift of the in-service date from September 2018, but the solution was implemented for all Gas Engineering and Customer Connections teams at National Grid, and included efficiency gains and automation for all Service Areas.
Cascade Electric Application Upgrade Project	3986	2018 Aug 31	2018 Nov 05	17%	The project was put into service on November 5th, 2018. The shift in forecast date by two months was the result of a dependency on the STORMS iScheduler project, which was delayed to the point that an executive decision was made to break the dependency to allow the Cascade Electric Upgrade to be deployed in advance of the STORMS upgrade. The deployment change required retesting to the legacy STORMS environment, as the original target application environment that had been tested was no longer applicable for the deployment window.
Ageing System Stabilization/Upgrades	4188	2018 Jun 15	2018 Sep 08	11%	This project consisted of 3 separate workstreams. The Schedule Variance was for the WS01 - AVLS – Vehicle Location System only, which had severe weather and a high number of storms that impacted the go-live date, along with a defective database server and modifications to the application configuration and testing.
Regulatory, Legal, and Compliance Mandates					
Enable Transactional Email in CRS	5180	2018 Sep 30	2019 Jan 28	44%	The schedule was delayed as a result of increased scope that resulted in 2 additional requirements; 1. Change in delivery method for eBill to new customers; 2. Delivery of Welcome Email. Additionally, several third party vendors had work delayed due to other NG projects, contention with NG IT Change Freeze, and other issues. The NG work stoppage along with IT third party vendor issues delayed activities around the middleware integration.
CXT-My Account Service and Billing Functions F&A	4750B	2018 Dec 31	2018 Oct 12	-15%	User Acceptance Test (UAT) for Positive ID and Office Meter Off were combined, creating regression test and overall delivery efficiencies. After UAT sign off the changes were deployed to production in Oct 2018.
Robotics / Process Automation Implementation	4941	2018 Aug 31	2018 Sep 25	10%	This project was impacted by: 1. delays in building out the secondary location of National Grid's strategic cloud node to host Robotic Process Automation's Disaster Recovery solution for virtual desktops and 2. delays with implementation of required network changes by ecosystem partner.
NMPC Rate Case	5159	2018 Apr 30	2018 Jul 27	27%	The project's forecasted go-live date in the R&D sanction paper was April 2018. The project was sanctioned for D&I with a go-live date of July 2018 once requirements were defined. Thus, there was a change in go-live dates. The project was sanctioned prior to the Joint Proposal being finalized to allow sufficient lead time to complete the changes.
Technology/Infrastructure Foundation and Reliability					
IAM Privilege Access Management (PAM) Phase 1	5214US	2018 Jun 01	2018 Dec 12	68%	Due to the need to demonstrate two consecutive quarters of successful SOX controls, the introduction of PAM Phase 1 was delayed to avoid changing processes midstream.

Niagara Mohawk Power Corporation d/b/a National Grid
Delivered Investments with Capital Spend Variance +/- 10%
April 1, 2018 - March 31, 2019

Project Name	INVP #	Forecasted Full Project Spend	Actual Capex	Variance	Capital Spend Variance Explanation
Business Programs and Projects					
Gas Capacity Review Database	4468	0.97	1.44	49.1%	The project was put into service on February 12th, 2019. The project CapEx increased due to an approved expansion in scope to include additional users in the Upstate New York region for the technology solution, and additional time needed to engage with our vendor partner on the additional scope and the need for additional contractual agreements based on the increased scope. The increased scope resulted in shift of the in-service date from September 2018, but the solution was implemented for all Gas Engineering and Customer Connections teams at National Grid, and included efficiency gains and automation for all Service Areas.
Ageing System Stabilization/Upgrades	4188	1.38	1.63	18.6%	Additional spend caused by longer testing period and additional server configuration required.
US CNI GMS SCADA Upgrade and Consolidation	3737	18.04	16.21	-10.1%	Variance due to lower labor expenditures than originally estimated.
dobleARMS	3982	0.64	0.33	-48.2%	The IT project CapEx was lower than forecast due to an approved reduction in scope for the IT project effort, limiting the work to the server and application installation, security and functional testing, and network integration. A parallel project led by the business (Substation O&M) addressed the installation of the networking equipment in the electrical substation for the pilot effort.
Mobile Material Assistant Upgrade (MMA)	4478	0.41	0.30	-26.9%	During the design phase it was determined by National Grid's Digital Risk & Security (DR&S) department that the Android barcode scanner would need to first be enrolled with AirWatch before it could connect to the National Grid's network for file sharing. This added additional scope and delays account for an increase of costs to the project.
Data Visualization Expansion	4606	3.74	3.17	-15.3%	The underspend is related to: 1. Reduced license costs - project team negotiated and procured licenses at discounted rates; 2. Lower number of licenses procured - licenses were managed efficiently within the project team and business users; 3. Lower than anticipated internal resource costs
US Control-Gas System Operating Procedure (SOP) upgrade	4480	0.34	0.26	-23.3%	Total project costs lower than forecast due to: 1. Project risk budget was not spent; 2. Project Resources were not needed to the extent allocated and in some cases they were released earlier than originally planned; 3. Vendor costs were lower than planned; 4. Initial estimates provided for licensing costs did not take into account agreements in place that provide for National Grid discounts.
New Arrearage Management Program	4421	0.51	0.58	12.8%	Due to late identification of stakeholders from Billing and Credit & Collections User Acceptance Test (UAT) took longer than planned .
Gas Service Database - UNY	3949	0.33	0.29	-10.1%	During the user acceptance testing, the business had requested a new requirement to retain the historical data. This along with the additional testing requirements has resulted in an extended testing phase, contributing to the overall capex impact
New Electric Connections	4411C	2.39	1.99	-16.8%	The project underspend is the result of optimizing technical resources, unused professional services for content mapping and unused risk.
Review of DRMS Proposals and Integration of Selected DRMS into National Grid Systems	4584	0.36	0.29	-19.5%	Project underspend is the result of changing from the Secure Cloud Infrastructure (SCI) approach to another, less costly approach.
EMM Phase II	4714	1.78	1.44	-19.4%	Project underspend is due to the equipment costs being less than the sanctioned estimate.
Data Visualization Evolution	4768	2.70	2.21	-18.1%	This project was completed in January 2019, ahead of the planned April 2019 completion date. Therefore, project underspend is the result of a reduction in labor costs.
GTIS - Slice of System	5108	0.91	0.64	-30.2%	The project underspend is the result of lower software costs, lower labor costs due to maximization of efficiencies and unplanned outages, as well as not using the project risk margin.
US Field Force Help Desk - MA Gas	5186	-	0.37	100.0%	When this project was originally sanctioned, there was no CAPEX planned. However, equipment was able to be capitalized moving costs from OPEX to CAPEX.
Regulatory, Legal, and Compliance Mandates					
Enable Transactional Email in CRS	5180	0.62	0.51	-16.6%	The project underspend is the result of scope reduction as the "opt-out" piece was descope.
CXT-My Account Service and Billing Functions F&A	4750B	0.26	0.49	87.2%	Delays in finalizing project scope necessitated the need for additional cost, based on detailed analysis changes for Budget bill, Account Overview, POS ID and Office Meter Off self-serve transactions.
Robotics / Process Automation Implementation	4941	0.95	1.06	11.7%	Additional System Integrator scope contributed to cost variance.

Niagara Mohawk Power Corporation d/b/a National Grid
 Delivered Investments with Capital Spend Variance +/- 10%
 April 1, 2018 - March 31, 2019

Project Name	INVP #	Forecasted Full Project Spend	Actual Capex	Variance	Capital Spend Variance Explanation
Gateway Upgrades (vStig Scaling Upgrades)	4975USG	2.18	0.45	-79.2%	The Gateway Project was reduced in scope. The first reduction was to upgrade Cisco Anyconnect rather than replace it. The 2nd reduction was to remove the data loss protection (DLP) component. This resulted in less spend than shown in the mandate.
Perimeter enhancements	4975USA	0.16	0.26	68.3%	Project overspend is due to identification and implementation of proxy rule changes that were more extensive and time consuming than originally planned as well as rule cleanup and port closing beyond original scope.
NE IPC Phone Upgrade	5120	0.49	0.83	67.2%	Project overspend is the result of revised vendor costs as well as additional IT cost identified after start-up.
Contract Management Solution for CCDI	4771A	3.04	1.80	-40.8%	Project underspend is the result of the project scope related to SAP integrations being reduced. In addition, all Verizon firewall changes have been accepted as a part of our business as usual contract and not charged as a cost of the project. Lastly, the Commercial Management team negotiated cost savings with Oracle, including the inclusion of training materials from Oracle resulting in further savings.
Add Effective Date to CSS-Customer System (NACHA)	5132	0.47	0.27	-43.6%	The Project underspend reflects a reduction in overall effort due to a reduction of scope - the business stakeholders reduced the number of financial institutions whose payments were included in the original estimates.
Website Security Protection	4975USD	0.19	0.24	23.0%	Oracle Migration schedule delays resulted in an increase in timelines subsequently increasing project cost.
Identity and Access Management (IAM) Unified Platform (IAM:Fine Grain Access Management)	4975USE	0.37	0.72	93.2%	Project overspend is the result of scope changes after the project was sanctioned.
@Risk Software for CCDI	4771D	0.09	0.06	-41.7%	Project underspend is the result of software license costs being less than forecasted.
<u>Technology/Infrastructure Foundation and Reliability</u>					
WiFi for Fleet Services Diagnostic Laptops	3956	0.68	0.51	-24.7%	Project underspend is due in part to a reduction in the number of resource days required by scheduling multiple sites to be activated on the same days thus sharing project team and engineering resources. The same team handled multiple activations concurrently reducing the overall cost of resources required. Likewise, site assessments were coordinated to allow for multiple sites to be assessed in a single day reducing total number of days required to perform assessments.
Apps Interface Remediation	4706	0.90	0.77	-14.6%	Project underspend is the result of the project team taking advantage of the opportunity to Go-Live earlier, therefore, requiring less resources from our eco-partner with a time and material (T&M) contract with National Grid, and also requiring less National Grid in-house resources.
MTC and Syracuse Boardrooms & Auditoriums	4759	0.35	0.29	-16.2%	Project underspend is the result of one less conference room being implemented as well as the cost per conference room being less than forecast.
IAM Privilege Access Management (PAM) Phase 1	5214US	0.59	0.80	34.9%	The project overspend is due to additional admin/professional services fees to ensure Sox testing was completed.

ATTACHMENT 7

Niagara Mohawk Power Corporation					
Information Technology Capital Investment Report					
Quarter Ended March 31, 2019					
FY19 Sanction Papers >\$1Million					
Inv ID	Name of Project	Total Investment (\$M)	Capital (\$M)	Date Sanctioned	Page Reference
1041	Closure for Two Energy Management Systems in New England and Upstate New York T&D	\$ 79.91	\$ 45.34	8/27/2018	Page 4
1185	OMS/DMS Platform Standardization & Enhancement Project	\$ 77.40	\$ 65.66	8/27/2018	Page 11
2577C	ARC FM Software Upgrade and System Enhancements	\$ 2.37	\$ 2.00	5/1/2018	Page 25
3430	EMM Phase 1	\$ 1.21	\$ 1.02	2/12/2019	Page 29
3839A	NY Retail Access Mandate Phase 1A	\$ 5.49	\$ 4.83	9/12/2018	Page 34
3882	NYS Pipeline Safety CMS Regulatory Compliance	\$ 1.89	\$ 1.67	5/1/2018	Page 39
4124	Automate Remote Net Metering	\$ 4.00	\$ 3.38	8/24/2018	Page 45
4217	US SAP: Business Planning Consolidation (BPC) - HANA	\$ 2.85	\$ 2.59	7/10/2018	Page 51
4397	SAP Ariba CI and TLS Upgrade	\$ 1.88	\$ 1.73	5/29/2018	Page 56
4400	Annual HR & Payroll Mandatory Service Pack Upgrade (HRSP) FY 18	\$ 1.55	\$ 1.24	11/13/2018	Page 62
4408	Document Management Systems Replacement Delivery	\$ 11.09	\$ 9.16	4/11/2018	Page 67
4411	New Customer Connections Program	\$ 8.36	\$ 6.67	7/11/2018	Page 85
4411C	New Electric Connections	\$ 3.04	\$ 2.39	9/20/2018	Page 105
4451	Gas Transportation System Phase II	\$ 1.68	\$ 1.23	5/1/2018	Page 110
4464	Data Visualization	\$ 8.28	\$ 8.18	1/9/2019	Page 115
4468	Gas Capacity Request Database	\$ 1.97	\$ 1.59	9/4/2018	Page 120
4489	Active Directory Improvements	\$ 2.39	\$ 2.24	4/11/2018	Page 133
4491	US 0365 Deployment	\$ 10.34	\$ 8.62	10/16/2018	Page 149

Niagara Mohawk Power Corporation					
Information Technology Capital Investment Report					
Quarter Ended March 31, 2019					
FY19 Sanction Papers >\$1Million					
Inv ID	Name of Project	Total Investment (\$M)	Capital (\$M)	Date Sanctioned	Page Reference
4529	Athena Phase 2	\$ 5.14	\$ 3.06	10/10/2018	Page 157
4662	Concur Expenses	\$ 3.06	\$ 2.50	2/5/2019	Page 162
4671	Mobile Devise Refresh FY17	\$ 3.95	\$ 3.95	6/12/2018	Page 167
4673	PI Enterprise Deployment	\$ 8.67	\$ 8.67	5/9/2018	Page 172
4729	Aquisition of Remote Sensing NY Areal Data	\$ 7.95	\$ 7.95	4/11/2018	Page 177
4750	Customer Experience Transformation Technology Program	\$ 12.57	\$ 9.73	12/12/2018	Page 182
4750D	CXT My Account MVP Project	\$ 10.13	\$ 9.45	2/1/2019	Page 200
4761	Us Foundation Hosting Renewal	\$ 8.36	\$ 6.62	10/10/2018	Page 207
4768	Data Visualization	\$ 2.87	\$ 2.70	6/19/2018	Page 214
4779	Time Entry and Approval Mobility Enablement	\$ 4.96	\$ 4.36	1/8/2019	Page 228
4821	NY Tax Remittance and Reporting Corrections	\$ 2.05	\$ 1.82	12/18/2018	Page 236
4914	EMS Lifecycle Hardware and Software Upgrade	\$ 19.17	\$ 16.78	5/29/2018	Page 249
4941	Process Automation Implementation	\$ 1.15	\$ 1.06	3/26/2019	Page 266
4965	Annual HR & Payroll Mandatory Service Pack Upgrade (HRSP) FY19	\$ 1.38	\$ 1.18	11/13/2018	Page 270
4970	US SAP Infrastructure	\$ 4.70	\$ 3.60	1/29/2019	Page 284
5156	Mandated IS Projects FY19	\$ 6.50	\$ 5.20	5/9/2018	Page 295
5199	AIX Upgrade	\$ 2.21	\$ 2.08	10/16/2018	Page 308
5226	AVLS Old 3G Modem Replacement	\$ 4.08	\$ 3.97	6/26/2018	Page 322

Niagara Mohawk Power Corporation					
Information Technology Capital Investment Report					
Quarter Ended March 31, 2019					
FY19 Sanction Papers >\$1Million					
Inv ID	Name of Project	Total Investment (\$M)	Capital (\$M)	Date Sanctioned	Page Reference
5037	DG IOAP Phase 2 C-F and CYME Server	\$ 2.94	\$ 2.51	1/22/2019	Page 433
5309	Network Modernization	\$ 7.91	\$ 5.66	3/13/2019	Page 336
5316	US T430 Refresh	\$ 2.43	\$ 2.28	2/5/2019	Page 356
5360	Lease Accounting Updates and Contract Management	\$ 2.10	\$ 1.40	2/12/2019	Page 369
5636	StorageCapacity Purchase and Configure for Use	\$ 6.85	\$ 6.81	3/13/2019	Page 383
4771	Complex Capital Delivery Phase 2	\$ 9.40	\$ 6.89	8/8/2018	Page 398
4828	Hicksville Fiber Upgrades	\$ 1.26	\$ 1.06	8/21/2018	Page 422
3683USD	Develop Robust Incident Response (DRIR) Confidential	\$ 2.51	\$ 1.82	2/5/2019	Confidential-will be available for on-site review
3683USAQ	Cloud Access Security Broker (CASB) Phase 2 Confidential	\$ 1.32	\$ 1.12	11/6/2018	Confidential-will be available for on-site review
4975USF	Internal Public Key Infrastructure (PKI) Confidential	\$ 2.66	\$ 2.10	8/13/2018	Confidential-will be available for on-site review
3683USG	Enhanced Phising Protection & Awareness Confidential	\$ 2.11	\$ 1.75	2/5/2019	Confidential-will be available for on-site review



Closure Template

Title:	Closure for Two Energy Management Systems in New England and Upstate New York T&D	Sanction Paper #:	USSC-12-248C
Project #:	INVP 1043: EMS NE S00281 INVP 1041: EMS NY C28802	Sanction Type:	Closure
Operating Company:	National Grid USA Svc. Co.	Date of Request:	8/27/2018
Author:	Joseph Farella / John Kastler	Sponsor:	John Spink, Vice President Control Center Operations
Utility Service:	IS	Project Manager:	Joe Farella John Kastler

1 Executive Summary

This paper is presented to close INVP 1041 & 1043. The total spend was \$79.911M. The original sanction amount was \$34.7M +/- 10%.

The latest sanctioned amount for this project was \$90.280M for the purposes of Development and Implementation.

Project Sanction Summary (\$M)				
Title	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
NY EMS Replacement	Capex	45.340	19.812	(25.528)
	Opex	2.487	0.336	(2.151)
	Removal	0.000	0.000	0.000
	Total	47.827	20.148	(27.679)
NE EMS Replacement	Capex	29.670	14.328	(15.342)
	Opex	2.414	0.224	(2.190)
	Removal	0.000	0.000	0.000
	Total	32.084	14.552	(17.532)
Total	Capex	75.010	34.140	(40.870)
	Opex	4.901	0.560	(4.341)
	Removal	0.000	0.000	0.000
	Total	79.911	34.700	(45.211)

1.1 Variance Analysis

Drivers for cost increases from the original sanction include:

- A scope change was made to separate the Outage Management System functions from the Energy Management System functions on the communications networks. This was a result of the maturing understanding of the NERC CIP requirements in the industry at the time, and implemented changes to ensure the security essential to operate the system and to meet the NERC CIP requirements.



Closure Template

- The implementation and testing of the complex, cyber secure Local and Wide Area Networks exposed additional issues and changes which increased hardware and labor costs. These included:
 - Implementation of additional bandwidth.
 - Segregated networks for the Quality Assurance System and the Operator Training System.
 - LAN stabilization activity to implement proper routing, switching, and firewall configuration.
- Software costs increased due to data base management requirements (increased hardware needs; increased software licenses for Oracle and PI, a modern data historian).
- Security requirements for network monitoring increased since original sanction leading to a change in scope for the project.
- A scope change was made to add hardware to support the remote maintenance system of the EMS at the ABB factory (Factory Maintenance System).

Please see the following documents for more details on the cost variances:

- INVP1041_INVP1043 Design and Implement Two EMS in NY and NE 23-May-2012 D-I Resanction.doc
- INVP 1041_1043 EMS Replacement – 25-Sep-2013 – Resanction.doc
- INVP1041_1043_EMS Replacement.doc (12/10/14)

1.2 Schedule Variance

Schedule Variance - NY EMS	
Project Grade - Ready for Use Date	12/31/2011
Actual Ready for Use Date	2/10/2015
Schedule Variance	3 years, 1 months, 10 days

Schedule Variance - NE EMS	
Project Grade - Ready for Use Date	5/31/2012
Actual Ready for Use Date	4/22/2015
Schedule Variance	2 years, 10 months, 22 days

Drivers for the schedule extension include:

- The decision to split the Outage Management System functions from the Energy Management System functions on the communications networks.
- The implementation of additional bandwidth



Closure Template

- Segregated networks for the Quality Assurance System and the Operator Training System.
- LAN stabilization activity to implement proper routing, switching, and firewall configuration.
- Changing security requirements for network monitoring.
- The implementation of the ABB system requirements identified in the ABB final engineering, increased the ABB product development timeline.

Note that there were a number of features ABB was obligated by contract to address that were not addressed before the February and April 2015 go live dates. National Grid made a decision to go live without these features. The contract was held open for a prolonged period of time. This allowed ABB to provide these features. The contracts were then closed out. This delayed the submission of this closure report.

2 Project Summary

This project replaced the existing Energy Management Systems (EMS) in NY & NE. The EMS system monitors, operates and controls the transmission and distribution electric assets as well as exchanges data and information with the regional Independent System Operators (ISO's) and neighboring Transmission Owners (TO's) in New York (NY) and New England (NE).

The EMS replacements were undertaken as an asset replacement to mitigate reliability risks associated with the loss of system control and situational awareness of the T&D electrical systems, minimize the possibility of disrupting the ISO markets, and to eliminate the lack of vendor support for the existing NY EMS.

2.1 In-Service Date

The NY EMS System went live on 2/10/2015. The NE EMS System went live on 4/22/2015.



Closure Template

3 Final Cost by Project

Actual Spending (\$M) vs. Sanction (\$M)				
Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over)/ Under
1041 NY EMS Replacement	Capex	45.340	19.812	(25.528)
	Opex	2.487	0.338	(2.151)
	Removal	0.000	0.000	0.000
	Total	47.827	20.148	(27.679)
1043 NE EMS Replacement	Capex	29.670	14.328	(15.342)
	Opex	2.414	0.224	(2.190)
	Removal	0.000	0.000	0.000
	Total	32.084	14.552	(17.532)

Actual Spending (\$M) vs. Sanction (\$M)				
	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over)/ Under
Total	Capex	75.010	34.140	(40.870)
	Opex	4.901	0.560	(4.341)
	Removal	0.000	0.000	0.000
	Total	79.911	34.700	(45.211)

4 Improvements / Lessons Learned/Root Cause

1. Internal and external SMEs should complete a comprehensive communication network impact assessment across related projects during the requirements phase.
2. Projects implementing new software products should incorporate greater levels of scrutiny on baseline software.
3. Ensure large projects validate original estimates and assumptions after requirements and before design phase of project.



Closure Template

5 Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	<input checked="" type="radio"/> Yes <input type="radio"/> No
Gate E checklist completed (appl. only to CCD)	<input type="radio"/> Yes <input checked="" type="radio"/> N/A
All relevant costs have been charged to project	<input checked="" type="radio"/> Yes <input type="radio"/> No
All work orders and funding projects have been closed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All unused materials have been returned	<input checked="" type="radio"/> Yes <input type="radio"/> No
All IS Service Transition activities have been completed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All lessons learned have been entered appropriately into the IS Knowledge Management Tool (KMT) lesson learned database	<input checked="" type="radio"/> Yes <input type="radio"/> No

6 Statements of Support

6.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Joe Farella	Business Representative
PDM	Debbie Rollins	Head of PDM
BRM	Aman Aneja	Relationship Manager
PDM	Michelle McNaught	Program Delivery Director
IS Finance	Michelle Harris	Manager
IS Regulatory	Dan DeMauro	Director
DR&S	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Svetlana Lyba	Manager



Closure Template

6.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Anand, Sonny
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Procurement	Chevere, Diego



Closure Template

7 Decisions

The Senior Executive Sanctioning committee (SESC) approved this paper at a SESC meeting held on August 27, 2018

Signature..........Date.....
Margaret Smyth
US Chief Financial Officer
Chair, Senior Executive Sanctioning Committee



Closure Template

Title:	OMS/DMS Platform Standardization & Enhancement Project	Sanction Paper #:	USSC-12-249C
Project #:	INVP 1185 Capex: S000544	Sanction Type:	Closure
Operating Company:	National Grid USA Svc. Co.	Date of Request:	8/27/2018
Author:	Douglas McCarthy	Sponsor:	John Spink, Vice President Control Center Operations
Utility Service:	IS	Project Manager:	Jane Becker

1 Executive Summary

This paper is presented to close INVP 1185. The total spend was \$77.402M. The original sanctioned amount for this project was \$29.971M at +/- 10% (project grade).

The latest re-sanctioned amount for this project was \$79.738M.

Project Sanction Summary (\$M)				
Title	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
OMS/DMS Platform Standardization & Enhancement Project	Capex	65.661	27.747	(37.914)
	Opex	11.741	2.224	(9.517)
	Removal	0.000	0.000	0.000
	Total	77.402	29.971	(47.431)

1.1 Variance Analysis

The “OMS/DMS Platform Standardization & Enhancement Project” was originally sanctioned in August 2009 for \$29.97M, with a projected go-live date of November 2012. The project’s actual cost was \$77.402M with go-live in December 2015. Project overspend of \$47.431M and delivery delays are documented in three re-sanction events:

- The project re-sanction in May 23, 2012 increased the sanctioned project costs by \$19.2M to a total of \$49.2M and extended the implementation timeline to February 2014. High level drivers for this re-sanction included a more refined understanding of the overall project requirements and costs of implementing new regional Outage Management Systems (OMS) with integration capability to the new EMS (Energy Management System)/SCADA systems. An assessment performed by National Grid and its vendor Asea Brown Boveri (ABB) reviewing scope, delivery, integrations with EMS, and mitigation of risks resulted in the following project variations:
 - Increase in application costs including license and maintenance contracts for Oracle and JCAPS applications, security tools, and reporting



Closure Template

- Additional capability of Wide Area and Local Area Networks for design complexity and revalidated capacity assumptions
- Labor cost increases primarily due to schedule extensions and increased resource requirements

- The project re-sanction in September 25, 2013 increased the May 2012 sanctioned project costs by \$15.9M to a total of \$65.181M and extended the implementation timeline to December 2014. High level drivers for this re-sanction included:
 - Implementation and testing of the complex, cyber secure Local and Wide Area Networks increased labor costs for implementation of additional bandwidth, provision for segregated networks for Quality Assurance System and the Operator Training System, and LAN stabilization activity to implement proper routing, switching, and firewall configuration
 - Increase in software and labor costs associated with the additional time to complete development and implementation of the integrated ABB EMS product, and subsequent implementation of OMS
 - Implementation of lessons learned from other key programs which identified additional opportunities to ensure application and business readiness for go-live, specifically the addition of further end-to-end testing, mock go-live drills, and expansion of business readiness plans

- The project re-sanction of May 13, 2015, increased the September 2013 sanctioned project costs by \$14.6M to a total of \$79.738M and extended the implementation timeline to December 2015. A decision was made to split the Outage Management System functions from the Energy Management System functions on the communications networks. This was a result of the maturing understanding of NERC CIP requirements in the industry at the time. As a result, National Grid re-evaluated the architecture to ensure the security essential to operate the system and to meet the NERC CIP requirements was provided by the project. This decision resulted in separate implementations of the EMS and OMS systems, requiring updates to the project requirements, design, and test plans. Decoupling OMS and EMS was the least costly solution to mitigate these issues and resulted in cost increases in labor, hardware and software, and network expansion and re-configuration.

Changes in project costs and timelines increased AFUDC costs.



Closure Template

1.2 Schedule Variance

Schedule Variance	
Project Grade - Ready for Use Date	11/1/2012
Actual Ready for Use Date	12/4/2015
Schedule Variance	3 years, 1 months, 3 days

Variance in project timeline reflects changes in delivery scope as discussed in section “1.1 Variance Analysis”

2 Project Summary

The OMS/DMS Platform Standardization & Enhancement Project was raised to implement a tightly integrated OMS and DMS (Distribution Management System) in New York and New England. During the execution of this project, the following objectives were achieved:

- Deployment of vendor supported versions of the OMS application in New York and New England service territories
- Provide a platform for growth that will support additional automation on the Distribution Network, including Smart Grid and future mergers

In 2015, as a result of NERC CIP requirements, a decision was made to split the Outage Management System functions from the Energy Management System functions on the communications networks. This change limited the project team’s ability to integrate DMS/ OMS functions and delivery to the original goals set in 2009. Specifically, efficiency of network management is not achievable in the current deployment configuration.



Closure Template

3 Final Cost by Project

Actual Spending (\$M) vs. Sanction (\$M)				
Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
1185	Capex	65.661	27.747	(37.914)
	Opex	11.741	2.224	(9.517)
	Removal	0.000	0.000	0.000
	Total	77.402	29.971	(47.431)

Actual Spending (\$M) vs. Sanction (\$M)				
	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
Total	Capex	65.661	27.747	(37.914)
	Opex	11.741	2.224	(9.517)
	Removal	0.000	0.000	0.000
	Total	77.402	29.971	(47.431)

4 Improvements / Lessons Learned/Root Cause

Lessons Learned on the project include:

- Comprehensive network impact assessment across related projects/programs by internal and external subject matter experts is required during the Requirements Phase
- Verify screen designs with proto-types developed during the Requirements Phase
- The timing of procurement and delivery of hardware and software needs to balance budgetary concerns as well as maintenance and finance charges
- Develop system requirements while reviewing the functionality of the vendor's system to verify what is truly baseline versus what may be a required enhancement or business process change



Closure Template

5 Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	<input checked="" type="radio"/> Yes <input type="radio"/> No
All relevant costs have been charged to project	<input checked="" type="radio"/> Yes <input type="radio"/> No
All work orders and funding projects have been closed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All unused materials have been returned	<input checked="" type="radio"/> Yes <input type="radio"/> No
All IS Service Transition activities have been completed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All lessons learned have been entered appropriately into the IS Knowledge Tool lesson learned database	<input checked="" type="radio"/> Yes <input type="radio"/> No



Closure Template

6 Statements of Support

6.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Function	Individual
Business Representative	John Spink
Head of PDM	Deb Rollins
Relationship Manager	Aman Aneja
Program Delivery Director	Kristen Lemire
IS Finance Management	Michelle Harris
IS Regulatory	Dan DeMauro
DR&S	Elaine Wilson
Service Delivery	Mark Mirizio
Enterprise Architecture	Joe Clinchot

6.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual	Area
Regulatory	Harvey, Maria	IS
Jurisdictional Delegate(s)	Anand, Sonny	Electric - NE
	Harbaugh, Mark	Electric - NY
	Hill, Terron	FERC
Procurement	Chevere, Diego	All



Closure Template

7 Decisions

The Senior Executive Sanctioning committee (SESC) approved this paper at a SESC meeting held on August 27, 2018.

Signature.....Date.....

Margaret Smyth
US Chief Financial Officer
Chair, Senior Executive Sanctioning Committee



Resanction Request

Title:	OMS/DMS Platform Standardization & Enhancement Project	Sanction Paper #:	USSC-12-249
Project #:	INVP 1185 / S00544 / XG380008082	Sanction Type:	Resanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	May 13, 2015
Author / NG Representative:	Diane Beard / Mike Gerolamo	Sponsor:	John Spink, Vice President Control Center Operations
Utility Service:	IT	Project Manager:	Jane Becker

1 Executive Summary

This paper requests the resanction of INVP 1185 in the amount \$79.738M with a tolerance of +/- 10% for the purposes of Development & Implementation.

This sanction amount is \$79.738M broken down into:

- \$67.157M Capex
- \$12.561M Opex
- \$ 0.020M Removal

Note the previously requested sanction amount of \$65.181M.

2 Resanction Details

2.1 Project Summary

This resanction is in regard to the planned replacement and decommissioning of the two regional existing Outage Management Systems (OMS), in New England (NE) and Upstate New York (NY).

In March 2014 National Grid commissioned a review of the Energy Management System (EMS) / OMS program, to better understand potential risks of the solution design with respect to the utility industry’s maturing understanding of cyber security. Significant cyber security risks were identified, primarily due to the linkage between the EMS and the OMS. Specifically, there was a potential cyber security threat of a larger user population, associated with OMS, gaining access to a critical EMS application. While the probability of these risks being realized is low, the impact is high. EMS is a mission critical system and the efficient operation of the system is dependent on its secure performance. To mitigate the security risks, a decision was reached to decouple the two systems.

As a result of decoupling EMS and OMS, the project go live dates will move to October 15, 2015 for NY-OMS, and December 15, 2015 for NE-OMS. Additional time is needed



Resanction Request

to update requirements and design documentation, procure required hardware and build a new private network for OMS that is separate from EMS, test the new network, perform security audits, conduct testing and remediate any outstanding issues, and complete training.

The EMS and OMS projects will replace the Company’s outdated systems and ensure these systems can be fully supported by vendors in the future. The Company anticipates the upgrade and replacement of these systems will provide certain benefits vital to successful operation of the electric system, including, but not limited to: improved informational security; increased functionality and situational awareness; more accurate and reliable data and reporting; and improved storm management.

After re-sanction in September 2013, the Company projected an in-service date for EMS in March 2014 and OMS in June 2014. However, the Company discovered several issues during project development and integration not originally anticipated during the planning process. Concerns developed regarding potential cybersecurity risks associated with EMS and the Company was concerned these risks would affect data integrity. Software defects were also discovered and, while the vendor, ABB, made progress in correcting these defects, the defects created additional risk and schedule uncertainty. Based on these concerns, the Company determined it could not proceed with EMS/OMS integration without further analysis.

The Company performed an options assessment of the projects in April 2014 to analyze the issues discovered during development. After vetting its options, the Company decided, as indicated earlier, to decouple and separately implement the EMS and OMS systems. Decoupling was the least cost solution to mitigate the issues discovered during project development.

2.2 Summary of Projects

Project Number	Project Title	Estimate Amount (\$M)
INVP 1185	OMS/DMS Platform Standardization & Enhancement Project	79.738
Total		79.738

2.3 Prior Sanctioning History

Previously approved sanctions are attached and listed below (Newest to Oldest)

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Paper Title	Sanction Type	Paper Reference Number	Tolerance
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Resanction Request

Sep 25, 2013	USSC	\$65.181M	\$65.181M	OMS/DMS Platform Standardization & Enhancement Project	Resanction	USSC-12-249	10%
May 23, 2012	USSC	\$49.200M	\$49.200M	OMS/DMS Platform Standardization & Enhancement Project	Development and Implementation	USSC-12-249	10%
Jun 25, 2009	ED&G IS Sanctioning	\$29.970M	\$29.970M	OMS DMS Standardization and Enhancement Project 23-May-2012 D-I Resanction	Design, Development and Implementation	USSC-12-249	10%

Over / Under Expenditure Analysis

Summary Analysis (\$M)	Capex	Opex	Removal	Total
Latest Approval	55.897	9.264	0.020	65.181
Change*	11.260	3.297	0.000	14.557

*Change = (Re-sanction – Amount Latest Approval)

2.4 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total	
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +		
					2014/15	2015/16	2016/17	2017/18	2018/19	2019/20		
INVP 1185	OMS/DMS Platform Standardization & Enhancement Project	+/- 10%	CapEx	44.715	7.800	14.642	0.000					67.157
			OpEx	4.192	2.184	6.172	0.013					12.561
			Removal	0.000	0.000	0.020	0.000					0.020
			Total	48.907	9.984	20.834	0.013					79.738
Total Project Sanction			CapEx	44.715	7.800	14.642	0.000					67.157
			OpEx	4.192	2.184	6.172	0.013					12.561
			Removal	0.000	0.000	0.020	0.000					0.020
			Total	48.907	9.984	20.834	0.013					79.738

2.5 Business Plan



Resanction Request

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY2014-15 CapEx	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input checked="" type="radio"/> Under <input type="radio"/> NA	2.936
IS Investment Plan FY2014-15 OpEx	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input checked="" type="radio"/> Under <input type="radio"/> NA	1.200
IS Investment Plan FY2015-16 CapEx	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input checked="" type="radio"/> Under <input type="radio"/> NA	0.258
IS Investment Plan FY2015-16 OpEx	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input checked="" type="radio"/> Under <input type="radio"/> NA	0.008
IS Investment Plan FY2016-17 OpEx	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> N/A	0.013

2.6 Drivers

2.6.1 Detailed Analysis Table

The following table indicates the major key variations that account for the difference between the last sanction amount and the requested resanction amount.

Detail Analysis (M's)	Over/Under Expenditure?	Amount
1. Labor	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	\$16.10M
2. Hardware/Software	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	\$1.170M
3. AFUDC (Allowance for Funds Used During Construction) Allocation	<input type="checkbox"/> Over <input checked="" type="checkbox"/> Under	\$1.010M
4. Risk	<input type="checkbox"/> Over <input checked="" type="checkbox"/> Under	\$1.930M
5. Others	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	\$0.410M

2.6.2 Explanation of Key Variations

As a result of the decision to decouple the EMS and OMS, additional work is needed to update requirements and design documentation, segregate OMS from the EMS



Resanction Request

hardware, reconfigure network firewalls that had been associated with the OMS and perform regression testing.

1. Extended Labor and Timeline (\$16.100M)
 - Requirements and design documentation will be updated to reflect a decoupled OMS system. This includes a significant number of updates to the business requirements, technical requirements, detailed application design documents, and test plans.
 - Labor for the design and implementation of the new private networks to support the New York and New England OMS applications.
 - Labor costs associated with data center construction and reconfiguration to support additional network and server infrastructure.
 - Testing of the application and network will be required once the new OMS network is complete to ensure proper operation of the standalone OMS.
 - Labor by ABB to support the decoupling of EMS and OMS and set up the OMS application on the new OMS network.
 - Increase in labor due to expanded training program; Field feedback resulted in increased number of trainees, full cost of training now being borne by the project.
 - Total labor costs are somewhat offset by the transfer of labor costs associated with dedicating the network to EMS. The original planned network was shared between the OMS and EMS applications. Since the original network will be dedicated to EMS going forward, the portion of the labor costs charged to OMS to date for establishing that network will be transferred to the EMS project.
2. Increased Hardware/Software costs are associated with the physical creation of new private networks to support both the New York and New England OMS applications as well as the extension of the schedule. Costs include purchase of over 70 switches and firewalls, 40 servers, and 140 workstations as well as increased support and maintenance costs due to schedule extension. Total increased costs are somewhat offset by the transfer of Hardware/Software costs related to dedication of the original network to EMS. (\$1.170M)
3. Decrease in AFUDC due to decrease in rates from 2013 resanction forecast (\$-1.010M)
4. Reduced project risk margin from 3 months to 1 month (-\$1.930M)
5. Other costs include overheads and travel (\$0.410M)

2.7 If cost > approved Business Plan how will this be funded?

Re-allocation of funds within the portfolio will be managed by the IS Relationship Manager with the Planning Analyst assistance to meet jurisdictional budgetary, statutory and regulatory requirements.



Resanction Request

2.8 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	Oct 2009
Begin Requirements and Design	Dec 2009
Begin Development and Implementation	May 2010
Move to Production - NY	Oct 2015
Move to Production - NE	Dec 2015
Project Complete	Dec 2015
Project Closure	May 2016

2.9 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
May 2016	Closure

3 Statements of Support

3.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities	Title
IS Business Relationship Mgmt	Aman Aneja	1. Review & Endorse IS Investment Proposals 2. Ensure IS Stakeholders approvals are obtained	IS Portfolio Relationship Manager
IS Finance	Chip Benson	Finance Director	Finance Director
IS Regulatory	Wayne Watkins	Regulatory Director	Regulatory Director
US Business Sponsor	John Spink	VP of the business area	Vice President Control Center Operations

3.2 Reviewers

The reviewers have provided feedback on the content/language of the paper

Function	Individual	Area
Finance	Chip Benson	All
Regulatory	Peter Zschokke	All
Jurisdictional Delegate(s)	Jim Patterson	New England – Electric
	Mark Harbaugh	New York- Electric
	Carol A. Sedewitz	FERC
Procurement	Art Curran	All



Resanction Request

4 Decisions

The US Sanctioning Committee (USSC) at a meeting held on May 13, 2015.

- (a) APPROVED this paper and the investment of \$79.738M and a tolerance of +/- 10%.
- (b) APPROVED the RTB Impact of \$34.917M total for 5 years for combined NY and NE.
- (c) NOTED that Jane Becker is the Project Manager and has the approved financial delegation.

Signature.....Date.....

Margaret Smyth
US Chief Financial Officer
Chair, US Sanctioning Committee



USSC Closure Paper

Title:	ArcFM Software Upgrade and System Enhancements	Sanction Paper #:	USSC-16-243C
Project #:	INVP 2577C Capex: S006601	Sanction Type:	Closure
Operating Company:	National Grid USA Svc. Co.	Date of Request:	5/1/2018
Author:	Michael Cowan	Sponsor:	William Hilbrunner, Vice-President Operations Support
Utility Service:	IS	Project Manager:	Michael Cowan

1 Executive Summary

This paper is presented to close INVP 2577C. The total spend was \$2.370M. The sanctioned amount for this project was \$2.552M at +/- 10% (project grade).

Project Sanction Summary (\$M)				
Title	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance
ArcFM Software Upgrade and System Enhancements	Capex	2.004	2.302	0.298
	Opex	0.366	0.250	(0.116)
	Removal	0.000	0.000	0.000
	Total	2.370	2.552	0.182

1.1 Variance Analysis

The project was underspent by avoiding database server licensing costs. This was due to unexpected commercial efficiencies gained from the National Grid enterprise license agreement with the vendor.

This cost avoidance resulted in the majority of the Capex savings and reduced the overall project spend.

1.2 Schedule Variance

Schedule Variance	
Project Grade - Ready for Use Date	2/20/2017
Actual Ready for Use Date	4/10/2017
Schedule Variance	0 years, 1 months, 21 days



USSC Closure Paper

2 Project Summary

This project upgraded the Esri ArcGIS and Schneider ArcFM platform in Massachusetts (MA) to a supported version designed for gas and electric utilities. In addition this project also delivered the infrastructure required to deploy the new web-based field-mapping product “Portal for ArcGIS”. Lastly, this project also decommissioned the ArcFM Viewer application and associated legacy infrastructure.

The outcome of this project was an upgraded Esri software platform, new web-based field-mapping product “Portal for ArcGIS”, and infrastructure that supports the current needs of the MA US Gas Business Unit.

2.1 In-Service Date

April 10, 2017

3 Final Cost by Project

Actual Spending (\$M) vs. Sanction (\$M)				
Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance
INVP 2577C	Capex	2.004	2.302	0.298
	Opex	0.366	0.250	(0.116)
	Removal	0.000	0.000	0.000
	Total	2.370	2.552	0.182

4 Improvements / Lessons Learned / Root Cause

#	Lesson Learned	Recommended Action
1	Competitively bid significant project work to ensure the best value and quality for National Grid.	Follow this approach where applicable in all future projects.
2	Include Service Delivery early in the project (Requirements Phase) to address infrastructure and support requirements.	R&D team should define, document and prioritize all potential requirements from Service Delivery.



USSC Closure Paper

Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	<input checked="" type="radio"/> Yes <input type="radio"/> No
All relevant costs have been charged to project	<input checked="" type="radio"/> Yes <input type="radio"/> No
All work orders and funding projects have been closed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All unused materials have been returned	<input checked="" type="radio"/> Yes <input type="radio"/> No
All IS Service Transition activities have been completed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All lessons learned have been entered appropriately into the IS Knowledge Tool lesson learned database	<input checked="" type="radio"/> Yes <input type="radio"/> No

5 Statements of Support

6.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Function	Individual
Business Representative	William Hilbrunner
Head of PDM	Deb Rollins
Relationship Manager	Rick Sheer
Program Delivery Manager	Sally Seltzer
IS Finance Management	Michelle Harris
IS Regulatory	Dan DeMauro
DR&S	Elaine Wilson
Service Delivery	Mark Mirizio
Enterprise Architecture	Svetlana Lyba

6.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual	Area
Regulatory	Harvey, Maria	IS
Jurisdictional Delegate(s)	Currie, John	Gas - NE
Procurement	Chevere, Diego	All



USSC Closure Paper

6 Decisions

I approve this paper.	
Signature.....	Date.....
David H. Campbell, Vice President, ServCo Business Partnering, USSC Chair	



Closure Paper

Title:	EMM Phase 1	Sanction Paper #:	USSC-17-241C
Project #:	INVP 3430 Capex: S007551	Sanction Type:	Closure
Operating Company:	National Grid USA Svc. Co.	Date of Request:	2/12/2019
Author:	Aravind Lochan / Andrew Yee	Sponsor:	John Gilbert, Global Head of Service Delivery
Utility Service:	IT	Project Manager:	David McCune

1 Executive Summary

This paper is presented to close INVP 3430. The total spend was \$1.210M. The original sanctioned amount for this project was \$ 0.401M at +/- 10%.

Note: The latest sanction amount was \$1.225M at +/- 10%

2 Project Summary

This project established and deployed a Software as a Service (SaaS) based Enterprise Mobility Management (EMM) service platform, which is capable of on-boarding National Grid mobile devices with National Grid’s security policies, app store to access all corporate systems and corporate data in a secure fashion.

This project has also implemented ng-m (secured mobile National Grid wifi access) specific to National Grid mobile devices as part of Phase 1.

3 Variance Analysis

3.1 Cost Summary Table

Project Sanction Summary (\$M)				
INVP 3430 - EMM - Phase 1	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
INVP 3430 - EMM - Phase 1	Capex	1.018	0.000	(1.018)
	Opex	0.192	0.401	0.209
	Removal	0.000	0.000	0.000
	Total	1.210	0.401	(0.809)



Closure Paper

3.2 Cost Variance Analysis

The project cost variance is associated with a scope change of licenses from 2000 to 4000 users, as well as a financial decision to make a one-time purchase of the 4000 perpetual licenses and a dedicated environment to run EMM platform.

3.3 Schedule Variance Table

Schedule Variance	
Project Grade - Ready for Use Date	4/20/2018
Actual Ready for Use Date	4/27/2018
Schedule Variance	7 days

3.4 Schedule Variance Explanation

The schedule variance was a direct result of a couple of change requests which were implemented during the project release:

- (1) VLAN (Virtual Local Area Network) setup was complete in data centers
- (2) Corporate Mobile network access (ng-m) was enabled

4 Final Cost by Project

Actual Spending (\$M) vs. Sanction (\$M)				
INVP 3430 - EMM - Phase 1	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
INVP 3430 - EMM - Phase 1	Capex	1.018	0.000	(1.018)
	Opex	0.192	0.401	0.209
	Removal	0.000	0.000	0.000
	Total	1.210	0.401	(0.809)

5 Improvements / Lessons Learned/Root Cause

Initiate NSSR (Non-Standard Service Requests) process upfront to engage any vendor to deliver as per project schedule. 2018-LL-590



Closure Paper

6 Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	<input checked="" type="radio"/> Yes <input type="radio"/> No
Gate E checklist completed (appl. only to CCD)	<input type="radio"/> Yes <input checked="" type="radio"/> N/A
All relevant costs have been charged to project	<input checked="" type="radio"/> Yes <input type="radio"/> No
All work orders and funding projects have been closed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All unused materials have been returned	<input checked="" type="radio"/> Yes <input type="radio"/> No
All IS Service Transition activities have been completed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All lessons learned have been entered appropriately into the IS Knowledge Management Tool (KMT) lesson learned database	<input checked="" type="radio"/> Yes <input type="radio"/> No

7 Statements of Support

7.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Doug Page	Business Representative
PDM	Helen Smith	Head of PDM
BRM	Brian Detota	Relationship Manager
PDM	Ken Wermann	Program Delivery Director
IS Finance	Michelle Harris	Manager
IS Regulatory	Dan DeMauro	Director
DR&S	Peter Shattuck	Manager
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Director



Closure Paper

7.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



Closure Paper

8 Decisions

I approve this paper.

Signature.....Date.....

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



Closure Paper

Title:	NY Retail Access Mandate Phase 1A	Sanction Paper #:	USSC-16-036C
Project #:	INVP 3839A Capex: S006421	Sanction Type:	Closure
Operating Company:	National Grid USA Svc. Co.	Date of Request:	9/12/2018
Author / NG Representative:	Cindy Tomeny / Michael Olesker	Sponsor:	John Vaughn, VP Energy Procurement
Utility Service:	IS	Project Manager:	Deborah Rollins / Cindy Tomeny

1 Executive Summary

This paper is presented to close INVP 3839A. The total spend was \$5.493M. The original sanctioned amount for this project was \$6.147M at +/- 10%.

2 Project Summary

This mandated project was in response to an Order issued on February 25, 2014 by the New York Public Service Commission in Case 12-M-0476, requiring modifications to Residential and Small Non-Residential Retail Access Markets.

The objectives of this project were enhancements to the Customer Service Systems consistent with the Commission’s Order, in the following functional areas:

- Customer Gas Accelerated Switching
- Customer / ESCO Price Assurance - Billing Credits
- Customer / Low Income Moratorium – Prohibition
- Customer / ESCO Reinstatement
- Customer / ESCO Previous Account Notification

3 Variance Analysis

3.1 Cost Summary Table

Project Sanction Summary (\$M)				
Title	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over)/ Under
NY Retain Access	Capex	4.830	5.278	0.448
	Opex	0.663	0.869	0.206
	Removal	0.000	0.000	0.000
	Total	5.493	6.147	0.654



Closure Paper

3.2 Cost Variance Analysis

The INVP 3839A project was delivered on time and within budget. The project cost was well within the sanctioned budget. The underspend of \$0.6M was due to resource and workload management..

3.3 Schedule Variance Table

Schedule Variance	
Project Grade - Ready for Use Date	10/20/2017
Actual Ready for Use Date	10/20/2017
Schedule Variance	- 0 years, 0 months, 0 days

3.4 Schedule Variance Explanation

N/A

4 Final Cost by Project

Actual Spending (\$M) vs. Sanction (\$M)				
Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
3839A	Capex	4.830	5.278	0.448
	Opex	0.663	0.869	0.206
	Removal	0.000	0.000	0.000
	Total	5.493	6.147	0.654

5 Improvements / Lessons Learned/Root Cause

- Plan in extra contingency when working with PSC mandated projects. Extra time and flexible resources should be allocated to handle additional scope as necessary. [2018-LL-498]
- When regression testing financial transactions using Electronic Data Interchange, make sure to process a full end-to-end test to avoid negative impacts and include external service supply companies to participate as testing partners. [2018-LL-499]
- Schedule work on new CIS technical platform activities early in the project. Engage external parties early on to ensure that all elements are in working order. [2018-LL-500]



Closure Paper

6 Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	<input checked="" type="radio"/> Yes <input type="radio"/> No
Gate E checklist completed (appl. only to CCD)	<input type="radio"/> Yes <input checked="" type="radio"/> N/A
All relevant costs have been charged to project	<input checked="" type="radio"/> Yes <input type="radio"/> No
All work orders and funding projects have been closed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All unused materials have been returned	<input checked="" type="radio"/> Yes <input type="radio"/> No
All IS Service Transition activities have been completed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All lessons learned have been entered appropriately into the IS Knowledge Management Tool (KMT) lesson learned database	<input checked="" type="radio"/> Yes <input type="radio"/> No



Closure Paper

7 Statements of Support

7.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	John Vaughn	Business Representative
PDM	Deborah Rollins	Head of PDM
BRM	Aman Aneja	Relationship Manager
PDM	Michael Pawlowski	Program Delivery Director
IS Finance	Michelle Harris	Manager
IS Regulatory	Daniel DeMauro	Director
DR&S	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joseph Clinchot	Director

7.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Anand, Sonny
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



Closure Template

8 Decisions

The US Sanctioning Committee (USSC) approved this paper at a USSC meeting held on September 12, 2018.

Signature.....Date.....
David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



Closure Paper

Title:	NYS Pipeline Safety CMS Regulatory Compliance	Sanction Paper #:	USSC-15-168v2C
Project #:	INVP 3882 Capex: S005861	Sanction Type:	Closure
Operating Company:	National Grid USA Svc. Co.	Date of Request:	5/1/2018
Author:	Sarah Slade	Sponsor:	Daniel McNamara VP, Gas Pipeline Safety and Compliance
Utility Service:	IS	Project Manager:	Sarah Slade

1 Executive Summary

This paper is presented to close INVP3882. The total spend was \$1.891M. The sanctioned amount for this project was \$1.949M at +/- 10% (project grade).

Project Sanction Summary (\$M)				
Title	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance
NYS Pipeline Safety CMS Regulatory Compliance	Capex	1.669	1.795	0.126
	Opex	0.222	0.154	(0.068)
	Removal	0.000	0.000	0.000
	Total	1.891	1.949	0.058

1.1 Variance Analysis

The project was underspent within the 10% tolerance.

1.2 Schedule Variance

Variance to the original schedule (Phase 1) was 21 days due to a dependency on the SAP Business Objects (BO) update release scheduled for October 2016. The SAP BO update release was delayed due to technical issues. Additionally, the Steering Committee approved a Phase 2 of work on 11/7/2016 which was scoped to address critical change records needed for the reports to be used. Phase 2 was completed on 3/17/2017. The combined schedule variance due to the SAP BO update release and Phase 2 was 4 months and 14 days.



Closure Paper

Schedule Variance	
Project Grade - Ready for Use Date	10/31/2016
Actual Ready for Use Date (Phase 1)	11/21/2016
Actual Ready for Use Date (Phase 2)	3/17/2017
Schedule Variance	0 years, 4 months, 14 days

2 Project Summary

Regulators in New York State (NYS) are requiring complete and accurate operational records to demonstrate compliance in an affirmative manner with Federal Department of Transportation (DOT) Part 191,192,193, and Jurisdictional requirements, such as 16NYCRR Part 255 & 261 in New York. National Grid historically has had challenges producing these records in a timely fashion due to lack of granularity within existing field systems and lack of a consolidated regulatory compliance reporting solution.

The current process for producing compliance reports is manual and very time consuming. Compliance data are manually extracted from the following disparate systems in:

Downstate New York (DNY):

- Mobile Data Solutions Inc. (MDSI) System
- Customer Related Information System (CRIS)

Upstate New York (UNY):

- Mobile Work Management (MWork) System
- Customer Service System (CSS)

These data are not formatted in a uniform manner and therefore, data extracts are excessive to the point of being confusing and frustrating for the NYS regulators. To meet regulatory requirements, the NYS Customer Meter Services (CMS) team requires the ability to review compliance documentation, in a consolidated repository.

This mandated project successfully implemented a gas pipeline safety compliance data acquisition and regulatory reporting data management tool that is based on the Business Objects (BO) Reporting Platform. This solution provides the capability to routinely report and extract gas pipeline compliance data. It is compatible with a unified front office solution that National Grid is envisaging for the future. The first phase of this project went live on 11/21/16 and delivered the baseline reports. A second phase, that went live on 3/17/17, delivered enhancements to the reports to meet user and compliance needs.



Closure Paper

2.1 In-Service Date

March 17, 2017

3 Final Cost by Project

Actual Spending (\$M) vs. Sanction (\$M)				
Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance
INVP 3882	Capex	1.669	1.795	0.126
	Opex	0.222	0.154	(0.068)
	Removal	0.000	0.000	0.000
	Total	1.891	1.949	0.058

4 Improvements / Lessons Learned/Root Cause

#	Lesson Learned	Recommended Action
1	Need to engage CSC at least 6 weeks prior to a Non Standard Service Request (NSSR) for server set-up; need to clearly state in Non Standard Service Request (NSSR) that server support during project lifecycle should be expected	Engage CSC early and clearly call out in Non Standard Service Request (NSSR) that they will need to support server during project lifecycle
2	Prevailing version of DataStage 8.1 is not supported/unstable and is prone to outages in Development and Quality Assurance environments which require server re-start with no guarantee of success	Project team must be acutely aware of urgency to get server re-start request to CSC; CSC must be engaged as soon as possible and on stand by throughout project dev/test period; Additional time may need to be built in to project plan until Information Services (IS) can upgrade Extract, Transform, Load (ETL) tool



Closure Paper

5 Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	<input checked="" type="radio"/> Yes <input type="radio"/> No
All relevant costs have been charged to project	<input checked="" type="radio"/> Yes <input type="radio"/> No
All work orders and funding projects have been closed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All unused materials have been returned	<input checked="" type="radio"/> Yes <input type="radio"/> No
All IS Service Transition activities have been completed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All lessons learned have been entered appropriately into the IS Knowledge Tool's lesson learned database	<input checked="" type="radio"/> Yes <input type="radio"/> No

6 Statements of Support

6.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Function	Individual
Business Representative	Daniel McNamara
Head of PDM	Deb Rollins
Relationship Manager	Rick Sheer
Program Delivery Director	Sally Seltzer
IS Finance Management	Michelle Harris
IS Regulatory	Dan DeMauro
DR&S	Elaine Wilson
Service Delivery	Mark Mirizio
Enterprise Architecture	Svetlana Lyba



Closure Paper

6.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual	Area
Regulatory	Harvey, Maria	IS
Jurisdictional Delegate(s)	Hill, Terron	FERC
	Currie, John	Gas - NE
	Wolf, Don	Gas - NY
Procurement	DeRosa, Steve	All



Closure Paper

7 Decisions

I approved this paper.

Signature.....Date.....
David H. Campbell, Vice President, ServCo Business Partnering, USSC Chair



Closure Paper

Title:	Automate Remote Net Metering	Sanction Paper #:	USSC-15-259C
Project #:	INVP 4124 Capex: S006201	Sanction Type:	Closure
Operating Company:	National Grid USA Svc. Co.	Date of Request:	8/24/2018
Author:	Richard Malek/Riziel Cruz-Bower	Sponsor:	Jody Allison, VP Billing Collections Strategy & Operations
Utility Service:	IS	Project Manager:	Richard Malek/ Riziel Cruz-Bower

1 Executive Summary

This paper is presented to close INVP4124. The total spend was \$4.003M. The original sanctioned amount for this project was \$3.998M at +/- 10%.

2 Project Summary

The Remote Net Metering Project fully automated the remote net metering billing process in the Customer Service System (CSS). Prior to the project completion, the billing function was performed manually by Accounts Processing. As the volume of remote net metering customers has increased, this effort eliminated manual record keeping, minimized the risk of processing errors, generated bills as the charges are incurred, and reduced Sarbanes Oxley (SOX) compliance risks.

This project was broken into 6 workstreams:

- Host and Satellite Relationship Set-up
- SC2 Non Demand kWh Transfer
- Community Net Metering
- Percentage Dollar Transfer
- Cascading Dollar Transfer
- Avoided Cost Credit



Closure Paper

3 Variance Analysis

3.1 Cost Summary Table

Project Sanction Summary (\$M)				
INVP4124 Automate Remote Net Metering	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
4124	Capex	3.380	3.130	(0.250)
	Opex	0.620	0.858	0.238
	Removal	0.000	0.000	0.000
	Total	4.000	3.988	(0.012)

3.2 Cost Variance Analysis

Although the project was delayed by six months, the project team was able to complete all deliverables within the sanctioned cost.

3.3 Schedule Variance Table

Schedule Variance	
Project Grade – Ready for Use Date	08/31/2017
Actual Ready for Use Date	02/23/2018
Schedule Variance	0 years, 6 months, 0 days

3.4 Schedule Variance Explanation

The Remote Net Metering project automated the manual net metering billing processes in the Customer Service System (CSS) through the completion of six project workstreams. However, the project was six months late of its projected schedule of completion.

The following are the reasons for the schedule variance: (1) There were seven changes in business requirements, resulting in multiple change requests, a deviation from the original scope, and impacting overall project schedule and cost and (2) an Extended User Acceptance Test schedule.



Closure Paper

4 Final Cost by Project

Actual Spending (\$M) vs. Sanction (\$M)				
INVP4124 Automate Remote Net Metering	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
4124	Capex	3.380	3.130	(0.250)
	Opex	0.620	0.858	0.238
	Removal	0.000	0.000	0.000
	Total	4.000	3.988	(0.012)

5 Improvements / Lessons Learned/Root Cause

1. 2018-LL-553

Lesson learned - When implementing new programs that are viable for multiple work stream releases, it is better to do partial sanctions for each workstream; this way, there will be a more accurate cost and timeline assessment and can accommodate for potential requirement changes.

Action - Plan for a multiple partial sanction for each workstream/release.

2. 2018-LL-554

Lesson Learned - Implementing new programs can be challenging. There were no business Subject Matter Experts (“SMEs”) nor technical SMEs that have implemented this new billing program for remote net metered accounts on Distributed Generation. Requirements can potentially change due to difference in regulatory requirement interpretations.

Action - Increase the project risk margin for novel programs to allow for potential requirement changes.

3. 2018-LL-556

Lesson Learned - Business resource availability may affect project time line and delivery during User Acceptance Testing.

Action - Understand resource requirements and reconfirm business availability prior to User Acceptance Testing.



Closure Paper

6 Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	<input checked="" type="radio"/> Yes <input type="radio"/> No
Gate E checklist completed (appl. only to CCD)	<input type="radio"/> Yes <input checked="" type="radio"/> N/A
All relevant costs have been charged to project	<input checked="" type="radio"/> Yes <input type="radio"/> No
All work orders and funding projects have been closed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All unused materials have been returned	<input checked="" type="radio"/> Yes <input type="radio"/> No
All IS Service Transition activities have been completed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All lessons learned have been entered appropriately into the IS Knowledge Management Tool (KMT) lesson learned database	<input checked="" type="radio"/> Yes <input type="radio"/> No

7 Statements of Support

7.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Charles Florczyk	Business Representative
PDM	Deb Rollins	Head of PDM
BRM	Joel Semel	Relationship Manager
PDM	Riziel Cruz-Bower	Program Delivery Director
IS Finance	Michele Harris	Manager
IS Regulatory	Dan DeMauro	Director
DR&S	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Director



Closure Paper

7.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



Closure Template

8 Decisions

I approve this paper.

Signature.....Date.....
David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



Closure Paper

Title:	US SAP: Business Planning Consolidation (BPC) - HANA	Sanction Paper #:	USSC-17-228C
Project #:	INVP 4217 Capex: S007682	Sanction Type:	Closure
Operating Company:	National Grid USA Svc. Co.	Date of Request:	7/10/2018
Author:	Diane Beard / Ella Weisbord	Sponsor:	Peter Fitzgerald, VP Corporate Finance
Utility Service:	IS	Project Manager:	Samir Parikh

1 Executive Summary

This paper is presented to close INVP 4217. The total spend was \$1.852M. The original sanctioned amount for this project was \$2.893M at +/- 10%.

2 Project Summary

This project updated the Business Planning & Consolidation (BPC) solution of SAP to the vendor supported version. In addition, the upgrade supported increased accessibility to planning capabilities in the system and improved forecasting capabilities and enabled accelerated real time insights to variances for improved decision making. Real time variance analysis will allow for increased decision making and the ability to adjust course in a timely manner.

3 Variance Analysis

3.1 Cost Summary Table

Project Sanction Summary (\$M)				
Title	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
INVP 4217 US SAP: Business Planning Consolidation (BPC) - HANA	Capex	2.589	2.633	0.044
	Opex	0.263	0.260	(0.003)
	Removal	0.000	0.000	0.000
	Total	2.852	2.893	0.041

3.2 Cost Variance Analysis

This project did not fully utilize the authorized project spend resulting in an underspend of \$0.041M of the approved amount.



Closure Paper

3.3 Schedule Variance Table

Schedule Variance	
Project Grade - Ready for Use Date	11/30/2017
Actual Ready for Use Date	11/13/2017
Schedule Variance	- 0 years, 0 months, 17 days

3.4 Schedule Variance Explanation

N/A

4 Final Cost by Project

Actual Spending (\$M) vs. Sanction (\$M)				
Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
INVP 4217	Capex	2.589	2.633	0.044
	Opex	0.263	0.260	(0.003)
	Removal	0.000	0.000	0.000
	Total	2.852	2.893	0.041

Actual Spending (\$M) vs. Sanction (\$M)				
Total	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
Total	Capex	2.589	2.633	0.044
	Opex	0.263	0.260	(0.003)
	Removal	0.000	0.000	0.000
	Total	2.852	2.893	0.041

5 Improvements / Lessons Learned/Root Cause

1. SAP Max Attention Go-Live services are provided by SAP to ensure the Go-Live readiness of a particular project. In order to be effective, Max Attention should be engaged early on and consulted throughout the delivery of the project. Engaging Max Attention too late may result in inadequate time to address all findings and recommendations. [2018-LL-531]



Closure Paper

6 Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	<input checked="" type="radio"/> Yes <input type="radio"/> No
Gate E checklist completed (appl. only to CCD)	<input type="radio"/> Yes <input checked="" type="radio"/> N/A
All relevant costs have been charged to project	<input checked="" type="radio"/> Yes <input type="radio"/> No
All work orders and funding projects have been closed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All unused materials have been returned	<input checked="" type="radio"/> Yes <input type="radio"/> No
All IS Service Transition activities have been completed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All lessons learned have been entered appropriately into the IS Knowledge Management Tool (KMT) lesson learned database	<input checked="" type="radio"/> Yes <input type="radio"/> No

7 Statements of Support

7.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	William Donoghue	Business Representative
PDM	Deborah Rollins	Head of PDM
BRM	Joel Semel	Relationship Manager
PDM	Samir Parikh	Program Delivery Director
IS Finance	Michele Harris	Manager
IS Regulatory	Daniel DeMauro	Director
DR&S	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Director



Closure Paper

7.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Anand, Sonny
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



Closure Template

8 Decisions

I approve this paper.

Signature.....Date.....
David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



Closure Template

Title:	SAP Ariba CI and TLS Upgrade	Sanction Paper #:	USSC-17-155C
Project #:	INVP 4397 Capex: S007382	Sanction Type:	Closure
Operating Company:	National Grid USA Svc. Co.	Date of Request:	5/29/2018
Author / NG Representative:	Diane Beard / Brian Conroy	Sponsor:	Doneen Hobbs, SVP Shared Services
Utility Service:	IS	Project Manager:	Samir Parikh

1 Executive Summary

This paper is presented to close INVP 4397. The total spend was \$1.881M. The original sanction amount for this project was \$0.934M.

Note: The latest resanction amount was \$1.729M.

Project Sanction Summary (\$M)				
Title	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
US SAP Ariba TLS and CI upgrade	Capex	1.727	0.834	(0.893)
	Opex	0.154	0.100	(0.054)
	Removal	0.000	0.000	0.000
	Total	1.881	0.934	(0.947)

1.1 Variance Analysis

The original sanction amount of \$0.934M was for the required work to be completed by Wipro for a July go-live date. The work was competitively bid to facilitate effective delivery of the components of the project based on vendor expertise. National Grid selected SAP Ariba as the main hosting vendor while still requiring Wipro support for BASIS, testing, and cutover activities. The original quote underestimated work to be done by SAP Ariba as the hosting vendor by approximately \$0.680M. Additionally, the project go-live date was delayed from July to August due to conflicts with other projects using the required SAP systems at the same time. This delay added an additional \$0.267M to the project costs.



Closure Template

1.2 Schedule Variance

The project go-live date was delayed from July to August due to the fact that the SAP ERP Central Component (ECC), Supplier Relationship Management (SRM) and Process Integration (PI) systems needed for development and testing were not available in time because they were still being used by other projects, which added an additional \$0.300M to the project costs.

Schedule Variance	
Project Grade - Ready for Use Date	12/31/2016
Actual Ready for Use Date	9/11/2017
Schedule Variance	0 years, 8 months, 11 days

2 Project Summary

The project addressed the upgrade of two SAP Enterprise Infrastructure components to mitigate the risk of losing the Ariba connection to National Grid suppliers for the purposes of collaboration, and network activities such as the sending and receiving of purchase orders, as well as other necessary interfaces, such as GridForce. The TLS (Transport Layer Security) provides inbound and outbound communications security over the internet and was required to be upgraded to industry acceptable version 1.2. If the upgrade was not made to TLS version 1.2, National Grid would no longer be able to connect into the Ariba network of suppliers to send or receive purchase orders, invoices, or update shopping carts.

2.1 *In-Service Date*

September 11, 2017



Closure Template

3 Final Cost by Project

Actual Spending (\$M) vs. Sanction (\$M)				
Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
4397	Capex	1.727	0.834	(0.893)
	Opex	0.154	0.100	(0.054)
	Removal	0.000	0.000	0.000
	Total	1.881	0.934	(0.947)

Actual Spending (\$M) vs. Sanction (\$M)				
	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
Total	Capex	1.727	0.834	(0.893)
	Opex	0.154	0.100	(0.054)
	Removal	0.000	0.000	0.000
	Total	1.881	0.934	(0.947)

4 Improvements / Lessons Learned / Root Cause

1. Keep a tight control on vendor invoicing and charges. Make payments soon after work is completed satisfactorily, in order to be able to close the accounting sooner in the cycle. Follow this approach where applicable in all future projects.
2. Need advanced planning to accommodate Verizon Change Request process for implementing firewall changes. Add a task in the project plan at least 4 weeks prior to any connectivity testing being required.
3. Align with vendors/customers for sharing of data/connectivity for validation of test results. Connect Quality Assurance systems to allow for passing of documents to replicate production activities.



Closure Template

5 Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	<input checked="" type="radio"/> Yes <input type="radio"/> No
Gate E checklist completed (appl. only to CCD)	<input type="radio"/> Yes <input checked="" type="radio"/> N/A
All relevant costs have been charged to project	<input checked="" type="radio"/> Yes <input type="radio"/> No
All work orders and funding projects have been closed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All unused materials have been returned	<input checked="" type="radio"/> Yes <input type="radio"/> No
All as-builts have been completed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All lessons learned have been entered appropriately into the lesson learned database	<input checked="" type="radio"/> Yes <input type="radio"/> No

6 Statements of Support

6.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Brian Gehm	Business Representative
PDM	Deb Rollins	Head of PDM
BRM	Joel Semel	Relationship Manager
PDM	Samir Parikh	Program Delivery Director
IS Finance	Michelle Harris	Director
IS Regulatory	Daniel DeMauro	Director
DR&S	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Director
Enterprise Architecture	Joe Clinchot	Director



Closure Template

6.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Anand, Sonny
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



Closure Template

7 Decisions

I approve this paper.

Signature.....Date.....

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



Closure Paper

Title:	Annual HR & Payroll Mandatory Service Pack Upgrade (HRSP), FY18	Sanction Paper #:	USSC-17-024C
Project #:	INVP 4400 Capex: S007583 Capex: S007680	Sanction Type:	Closure
Operating Company:	National Grid USA Svc. Co.	Date of Request:	11/13/2018
Author / NG Representative:	Diane Beard / Ella Weisbord	Sponsor:	Doneen Hobbs, VP US Shared Services
Utility Service:	IT	Project Manager:	Samir Parikh

1 Executive Summary

This paper is presented to close INVP 4400. The total spend was \$1.549M. The original sanctioned amount for this project was \$1.662M at +/- 10%.

2 Project Summary

This project delivered updates to the US SAP application portfolio in order to comply with federal, state, and local government requirements. The updates are mandatory annual changes requested by Federal and State agencies, such as Internal Revenue Services (IRS), various State Departments of Finance, as well as different municipalities, which must be applied to the SAP core solution in order to properly reflect employee wages, employee and company withholdings, legal requirements and to comply with Federal and State regulatory reporting.

3 Variance Analysis

3.1 Cost Summary Table

Project Sanction Summary (\$M)				
Title	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
Annual HR & Payroll Mandatory Service Pack Upgrade (HRSP), FY18	Capex	1.243	1.267	0.024
	Opex	0.306	0.395	0.089
	Removal	0.000	0.000	0.000
	Total	1.549	1.662	0.113



Closure Paper

3.2 Cost Variance Analysis

This project has underspend of \$0.113M due to a decision to postpone two of the updates (C0 & C1 patches) until next fiscal year. The C0 and C1 patches are the collections of technical updates released by SAP in the month of December 2017. The team reviewed the changes and found that it would be more effective to bundle them in 2018 HRSP implementation rather than deploy them individually in 2017. This reduction in scope decreased final project cost.

3.3 Schedule Variance Table

Schedule Variance	
Project Grade - Ready for Use Date	3/31/2018
Actual Ready for Use Date	12/11/2017
Schedule Variance	- 0 years, 3 months, 20 days

3.4 Schedule Variance Explanation

N/A

4 Final Cost by Project

Actual Spending (\$M) vs. Sanction (\$M)				
Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
4400	Capex	1.243	1.267	0.024
	Opex	0.306	0.395	0.089
	Removal	0.000	0.000	0.000
	Total	1.549	1.662	0.113

5 Improvements / Lessons Learned / Root Cause

N/A



Closure Paper

6 Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	<input checked="" type="radio"/> Yes <input type="radio"/> No
Gate E checklist completed (appl. only to CCD)	<input type="radio"/> Yes <input checked="" type="radio"/> N/A
All relevant costs have been charged to project	<input checked="" type="radio"/> Yes <input type="radio"/> No
All work orders and funding projects have been closed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All unused materials have been returned	<input checked="" type="radio"/> Yes <input type="radio"/> No
All IS Service Transition activities have been completed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All lessons learned have been entered appropriately into the IS Knowledge Management Tool (KMT) lesson learned database	<input checked="" type="radio"/> Yes <input type="radio"/> No

7 Statements of Support

7.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Gerard Huntley	Business Representative
Program Delivery Management (PDM)	Deb Rollins	Head of PDM
Business Partner (BP)	Joel Semel	Relationship Manager
Program Delivery Management (PDM)	Samir Parikh	Program Delivery Director
IS Finance	Michelle Harris	Manager
IS Regulatory	Daniel DeMauro	Director
Digital Risk and Security (DR&S)	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Director



Closure Paper

7.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



Closure Template

8 Decisions

I approve this paper.

Signature.....Date.....

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



US Sanction Paper

Title:	Document Management Systems Replacement-Delivery	Sanction Paper #:	USSC-16-297 V3
Project #:	INVP 4408 Capex: S007549	Sanction Type:	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	April 11, 2018
Author:	John Kastler	Sponsor:	Ross Turrini SVP Gas Process Engineering
Utility Service:	IS	Project Manager:	John Kastler

1 Executive Summary

1.1 Sanctioning Summary

This paper requests partial sanction of INVP 4408 in the amount of \$11.090M with a tolerance of +/- 10% for the purposes of Development and Implementation for Wave 1 of the Document Management Replacement project delivery.

This partial sanction amount is \$11.090M broken down into:

- \$9.161M Capex
- \$1.929M Opex
- \$0.000M Removal

NOTE the potential investment of \$13.311M with a tolerance of +/- 25%, contingent upon submittal and approval of a Project Sanction paper following completion of Wave 1.

1.2 Project Summary

The Document Management Systems used to store, retrieve, and update electric, gas and power plant engineering drawings and documents at National Grid are beyond their useful lifespan and are creating an unacceptable level of risk to the Company. Inability to retrieve electric, gas and power plant information and mapping could lead to non-compliance with legal obligations for document storage, and Programs including “Dig-Safe”, leading to risk of accidental system damage. The applications have not been upgraded since their deployment and are now unsupported due to their aging computing technology and software. The downstate TeamCenter application has some components that have shut down and will no longer function properly. The Documentum desktop versions 5.3 and 6.0 are no longer supported by the vendor and are not compatible with Windows 7 operating system. TeamCenter is also not compatible with Windows 7. As a result, some business units have not been able to



US Sanction Paper

upgrade to the Windows 7 environment and are still working on the Windows XP operating system. Some areas are using the web version of Documentum which is cumbersome, slow, and impacting effective operations. Continued use of the XP operating system presents a significant cyber security risk.

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
4408		DMS Replacement Delivery	13.311
Total			13.311

1.4 Associated Projects

Project Number	Project Title	Estimate Amount (\$M)
3985	Document Management System Replacement F&A	0.573
Total		0.573

Note amount is an actual number, not an estimate, as that work is completed.

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Paper Title	Sanction Type	Tolerance
Jan 11, 2017	USSC	\$5.653M	\$8.177M	Document Management System Replacement - Delivery	Partial Sanction	+/- 25%
Nov 9, 2016	USSC	\$1.192M	\$3.657M	Document Management System Replacement - Delivery	Partial Sanction	+/- 25%



US Sanction Paper

Significant cost increases due to additional user groups added to scope and additional time needed to evaluate the end state hosting solution.

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
Jan 2019	Project Sanction

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input checked="" type="radio"/> Other	<p>Maintain supported levels of computing technology used to obtain compliance with, but not limited to, the following state and federal laws and regulations:</p> <p>NY state laws and regulations:</p> <ul style="list-style-type: none"> • 16 NYCRR, Rules and Regulations of the Department of Public Service • 16 NYCRR Section 753, "Dig Safely"; • NY State Public Service Commission Regulation 16 NYCRR 255.17 Preservation of records; • Pipeline and Hazardous Materials Safety Administration (PHMSA) Bulletin 11-01. • Public Service Law, Chapter 48 of the Consolidated Laws • High Voltage Proximity Act, contained in Labor Law, Chapter 31 of the Consolidated Laws, Section 202-h <p>MA state laws and regulations:</p> <ul style="list-style-type: none"> • Chapter 82, Section 40A <p>RI state laws and regulations:</p> <ul style="list-style-type: none"> • RIGL § 39-1.2-1, et seq. • RI Division of Public Utilities and Carriers Rules and Regulations Prescribing Standards for Gas Utilities, Master Meter Systems and Jurisdictional Propane Systems, at Section G (Records and Reports)



US Sanction Paper

	<ul style="list-style-type: none"> RI Division of Public Utilities and Carriers Standards for Electric Utilities, at Section 1.9 (Records and Report)
--	--

1.8 Asset Management Risk Score

Asset Management Risk Score: 48

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability
 Environment
 Health & Safety
 Not Policy Driven

1.9 Complexity Level

- High Complexity
 Medium Complexity
 Low Complexity
 N/A

Complexity Score: 17

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

- Yes
 No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)



US Sanction Paper

IS Investment Plan FY 18/22	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input checked="" type="radio"/> Under <input type="radio"/> NA	\$0.686M
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1.12 If cost > approved Business Plan how will this be funded?

N/A

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
CapEx	2.646	2.726	4.401	1.183	0.000	0.000	0.000	10.956
OpEx	0.320	0.508	1.212	0.315	0.000	0.000	0.000	2.355
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	2.966	3.234	5.613	1.498	0.000	0.000	0.000	13.311

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	Oct 2016
Partial Sanction	Nov 2016
Begin Requirements and Design	Nov 2016
Partial R&D Sanction	Jan 2017
Partial D&I sanction	Apr 2018
Begin Development and Implementation	Apr 2018
Project Sanction	Jan 2019
Move to Production / Last Go Live	Sep 2019
Project Complete	Oct 2019
Sanction Closure	Dec 2019

1.15 Resources, Operations and Procurement

Resource Sourcing		
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor



US Sanction Paper

Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green

1.16 Key Issues (include mitigation of Red or Amber Resources)

N/A

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative

1.18 List References

N/A



US Sanction Paper

2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on April 11, 2018:

- (a) APPROVED the investment of \$11.090 M and a tolerance of +/-10% for the purposes of development and implementation for Wave 1.
- (b) NOTED the potential run-the-business (RTB) impact of \$1.696M (per annum) for 5 years.
- (c) NOTED the potential investment of \$13.311M and a tolerance of +/-25% contingent upon submittal and approval of a Project Sanction paper following completion of Wave 1.
- (d) NOTED that Michelle McNaught has the approved financial delegation to undertake the activities stated in (a).

Signature.....Date.....

David H. Campbell, Vice President, ServCo Business Partnering, USSC Chair



US Sanction Paper

3 Sanction Paper Detail

Title:	Document Management Systems Replacement-Delivery	Sanction Paper #:	USSC-16-297 V3
Project #:	INVP 4408 Capex: S007549	Sanction Type:	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	April 11, 2018
Author:	John Kastler	Sponsor:	Ross Turrini SVP Gas Process Engineering
Utility Service:	IS	Project Manager:	John Kastler

3.1 Background

The Document Management Systems used to store, retrieve, and update electric, gas and power plant engineering drawings and documents at National Grid are beyond their useful lifespan and are creating an unacceptable level of risk to the Company. Inability to retrieve electric, gas and power plant system information and mapping could lead to non-compliance with legal obligations for document storage, and programs including “Dig-Safe”, leading to risk of accidental system damage. The applications have not been upgraded since their deployment and are now unsupportable due to their aging computing technology and software. The downstate TeamCenter application includes some components that have shut down and will no longer function properly. The Documentum desktop versions 5.3 and 6.0 are no longer supported by the vendor and are not compatible with Windows 7 operating system. TeamCenter is also not compatible with Windows 7. As a result, some business units have not been able to upgrade to the Windows 7 environment and are still working on the Windows XP operating system. Some areas are using the web version of Documentum which is cumbersome, slow, and impacting operational effectiveness. Continued use of the XP operating system presents a significant cyber security risk.

During the first half of 2016, National Grid conducted a study of five vendors to identify a suitable application for the replacement of the current Document Management Systems. This investment will provide funding for the purchase and deployment of the preferred application from the commercial Request For Proposal (RFP) event. By investing in a new Document Management System, National Grid will reduce or eliminate risks associated to the current document storage methodologies in use by the electric, gas and power plant business units.



US Sanction Paper

3.2 Drivers

Failure of the Document Management System, including an inability to retrieve detail system drawings and maps, would adversely affect Company operations and may prevent National Grid from meeting regulatory and legal obligations, including, but not limited to:

NY state laws and regulations:

- NY state law, Code rule 753, "Dig Safely" requires National Grid to mark out gas mains in 48 to 72 hours.
- NY State Public Service Commission NYCRR Title 16 Part 255.17 "Preservation of Records," which requires records for any pipeline designed to operate at 125 psig or more to be retained for as long as the line remains in service.
- PHMSA Bulletin 11-01, which requires a pipeline operator to "search, review and scrutinize documents and records, including but not limited to, all as-built drawings, alignment sheets, and specifications, and all design, construction, inspection, testing, maintenance, manufacturer, and other related records. These records shall be traceable, verifiable, and complete."
- 16 NYCRR, Rules and Regulations of the Department of Public Service
- Public Service Law, Chapter 48 of the Consolidated Laws
- High Voltage Proximity Act, contained in Labor Law, Chapter 31 of the Consolidated Laws, Section 202-h

MA state laws and regulations:

- Chapter 82, Section 40A

RI state laws and regulations:

- RIGL § 39-1.2-1, et seq.
- RI Division of Public Utilities and Carriers Rules and Regulations Prescribing Standards for Gas Utilities, Master Meter Systems and Jurisdictional Propane Systems, at Section G (Records and Reports)
- RI Division of Public Utilities and Carriers Standards for Electric Utilities, at Section 1.9 (Records and Report)

Over time, the business has adopted different strategies to manage document storage, including the use of TeamCenter, Documentum, and uncontrolled shared file systems. The result is that the business has multiple processes for storing documents, and has difficulty sharing information across departments. "File Share" based document storage methods do not provide the necessary controls, and documents are at risk of being inaccurate or deleted altogether. Different unsupported Document Management systems across the enterprise have created many operational and support issues.



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3.3 Project Description

This investment will deploy the OpenText Document Management System selected in the commercial Request For Proposal (RFP) event executed in the first half of 2016. Deployment of the new Document Management System will provide a secure and reliable storage solution to serve the needs of the gas and electric business units. The project will be executed using internal National Grid resources, Solution Delivery Center partners, and professional services from the software vendor. Included in the scope of this project:

- Secure the necessary licenses, computing infrastructure, and professional services to deploy the product with minimal risk on the OpenText hosting platform;
- Design solution to meet business end to end process requirements;
- Deployment of the new Document Management System will follow a phased in approach, with the scheduling and deployment determined by business priority;
- Deployment of the new Document Management System will include conversion of existing gas and electric documents stored in the current applications and shared file folders;
- Upgrade existing AutoCAD 2008 clients to current AutoCAD version to be compatible with the replacement Document Management System.

The scope of the project has been increased to include:

- Approximately 7K additional documents to be migrated for Gas Engineering Design (GED) – Downstate New York (NY) beyond what was originally known
- Addition of GED Upstate NY group
- Addition of GED New England (NE) group
- Addition of Operations and Support NY group
- There are Approximately 250K additional documents to be migrated for Electric beyond what was originally known
- Addition of Transmission NY and NE groups
- Addition of Distribution group
- Minor customization work
- Additional Open Text Modules/Licenses (Blazon for Content Suite, Blazon for Content Suite Add On, Object Importer, Remote Cache)
- AutoDesk product related work:
 - Purchase of additional AutoCAD and AutoDesk Architecture licenses – some of the current licenses are not eligible for upgrade
 - Replacing AutoDesk product license servers to allow the servers to be compatible with the new license server software
 - Migrating AutoCAD customizations
 - Creating AutoDesk product installer packages
 - AutoCAD training for Power Plant Operations team (for differences between AutoCAD 2009 and AutoCAD 2017).

Additional factors that have contributed to the costs for this project include:



US Sanction Paper

- Revised hosting costs, which are more expensive than originally estimated.
- Due to the complexity and scale of the server configurations, greater than expected timeframe to evaluate the most effective end state hosting solution.
- Additional Open Text licenses and modules needed than previously estimated.

3.4 Benefits Summary

Investment in a Document Management System will result in the following benefits to National Grid:

- Mitigates risk associated with inability of the document management system to retrieve accurate system documentation and maps. Key risks include:
 - More than two million drawings supporting Electric System, Gas engineering and Power Plant Operations, could be lost if the Company's current Document Management Systems fail. These drawings and files are the backbone of the business and serve as documentation of assets.
 - Accidental damage to Company assets due to improper mark out or site details, and/or fines and litigation costs associated with improper site mark out.
 - Power Plant Operation process safety hazards.
 - Degradation of relationships with municipalities should National Grid be unable to produce requested information in a reasonable amount of time.
 - Risk of fines if National Grid documentation is unable to meet regulatory requirements.
 - Negative Impact to normal operations if detail drawings and maps are unavailable.
 - Mitigates cyber security risk associated with the continued use of the unsupported XP operating systems.
- Assures reliability of document retrieval and version control allowing National Grid to accurately locate gas mains and electric assets.

3.5 Business and Customer Issues

There are no significant business or customer issues beyond what has been described elsewhere.

3.6 Alternatives

Alternative 1: Do Nothing

The potential risks to National Grid associated to the current Document Management Systems are unacceptable and require remediation at this time. Doing nothing or



US Sanction Paper

delaying this investment is not an acceptable option due to the potential risks associated to the current document storage methods. Thus, this alternative is not recommended going forward.

Alternative 2: Store documents without a Document Management System

The business has adopted different strategies to manage document storage, including the use of uncontrolled shared file systems. “File Share” based document storage does not provide the necessary controls, and documents are at risk of being inaccurate or deleted altogether. Thus, this alternative is not recommended going forward.

Alternative 3: Upgrade Teamcenter and Documentum

This alternative would not allow National Grid to benefit from synergies associated with deployment of a common solution for all US businesses. Optimal alignment of business requirements to the replacement Document Management System capabilities may not be achieved without the execution of the RFP process. With the Purchase of Documentum from Dell EMC, the Company would end up on Open Text eventually at greater cost. Thus, this alternative is not recommended.

3.7 Safety, Environmental and Project Planning Issues

There are no significant issues beyond what has been described elsewhere.

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	There is a risk that the TeamCenter application may fail before new DMS system is deployed	5	5	1	25	5	Mitigate	Project implementation planning will favor high risk business areas first.	None.	Continue delivery strategy while clients execute Business Continuity Plans.
2	There is a risk that Documentum may fail due to unsupported software levels	2	5	1	10	2	Mitigate	Monitor Documentum system health and usability.	None.	Continue delivery strategy while clients execute Business Continuity Plans.
3	There is a risk that the data/document migration may be more complex than anticipated.	3	4	3	12	9	Mitigate	Data reviews, migration design reviews, and mock migrations will be planned.	None.	Risk money may be needed or worst case a resanction could be required for the time and money to complete the work.



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3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
4408	DMS Replacement Delivery	Est Lvl (e.g. +/- 25%)	CapEx	2.646	2.726	4.401	1.183	0.000	0.000	0.000	10.956
			OpEx	0.320	0.508	1.212	0.315	0.000	0.000	0.000	2.355
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	2.966	3.234	5.613	1.498	0.000	0.000	0.000	13.311
Total Project Sanction			CapEx	2.646	2.726	4.401	1.183	0.000	0.000	0.000	10.956
			OpEx	0.320	0.508	1.212	0.315	0.000	0.000	0.000	2.355
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	2.966	3.234	5.613	1.498	0.000	0.000	0.000	13.311



US Sanction Paper

3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
\$M								
CapEx	2.646	3.404	5.686	0.108	0.000	0.000	0.000	11.844
OpEx	0.320	0.885	0.712	0.236	0.000	0.000	0.000	2.153
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	2.966	4.289	6.398	0.344	0.000	0.000	0.000	13.997

Variance (Business Plan-Project Estimate)

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
\$M								
CapEx	0.000	0.678	1.285	(1.075)	0.000	0.000	0.000	0.888
OpEx	0.000	0.377	(0.500)	(0.079)	0.000	0.000	0.000	(0.202)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	1.055	0.785	(1.154)	0.000	0.000	0.000	0.686

3.11.3 Cost Assumptions

This estimate was developed in 2018 using the standard IS estimating methodology which includes an assessment of project resource needs. Examples of these resource needs include hardware, software, internal and contract labor required to deliver the project. The accuracy level of estimate for each project is identified in table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

This is not an NPV project.

3.11.4.1 NPV Summary Table

This is not an NPV project.

3.11.4.2 NPV Assumptions and Calculations

Not Applicable.



US Sanction Paper

3.11.5 Additional Impacts

None.

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Role	Individual
Business Executive Sponsor	Ross Turrini
Head of PDM	Deb Rollins
Relationship Manager	Aman Aneja
Program Delivery Manager	Michelle McNaught
IS Finance Management	Michelle Harris
IS Regulatory	Dan DeMauro
DR&S	Elaine Wilson
Service Delivery	Mark Mirizio
Enterprise Architecture	Svetlana Lyba

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual	Area
Regulatory	Harvey, Maria	IS
Jurisdictional Delegate(s)	Anand, Sonny	Electric - NE
	Harbaugh, Mark	Electric - NY
	Hill, Terron	FERC
	Currie, John	Gas - NE
	Wolf, Don	Gas - NY
Procurement	Chevere, Diego	All



US Sanction Paper

4 Appendices

4.1 Sanction Request Breakdown by Project

\$M	4408	Total
CapEx	9.161	9.161
OpEx	1.929	1.929
Removal	0.000	0.000
Total	11.090	11.090

4.2 Other Appendices

4.2.1 Project Cost Breakdown

Project Cost Breakdown \$ (millions)						
Cost Category	sub-category	VOWD	FTC	FAC=VOWD+FTC	Name of Firm(s) providing	
Personnel	NG Resources	0.643	0.895	1.538		
	SDC Time & Materials		0.384	0.776	1.160	IBM
			0.256	0.463	0.719	WiPro
			0.047	-	0.047	DXC
			0	0.015	0.015	Verizon
	SDC Fixed-Price		0	-	-	IBM
			0	-	-	WiPro
			0	0.016	0.016	DXC
			0	-	-	Verizon
		All other personnel	1.096	0.154	1.250	
	TOTAL Personnel Costs	2.426	2.320	4.746		
Hardware	Purchase	0	0.027	0.027		
	Lease	0.155	0.550	0.705		
Software		2.561	0.893	3.454		
Risk Margin			0.576	0.576		
AFUDC		0.286	1.285	1.571		
Other		0.125	2.107	2.232		
	TOTAL Costs	5.553	7.758	13.311	Should match Financial Summary Total	



US Sanction Paper

4.2.2 Benefiting Operating Companies

This investment will benefit electric generation, transmission, and distribution, and gas transmission and distribution companies.

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp.	Electric Distribution	NY
Niagara Mohawk Power Corp.	Gas T&D	NY
Niagara Mohawk Power Corp.	Transmission	NY
KeySpan Energy Delivery New York	Gas T&D	NY
KeySpan Energy Delivery Long Island	Gas T&D	NY
Massachusetts Electric Company	Electric Distribution	MA
Massachusetts Electric Company	Transmission	MA
Nantucket Electric Company	Electric Distribution	MA
Boston Gas Company	Gas T&D	MA
Colonial Gas Company	Gas T&D	MA
The Narragansett Electric Company	Electric Distribution	RI
The Narragansett Electric Company	Gas Distribution	RI
The Narragansett Electric Company	Transmission	RI
New England Power Company	Transmission	MA
NE Hydro - Trans Electric Co.	Transmission Hydro	MA
New England Hydro - Trans Corp.	Transmission Hydro	NH
New England Electric Trans Corp	Transmission Hydro	NH
KeySpan Generation LLC (PSA)	Ele Generation	NY
KeySpan Glenwood Energy Center	Ele Generation	NY
KeySpan Port Jefferson Energy Center	Ele Generation	NY



US Sanction Paper

4.2.3 Ongoing Operational Costs (RTB):

This project will impact IS ongoing operations support costs as per the following table. These are also known as Run the Business (RTB) costs.

INV ID:	4408				Forecast Date:	01/11/18
Investment Name:	Document Management System Replacement-Delivery				Go-Live Date:	Oct-19
Project Manager:	John Kastler			PDM:	Michelle McNaught	
All figures in \$ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 18/19	FY 19/20	FY 20/21	FY 21/22	FY 22/23	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB	1,151.0	1,199.0	1,188.0	3,744.0	3,744.0	11,026.0
Last Sanction Business Net Impact to RTB	-	-	-	-	-	-
Last Sanction Total Net Impact to RTB	1,151.0	1,199.0	1,188.0	3,744.0	3,744.0	11,026.0
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB	1,301.1	1,851.6	1,851.6	1,851.6	1,851.6	8,707.5
Business Budgeted Net Impact to RTB	-	-	-	-	-	-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	688.9	1,696.2	1,696.2	1,696.0	1,696.0	7,473.3
Business Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	612.2	155.4	155.4	155.6	155.6	1,234.2
Business Budgeted Net Impact to RTB Variance	-	-	-	-	-	-

4.3 NPV Summary

N/A

4.4 Customer Outreach Plan

N/A



US Sanction Paper

Title:	New Customer Connections Program	Sanction Paper #:	USSC-16-260 v3
Project #:	INVP 4411 Capex: S007322	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	7/11/2018
Author:	Suzanne Rodriques	Sponsor:	Kelly Carney, VP Customer Exp and SysTransformation
Utility Service:	IS	Project Manager:	Jatinder P. Singh

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of INVP 4411 in the amount of \$8.362M with a tolerance of +/- 10% for the purposes of Full implementation.

This sanction amount is \$8.362M broken down into:

- \$6.671M Capex*
- \$1.691M Opex*
- \$0.000M Removal*

1.2 Project Summary

In September 2015, a five-year program was developed by the Customer Organization designed to systematically address a number of initiatives under the umbrella of the Customer Experience Transformation Strategy (CXT). These initiatives are expected to deliver significant Customer Experience improvements. Two of the initial projects identified were the DG Portal and the New Electric Connections portal. While these projects were initially identified separately, from the process and customer perspective, there is significant similarity in workflow management and they therefore are being addressed as a combined *New Customer Connections Program* with several phases to be delivered through FY19.

The program delivered the Distributed Generation Interconnection Online Application Portal (DG IOAP Phase 1, Release 1) for New York in May 2017. It also delivered on DG IOAP for New England with incremental releases occurring in November 2017, February 2018, April 2018 and May 2018. Requirements, initial design and partial build have been conducted for New Electric connections. In order to better align with the Gas Business Enablement (GBE) Program, the decision to remove New Gas connections from the New Customer Connections Program was made in April 2018.



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This final program sanction request is to further enhance the Online Application Portal by developing and implementing capabilities for New Electric Connections.

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
4411A		Distributed Generation NY	2.914
4411B		Distributed Generation NE	1.741
4411C		New Electric Connectionc	3.707
Total			8.362

In April 2018 it was decided to eliminate 4411D – New Gas Connections from this program to better align with the Gas Business Enablement Program.

1.4 Associated Projects

Project Number	Project Title	Estimate Amount (\$M)
3941	Distributed Generation Application Tracking	0.429
Total		0.429

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Potential Investment Tolerance
5/10/17	USSC	\$5.217M	\$6.203M	Partial	25%
9/14/16	USSC	\$3.207M	\$6.332M	Partial	25%

Although the program has eliminated the 4411D – New Gas Connections project, the overall program costs have increased. The increase is due to the following factors:

- Delays and additional work to accommodate changes to the tariffs
- Delays in delivering on DG NE Complex due to business availability for definition and testing
- Increase in scope to accommodate RI Regrowth program
- Additional requirements for New Electric Connections uncovered during requirements and design phase, including an increase from four (4) estimated



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- back-end interfaces to twenty-one (21) in order to deliver on the minimal viable product
- Increased costs and timeline to deliver a better user experience for Electric Connections and Distributed Generation as identified by the Voice of Customer workshops

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
June 2019	Project Closure Sanction

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input checked="" type="radio"/> Other	This program will fund three projects; one of which is mandatory and the others are policy-driven. The individual project sanction documents will identify the Category for the deliverables within each project as identified in Section 1.3.

1.8 Asset Management Risk Score

Asset Management Risk Score: 49

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability
 Environment
 Health & Safety
 Not Policy Driven

1.9 Complexity Level

- High Complexity
 Medium Complexity
 Low Complexity
 N/A



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Complexity Score: N/A

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

Yes No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY19-23	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	\$3.385M

1.12 If cost > approved Business Plan how will this be funded?

Re-allocation of funds within the IS budget has been managed and approved to meet jurisdictional budgetary, statutory and regulatory requirements.

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
CapEx	3.816	2.855	0.000	0.000	0.000	0.000	0.000	6.671
OpEx	1.008	0.676	0.007	0.000	0.000	0.000	0.000	1.691
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	4.824	3.531	0.007	0.000	0.000	0.000	0.000	8.362



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1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	September 2016
Partial Sanction	September 2016
Begin Requirements and Design	September 2016
Program Sanction	July 2018
Begin Development and Implementation	November 2016
Move to Production / Last Go Live	February 2019
Program Complete	March 2019
Program Closure	June 2019

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green

1.16 Key Issues (include mitigation of Red or Amber Resources)

1	Inconsistent data quality and formatting across all business systems could cause delays in data sharing across systems. This has the potential of
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	delaying the project to address data exceptions not accounted for in the transformation layer.
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1.17 Climate Change

Contribution to National Grid’s 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative

1.18 List References

N/A



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2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on 07/11/2018:

- (a) APPROVE this paper and the investment of \$8.362M and a tolerance of +/-10% for the purposes of Development and Implementation.
- (b) APPROVE the run-the-business (RTB) of \$0.960M (per annum) for five (5) years.
- (c) NOTE that Michelle McNaught is the Program Delivery Director and has the approved financial delegation.

Signature.....Date.....

David H. Campbell, Vice President, ServCo Business Partnering, USSC Chair



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3 Sanction Paper Detail

Title:	New Customer Connections Program	Sanction Paper #:	USSC-16-260 v3
Project #:	INVP 4411 Capex: S007322	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	7/11/2018
Author:	Suzanne Rodriques	Sponsor:	Kelly Carney, VP Customer Exp and SysTransformation
Utility Service:	IS	Project Manager:	Jatinder P. Singh

3.1 Background

Distributed Generation (DG) customer integration into the National Grid electric network is a fast growing area of our business that is regulated and mandated across all National Grid electric service territories. Each state has its own interconnection tariff, which outlines the process, forms, cost, timelines, penalties, and tracking and reporting requirements for administering the end to end DG interconnection process.

The New York Public Service Commission (NYPSC) requires that all electric distribution companies create and manage an online portal for DG application submissions (“NY State Standardized Interconnection Requirements and Application Process for New Distributed Generators 2 MW or Less Connected in Parallel with Utility Distribution Systems,” Section I. D). The Massachusetts Department of Public Utilities (DPU) has implemented a penalty-based enforcement mechanism with penalties up to \$1.5 million/year, which requires verifiable tracking of application process time dependencies for DG applications.

The National Grid Distributed Generation team administers the DG interconnection process for all customer-owned DG applications in all of National Grid’s electric service territories. National Grid processed over 25,000 DG applications in 2016, and it was projected that the volume would double in coming years, exceeding the capability of legacy tools and processes. Investigation into the DG process and systems revealed that a very similar workflow process is followed for new connections for gas and electric service.

In the Spring of 2016, an RFP was conducted, under INVP 3941, to identify a vendor to assist in fulfilling the NY mandate for an online DG portal. Six vendors responded to the RFP and were evaluated on the software functionality, workflow configuration, implementation, Customer Experience Transformation Strategy (CXT) expandability, architecture, security, support and pricing. Two of the vendors were brought back to provide a demonstration of functionality and answer further questions.



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Salesforce/Accenture was the only solution that met the major criteria identified by National Grid. A Feasibility and Analysis study was then undertaken to develop the high level requirements, cost and timeline for a multi-phase implementation of a strategic, secure and reliable solution that meets regulatory requirements and implements efficient business processes. This program also will satisfy a portion of the CXT Strategy, whose goal is to enable new capabilities for delivering on an improved experience including replacing end of life digital platforms and delivering new levels of customer self-service and communication across multiple channels.

National Grid has implemented a standard business process for all connections and increased the web-based self-service offerings to include New Electric Connections. This program has delivered on:

4411A – Distributed Generation NY in May 2017.

4411B – Distributed Generation NE in November, 2017 for Simple NE applications; in February 2018 and April 2018 for enhancements for Rhode Island Re-growth; and in May 2018 for Complex NE applications.

4411C – New Electric Connections high level requirements, initial design and partial build.

In April 2018, it was decided to eliminate **4411D – New Gas Connections** from this program to better align with the Gas Business Enablement program.

The automation of Standardized Interconnection Requirements (SIR) technical screenings (DG IOAP Phase 2) will be delivered under separate sanction papers.

3.2 Drivers

The key drivers of this investment are:

- Ensure compliance with the NY PSC's and MA DPU's Distributed Generation mandates
- Improve customer satisfaction with an online portal that provides the customer visibility of an application's progress
- Improve efficiency of National Grid US Distributed Generation processes in MA, NY and RI
- Improve efficiency of National Grid US New Customer Connections processes in MA, NY and RI
- Provide a system of record for DG information



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3.3 Project Description

This program will provide an online portal for customers to request DG interconnections and new electric customer connections. The program will deliver on regulatory requirements pertaining to DG, and establish a system of record for all Distributed Generation information. Additionally, because of the workflow synergy with new customer connections, the program will also deliver new processes for the business and offer self-service for all connection processes.

The program will be implemented in multiple releases, beginning with NY DG. Delivery will consist of a full process reengineering effort to build the best future state scenario for customers. In both the DG and connections areas, new capabilities for customer self-service will be added and the process will be redesigned to enable a streamlined and intuitive customer experience. As described in Section 4.4, National Grid will use Voice of Customer (VOC) feedback to inform the design of the portal throughout the process.

The New Customer Connections workflow structure is being built utilizing Salesforce and incorporating into the existing National Grid CRM solution, known as Gridforce. The core workflow structure has been built, and has been configured to the NY & NE DG requirements. This new workflow structure provides ease of changing the workflow steps, timelines and processes that can be performed by a system administrator. Integration to the electric customer system has been established as well as to one of the existing work management systems.

In the final phase of the program, the portal will be configured for New Electric Connections. In addition to the integration to the customer systems, existing work management systems for back-end data will be implemented to automate many of the manual tasks performed today.

The online portal primarily services contractors doing repeated work with National Grid. Each contractor will have a logon profile, be able to apply for service online and be able to see the status of their work with National Grid. They will also be notified via email on status changes or if there is a need for additional information.

The projects will be delivered utilizing a hybrid agile development methodology, and will be managed as a single program to drive maximum efficiency. The project will be executed using internal National Grid and external Accenture vendor resources. The program will be overseen by the New Customer Connections program board.

The program is divided into the following projects:

1. **INVP 4411A** - Distributed Generation for NY: This project includes the establishment of a robust workflow management tool that is the foundation for all other customer connections. It included integration to back-end systems for productivity



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improvements, and included the following:

- DG NY processes for Simple, Complex, Standard and Cost Estimate for the Coordinated Electric System Interconnection Review (CESIR) applications
- Ability to track the lifecycle from beginning to end across regions according to existing and historic tariff definitions
- Milestone management and tracking
- Maximized standardization by allowing real-time validation of application input fields
- Data migration for historic and in-flight DG for NY
- Secure login and user management
- Standardized reporting capabilities
- Standardized emails and email capability between DG personnel and applicants
- Digital document generation to eliminate paper
- E-signature technology to increase processing speed and security
- External user knowledge base; streamlined and updated web content for DG

2. **INVP 4411B** - Distributed Generation for MA and RI: This project enhanced the system integration for all DG to further improve productivity as well as deliver:

- DG MA processes for Simple, Complex and Expedited applications, Impact studies
- DG RI processes for Simple, Complex and Expedited applications, Impact studies
- Data migration for historic and in-flight DG data for MA and RI

3. **INVP 4411C** - New Electric Connections: This project will utilize the base workflow to deliver:

- The application process for New Electric Connections for MA, NY and RI to include Simple, Complex, Fast Track, Upgrades and Disconnect/Reconnect
- Up-to-date status of an application
- A more-intuitive user experience
- Additional back-end integration to provide near real-time Work Request numbers, where possible.

Factors that contribute to the increase in costs for this program include:

- Ongoing changes to the Standard Interconnection Requirements (SIR) tariffs throughout the project;
- User Experience modifications to the existing interface as identified by the Voice of Customer (VOC) sessions;
- Four-fold increase in the number of integration points to back-end systems to produce a good user experience that will drive calls away from the contact centers; and
- Significant increase in the number of automated forms from initial estimates.



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3.4 Benefits Summary

This investment will deliver the following benefits:

- Satisfy regulatory mandates for electronic submission of Distributed Generation (DG) applications and “chess clock” like methods for tracking application processing time dependencies
- Lower risk of potential fines for non-compliance by making timelines more visible and providing notification as due dates are approaching
- Streamline, automate and centralize the management of DG application processes which currently rely heavily on manual processes to support 25K to 40K DG applications per year
- Improve customer satisfaction by providing a single source for all connection information
- Streamline, automate and centralize the management of New Electric application processes which currently rely heavily on manual processes to support 60K to 75K applications per year

3.5 Business and Customer Issues

Customer adoption of the new process is crucial to the success of the project. The online process will be built to be intuitive, will include a new user Knowledge Base and interactive communication for customers and contractors while working with online applications and forms. As described in Section 4.4, National Grid has and will be using the Voice of Customer (VOC) throughout the design and delivery of this portal project to ensure the project meets customer expectations.

3.6 Alternatives

Alternative 1: Do Nothing

This option was rejected because it leaves National Grid non-compliant for a DG portal in NY. It also leaves National Grid vulnerable to being non-compliant with regulations in other states.

Alternative 2: Defer the Project

This option was rejected because of the rapid growth of DG application volume and NY PSC target of creating Web based application monitoring capabilities.

Alternative 3: Deliver Only Distributed Generation

This option was rejected because of the rapid growth of New Connections volume. Omitting the New Connections in this program delays delivering on the Customer



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Experience Transformation strategy and does not allow us to take advantage of the synergies of delivering both DG and New Customer Connections in tandem.

3.7 Safety, Environmental and Project Planning Issues

There are no significant issues beyond what has been described elsewhere.

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	Business resources may not be available due to other critical initiatives or day to day jobs.	3	4	4	12	12	Mitigate	Get a firm commitment for IS, Vendor and Business resources early on with an appropriate backfill resource plan as needed.	Cost and Schedule impacts	Re-prioritize deliverables and adjust resource allocation or secure alternate resources to keep cost and schedule in check.
2	There may be conflicts with other projects and BAU activities that could impact this Program.	3	4	4	12	12	Mitigate	Identify dependent projects/systems early on and adjust delivery schedule accordingly.	Service benefit impacts, Cost and Schedule impacts	Monitor dependent projects and availability of dependent systems. Deploy appropriate approach to mitigate delays.

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A



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3.10.3 CIAC / Reimbursement

	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
\$M								
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total	
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +		
4411A	Distributed Generation NY	Est Lvl (e.g. +/- 10%)	CapEx	2.253	(0.018)	0.000	0.000	0.000	0.000	0.000	0.000	2.235
			OpEx	0.679	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.679
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	2.932	(0.018)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4411B	Distributed Generation NE	Est Lvl (e.g. +/- 10%)	CapEx	1.357	0.100	0.000	0.000	0.000	0.000	0.000	0.000	1.457
			OpEx	0.247	0.037	0.000	0.000	0.000	0.000	0.000	0.000	0.284
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	1.604	0.137	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4411C	New Electric Connections	Est Lvl (e.g. +/- 10%)	CapEx	0.206	2.773	0.000	0.000	0.000	0.000	0.000	0.000	2.979
			OpEx	0.082	0.639	0.007	0.000	0.000	0.000	0.000	0.000	0.728
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.288	3.412	0.007	0.000	0.000	0.000	0.000	0.000	0.000
Total Project Sanction			CapEx	3.816	2.855	0.000	0.000	0.000	0.000	0.000	0.000	6.671
			OpEx	1.008	0.676	0.007	0.000	0.000	0.000	0.000	0.000	1.691
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	4.824	3.531	0.007	0.000	0.000	0.000	0.000	0.000	8.362



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3.11.2 Project Budget Summary Table

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
\$M								
CapEx	3.816	0.119	0.000	0.000	0.000	0.000	0.000	3.935
OpEx	1.008	0.034	0.000	0.000	0.000	0.000	0.000	1.042
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	4.824	0.153	0.000	0.000	0.000	0.000	0.000	4.977

Variance (Business Plan-Project Estimate)

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
\$M								
CapEx	0.000	(2.736)	0.000	0.000	0.000	0.000	0.000	(2.736)
OpEx	0.000	(0.642)	(0.007)	0.000	0.000	0.000	0.000	(0.649)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	(3.378)	(0.007)	0.000	0.000	0.000	0.000	(3.385)

3.11.3 Cost Assumptions

This estimate was developed in 2018 using the standard IS estimating methodology, which includes an assessment of project costs. Examples of these project costs are internal and contract labor, hardware and software to deliver the project, cost of living adjustments for multi-year projects, AFUDC for capital investments, risk, as well as ongoing support costs. Utilizing the Financial Workbook, standard rates are used in the estimate to promote consistency (ex: internal labor rates, cost of living adjustments %, AFUDC % and risk %). The accuracy level of estimate is identified in Table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

This is not an NPV project.

3.11.4.1 NPV Summary Table

N/A

3.11.4.2 NPV Assumptions and Calculations

N/A



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3.11.5 Additional Impacts

None.

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Kelly Carney	Business Representative
PDM	Deb Rollins	Head of PDM
BRM	Aman Aneja	Relationship Manager
PDM	Michelle McNaught	Program Delivery Director
IS Finance	Michelle Harris	Director
IS Regulatory	Daniel DeMauro	Director
DR&S	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Director
Enterprise Architecture	Joseph Clinchot	Director

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Anand, Sonny
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



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4 Appendices

4.1 Sanction Request Breakdown by Project

N/A

4.2 Other Appendices

4.2.1 Project Cost Breakdown

Project Cost Breakdown \$ (millions)						
Cost Category	sub-category	VOWD	FTC	FAC=VOWD+FTC	Name of Firm(s) providing	
Personnel	NG Resources	0.796	0.396	1.192		
	SDC Time & Materials		0.874	0.501	1.375	IBM
			0.507	0.284	0.791	WiPro
			0.000	-	-	DXC
			0.008	0.020	0.028	Verizon
			0.000	-	-	IBM
	SDC Fixed-Price		0.000	-	-	WiPro
			0.000	-	-	DXC
			0.000	-	-	Verizon
			0.000	-	-	
	All other personnel	2.261	1.526	3.787	Accenture, KSV	
TOTAL Personnel Costs	4.446	2.727	7.173			
Hardware	Purchase	0.000	-	-		
	Lease	0.000	-	-		
Software		0.383	0.186	0.569	Salesforce, Adobe, Form Assembly, Conga	
Risk Margin			0.283	0.283		
AFUDC		0.083	0.099	0.182		
Other		0.068	0.088	0.156	Shared Overhead	
TOTAL Costs		4.980	3.382	8.362		

4.2.2 Benefiting Operating Companies

The following companies will benefit from this program. The allocation of these benefits will be based upon the number of customers, and will vary for each project within the program.

4.2.2.1 INVP 4411A Distributed Generation NY

For **INVP 4411A Distributed Generation NY** project, the costs will be allocated to Niagara Mohawk Power Corp. for Electric Distribution.



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This project will also deliver the core system for all connections. Therefore, as each subsequent project is released into production, it will share in the amortization of the core system project costs as well.

Distributed Generation NY Allocation:

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp.	Electric Distribution	NY

Core system Amortization Allocation:
 Release of INVP 4411B – Distribution NY

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp.	Electric Distribution	NY

4.2.2.2 INVP 4411B Distributed Generation NE

For **Distributed Generation NE** project, the costs will be allocated by the number of customers across all New England Electric companies.

Operating Company Name	Business Area	State
Massachusetts Electric	Electric Distribution	MA
Nantucket Electric Company	Electric Distribution	MA
Narragansett Electric Company	Electric Distribution	RI

Also, upon implementation of the Distributed Generation NE project, the core system Amortization Allocation will be modified to include the additional benefiting NE companies, and will become allocated as follows:

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp.	Electric Distribution	NY
Massachusetts Electric	Electric Distribution	MA
Nantucket Electric Company	Electric Distribution	MA
Narragansett Electric Company	Electric Distribution	RI

4.2.2.3 INVP 4411C New Electric Connections

For **New Electric Connections** project, the costs will be allocated by the number of customers across all Electric Distribution Companies. There is no change to the benefiting companies to the core system.



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Operating Company Name	Business Area	State
Niagara Mohawk Power Corp.	Electric Distribution	NY
Massachusetts Electric	Electric Distribution	MA
Nantucket Electric Company	Electric Distribution	MA
Narragansett Electric Company	Electric Distribution	RI

4.2.3 IS Ongoing Operational Costs (RTB):

This project will increase/decrease IS ongoing operations support costs as per the following table. These are also known as Run the Business (RTB) costs.

All figures in \$ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY 21/22	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB	68.0	113.0	105.0	99.0	99.0	484.0
Last Sanction Business Net Impact to RTB	50.0	325.0	360.0	360.0	360.0	1,455.0
Last Sanction Total Net Impact to RTB	118.0	438.0	465.0	459.0	459.0	1,939.0
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB		98.0	96.0	94.0	94.0	382.0
Business Budgeted Net Impact to RTB	56.0	361.0	360.0	360.0	360.0	1,497.0
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	8.0	28.0	106.0	106.0	106.0	354.0
Business Funded Net Impact to RTB Forecasted at Go-Live	56.0	361.0	854.0	854.0	854.0	2,979.0
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	(8.0)	70.0	(10.0)	(12.0)	(12.0)	28.0
Business Budgeted Net Impact to RTB Variance	-	-	(494.0)	(494.0)	(494.0)	(1,482.0)

Increase in RTB is attributed to the Software license & transactional charges cost, interfaces operational support cost. These costs will be funded by the Customer Organization.

4.3 NPV Summary

N/A

4.4 Customer Outreach Plan

Voice of Customer

National Grid has and will be using the Voice of Customer (VOC) throughout the design and delivery of this portal project; keeping the customer first. This includes:

Qualitative Research

- Initial Study: contacted twenty (20) Account Representatives at ten (10) solar companies that currently work with National Grid. The goal of this research is to



US Sanction Paper

gauge how these companies feel about the quality of service National Grid provides during the Distributed Generation process.

- Conference Room Pilot Workshops: The objective of these pilots it to try, test and validate the future state design with all relevant parties and end users throughout the process.

Quantitative Research

- End-use customer and market research that was completed by the New Energy Solutions team
- Periodic customer panels
- A post-installation quantitative satisfaction study to evaluate performance following portal implementation.

Additional Communications

National Grid will communicate via several channels throughout the development of, prior to and post launching of the portal. Communication channels and messaging at each stage will be tailored to the various internal and external audience members. Communication channels may include:

Internal	External
Email	Email
Personal Outreach	Personal Outreach
Newsletters	Direct Mail
Workshops	Workshops
Round Tables	Webinars

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Date: 09/20/2018

Investment Proposal Summary Sheet

INVP 4411C - New Electric Connections

Request Date: September 20, 2018	Relationship Manager: Premjith Singh	Author: Suzanne Rodrigues
Project Manager: Jatinder P. Singh	Program Delivery Director: Michelle McNaught	Sanction Type Sanction
Region: US	Category: Policy	Legal Entity:
Risk Score: 49	Primary Driver: Reliability	Project Classification: M
Project Sponsor: Kelly Carney, VP Customer Exp and SysTransformation	Program INVP – Description: 4411 – New Customer Connections	

Project Description:

This paper requests sanction of INVP 4411C in the amount **\$3.039M** with a tolerance of +/- 10% for the purposes of Full Project.

This sanction amount is **\$3.039M** broken down into:

\$2.386M	CapEx
\$0.653M	OpEx
\$0.000M	Removal

Brief Description

This policy-driven project is the third within the INVP 4411 New Customer Connections Program. The project will build upon the first two projects which delivered an online portal and workflow management for Distributed Generation (DG) NY and NE. The Electric Connections portal will provide Trade Allies/Customer the ability to submit their Electric applications and documentation, plus provide real-time status information based on their work order number or email address. While working through the new process flows for automating work orders, it was determined that there would be very limited success in being able to provide an actual work request number to the applicant in real-time due to the lack of standardized data within our legacy systems. The scope was refined to eliminate portions of automation for New Electric Connects. Some of the originally proposed integration points will benefit the Rhode Island Re-Growth and the Massachusetts Smart incentive DG process, and have been kept within the scope of the project. We are seeking full funding for this project for the purposes of Development and Implementation.

Factors that contribute to the increase in costs for this project include:

- Changes to the New Electric Connects process between the original and current state
- Increase in the number and complexity of integration to backend systems

Background

Over the last several years, the Customer Organization has undertaken a number of Process Excellence Initiatives in the areas of Distributed Generation (DG), New Electric Connections, and New Gas Connections. In September 2015, a five year Program was developed by the Customer Organization to systematically address a number of initiatives under the umbrella of the Customer Experience Transformation Strategy (CXT). These initiatives expect to deliver significant Customer Experience improvements. Two of the initial projects identified were the DG Portal and the New Gas & Electric Connections portal. While these projects were initially identified separately, from the process and customer perspective, there is significant similarity in workflow management. The INVP 4411 New Customer Connections program funds a portfolio of projects to deliver a system of record for all new customer connections. In April 2018, it was determined to omit the new gas connections from INVP 4411 New Customer Connections program to allow for better alignment with the Gas Business Enablement (GBE) effort.

In the spring of 2017, the Distributed Generation (DG) customer portal became available for New York interconnection processing under INVP4411A. INVP 4411B built upon this framework to deliver DG for New England, which had incremental releases in November 2017, February 2018 and April 2018. New Electric Connections solution will build upon this portal to provide additional connection templates and workflows.

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Date: 09/20/2018

Project Costs [\$M]	Prior Yrs	Yr 1 18/19	Yr 2 19/20	Yr 3 20/21	Yr 4 21/22	Yr 5 22/23	Yr 6 23/24	Total
Start-Up - OPEX	0.018							
Start-Up - CAPEX								
Start-Up - Risk Margin								
Start-Up SUBTOTAL	0.018							0.018

Requirements & Design OPEX	0.064	0.028						
Requirements & Design CAPEX	0.206	0.030						
Requirements & Design Risk Margin								
R&D SUBTOTAL	0.270	0.058						0.328

Development & Implementation – OPEX								
People		0.418	0.005					0.423
Software		0.083						0.083
Hardware								
Telecommunications								
Service Contracts								
Risk Margin		0.035	0.001					0.036

Development & Implementation – CAPEX								
People		1.979						1.979
Software								
Hardware								
Telecommunications								
Service Contracts								
Risk Margin		0.172						0.172
D&I SUBTOTAL		2.687	0.006					2.693
TOTAL PROJECT COSTS	0.288	2.745	0.006					3.039

Non-regulated project UPLIFT								
Non-regulated project TOTAL								

IS Investment Plan FY19 thru FY23								
Budget OPEX	0.000	0.000						
Budget CAPEX	0.000	0.000						

Impact on RTB costs	0.020	0.321	0.321	0.321	0.321	0.321	0.321	1.625
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Benefiting Operating Companies

See Appendix A

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Date: 09/20/2018

Alternatives

Alternative 1: Do Nothing

This option was rejected because omitting the New Connections in this program delays delivering on the Customer Experience Transformation strategy which has been committed to regulatory and does not allow us to take advantage of the synergies of delivering both Distributed Generation and New Customer Connections in tandem.

Alternative 2: Defer the Project

This option was rejected because of the rapid growth of New Connections volume.

TOTAL BENEFITS \$M								
Key Business Benefits:								
Electric Connections – Streamline and centralize the management of Electric Applications and provide self-service transparency to the status of existing work requests.								
REGrowth/Mass Smart – Streamline and automate integration for REGrowth/Mass Smart applications which currently rely heavily on manual backoffice processes.								

Key Risks:	Key Dates	Date (Mmm/YYYY)
<ul style="list-style-type: none"> • Business resources may not be available due to other critical initiatives or day to day jobs. 	Start Up	Apr/2017
	Partial Sanction	May/2017
	Requirements & Design	Nov/2017
	Develop & Implement	May/2018
	Move to Production / Last Go Live	Feb/2019
	Sanction Closure	Jun/2019

The supporters listed have aligned their part of the business to support the project.

Role	Individual's Name
Business Representative	Kelly Carney
Head of PDM	Deb Rollins
Relationship Manager	Premjith Singh
Program Delivery Director	Michelle McNaught
IS Finance Management	Michelle Harris
IS Regulatory	Dan DeMauro
DR&S	Elaine Wilson
Service Delivery	Brian Detota
Enterprise Architecture	Joe Clinchot

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Date: 09/20/2018

RECOMMENDATIONS

The Sanctioning Authority is invited to:

- a) APPROVE the investment of \$3.039M including risk margin of \$0.208M by September 20, 2018
- b) NOTE that Kelly Carney, VP Customer Exp and Sys Transformation is the Project Sponsor
- c) NOTE that Michelle McNaught is the Program Delivery Director and has the approved financial delegation to deliver the project

Decision of the Sanctioning Authority

I hereby approve the recommendations made in this paper.

Signature..... Date.....

Terence Sobolewski
SVP Chief Customer Officer

National Grid Confidential

Date: 09/20/2018

Appendix A

Benefiting Operating Companies

Work for New Electric Connects will be distributed among the following companies by the number of customers.

Benefiting Operating Companies
Niagara Mohawk Power Corp.
Massachusetts Electric Company
Nantucket Electric Company
Narragansett Electric Company

Work for Rhode Island ReGrowth and Massachusetts SMART automation will be distributed among the following companies by the number of customers.

Benefiting Operating Companies
Massachusetts Electric Company
Nantucket Electric Company
Narragansett Electric Company



Closure Paper

Title:	Gas Transportation System Phase II	Sanction Paper #:	USSC-16-298C
Project #:	INVP 4451 Capex: S007545	Sanction Type:	Closure
Operating Company:	National Grid USA Svc. Co.	Date of Request:	5/1/2018
Author:	William Myles	Sponsor:	Terence Sobolewski, SVP Business Process & Performance
Utility Service:	IS	Project Manager:	William Myles

1 Executive Summary

This paper is presented to close INVP 4451. The total spend was \$1.680M. The sanctioned amount for this project was \$2.120M at +/- 10%.

Project Sanction Summary (\$M)				
Title	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance
Gas Transportation System Phase II	Capex	1.230	1.556	0.326
	Opex	0.451	0.564	0.113
	Removal	0.000	0.000	0.000
	Total	1.681	2.120	0.439

1.1 Variance Analysis

The project underspend was due to:

- De-scoping of interface upgrade work which was dependent on the Oracle Fusion Common Framework for File Transfer was not ready to be performed. The de-scoped work is planned to be performed as part of a future IS4IS project (i.e. "FTS (UNIX51) migration to Fusion").
- Labor and Allowance for Funds Used During Construction (AFUDC) underruns were a result of de-scoping work and estimate variations from Start-Up phase estimates.



Closure Paper

1.2 Schedule Variance

Schedule Variance	
Project Grade - Ready for Use Date	6/30/2017
Actual Ready for Use Date	6/30/2017
Schedule Variance	- 0 years, 0 months, 0 days

2 Project Summary

This investment delivered the enhancements mandated by the NY Public Service Commission (PSC) (Cases 06-G-1185, 06-G-1186) to address the additional requirements identified during the testing phase of the Gas Transportation Information System (GTIS) project thereby limiting or removing the need for manual work-arounds.

This effort addressed change requests including these high priority items:

- Enhance system to modify enrollment contracts and customer billed usage when accounts are captured in control / expectation reports so transactions can be reprocessed by GTIS;
- Provide additional ability to override National Grid customer systems (CRIS and CSS) calculated base and slope customer values;
- Add additional Dun number + 4 capability to support the Community Choice Aggregation order; and
- Provide additional reporting capability including "Peaking assets" and "Generators" reports.

The solution delivery team employed Agile project delivery methodology and multiple deployments to assure NY PSC mandated functionality was implemented in the timeframe required by the September 21, 2016 order. Additional non-mandated functionality including improvements and enhancements to other system function (*i.e.* administration capabilities, security functions, reports, messaging) were implemented by the June 30, 2017 in-service date.

2.1 In-Service Date

June 30, 2017



Closure Paper

3 Final Cost by Project

Actual Spending (\$M) vs. Sanction (\$M)				
Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance
INVP 4451	Capex	1.230	1.556	0.326
	Opex	0.451	0.564	0.113
	Removal	0.000	0.000	0.000
	Total	1.681	2.120	0.439

4 Improvements / Lessons Learned / Root Cause

#	Lesson Learned	Recommended Action
1	Have a meeting prior to every Sprint with all business stakeholders to re-prioritize Change Requests for that Sprint based on business urgency.	Establish a cutoff date after which any revisions to requirements for work items will fall off to a subsequent Sprint based on priority.
2	Insufficient involvement of business users during all phases of testing can lead to delays in later testing phases.	Engage business users during the early phases of testing, especially for complex functionality, prior to User Acceptance Testing.

5 Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	<input checked="" type="radio"/> Yes <input type="radio"/> No
All relevant costs have been charged to project	<input checked="" type="radio"/> Yes <input type="radio"/> No
All work orders and funding projects have been closed	<input checked="" type="radio"/> Yes <input type="radio"/> No



Closure Paper

All unused materials have been returned	<input checked="" type="radio"/> Yes <input type="radio"/> No
All IS Service Transition activities have been completed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All lessons learned have been entered appropriately into the IS Knowledge Tool lesson learned database	<input checked="" type="radio"/> Yes <input type="radio"/> No

6 Statements of Support

6.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Function	Individual
Business Representative	Sobolewski, Terence
Head of PDM	Rollins, Deb
Relationship Manager	Aneja, Aman
Program Delivery Director	Rollins, Deb
IS Finance Management	Harris, Michelle
IS Regulatory	DeMauro, Daniel
DR&S	Wilson, Elaine
Service Delivery	Mirizio, Mark
Enterprise Architecture	Clinchot, Joseph

6.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.



Function	Individual	Area
Regulatory	Harvey, Maria	IS
Jurisdictional Delegate(s)	Hill, Terron	FERC
	Currie, John	Gas - NE
	Wolf, Don	Gas - NY
Procurement	Chevere, Diego	All



Closure Paper

7 Decisions

I approved this paper.

Signature..........Date..........
David H. Campbell, Vice President, ServCo Business Partnering, USSC Chair



Closure Paper

Title:	Data Visualization	Sanction Paper #:	USSC-16-337C
Project #:	INVP 4464 Capex: S007546	Sanction Type:	Closure
Operating Company:	National Grid USA Svc. Co.	Date of Request:	1/9/2019
Author:	Lori Damiano	Sponsor:	John Gilbert
Utility Service:	IT	Project Manager:	Thomas Towne

1 Executive Summary

This paper is presented to close INVP 4464. The total spend was \$8.283M. The original sanctioned amount for this project was \$7.934M at +/- 10%.

2 Project Summary

This project established Tableau and Alteryx software solutions in a cloud environment to enable self-service reporting and data visualization capabilities for the organization. The solution provided the opportunity for improved decision-making by providing capabilities to enhance data access to very large data sets, analytics, data visualization and export to other analytical software capabilities. Over time, it will also establish the foundation to replace software tools for reporting that are no longer supported by the original vendor and produce essential reports for oversight of the operation.

The project provided the base infrastructure required to run the services, including:

- procurement of software
- installation of Tableau and Alteryx in a Cloud Environment
- packaging of software for deployment to desktops
- implementation of user and system support services
- end user training

3 Variance Analysis

3.1 Cost Summary Table

Project Sanction Summary (\$M)				
Title	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
Data Visualization	Capex	8.183	7.819	(0.364)
	Opex	0.100	0.115	0.015
	Removal	0.000	0.000	0.000
	Total	8.283	7.934	(0.349)



Closure Paper

3.2 Cost Variance Analysis

The project cost variance is within tolerance.

3.3 Schedule Variance Table

Schedule Variance	
Project Grade - Ready for Use Date	7/31/2017
Actual Ready for Use Date	3/16/2018
Schedule Variance	0 years, 7 months, 13 days

3.4 Schedule Variance Explanation

Challenges with setting up infrastructure in Azure caused implementation delays with the project.

4 Final Cost by Project

Actual Spending (\$M) vs. Sanction (\$M)				
Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
4464	Capex	8.183	7.819	(0.364)
	Opex	0.100	0.115	0.015
	Removal	0.000	0.000	0.000
	Total	8.283	7.934	(0.349)

5 Improvements / Lessons Learned/Root Cause

Positive:

- 2018-LL-599 (pending): Creating a standard BRD is sometimes infeasible for Agile projects which are gathering, changing, and implementing user requirements on a weekly, sometimes, daily basis: Create a product backlog to document the progress/evolution of user requirements over time. Create a separate enabling requirements document and/or functional requirements document if necessary.

Negative:

- 2018-LL-598 (pending): US SDF deliverables are not well-suited for Agile projects: Streamline documentation deliverables for Agile projects. Make sure that all necessary stakeholders approve the SDF approach.
- 2018-LL-600 (pending): Multiple iterations of dashboards were required to land on the final product: Plan for this in the schedule



Closure Paper

6 Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	<input checked="" type="radio"/> Yes <input type="radio"/> No
Gate E checklist completed (appl. only to CCD)	<input type="radio"/> Yes <input checked="" type="radio"/> N/A
All relevant costs have been charged to project	<input checked="" type="radio"/> Yes <input type="radio"/> No
All work orders and funding projects have been closed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All unused materials have been returned	<input checked="" type="radio"/> Yes <input type="radio"/> No
All IT Service Transition activities have been completed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All lessons learned have been entered appropriately into the IT Knowledge Management Tool (KMT) lesson learned database	<input checked="" type="radio"/> Yes <input type="radio"/> No

7 Statements of Support

7.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	John Gilbert	Business Representative
Program Delivery Management (PDM)	Narayan Devireddy	Vice President IT, Solution Delivery
Business Partner (BP)	Joel Semel	Relationship Manager
Program Delivery Management (PDM)	Jeffrey Dailey	Program Delivery Director
IS Finance	Michelle Harris	Manager
IS Regulatory	Dan DeMauro	Director
Digital Risk and Security (DR&S)	Peter Shattuck	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Manager



Closure Paper

7.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



Closure Paper

8 Decisions

The US Sanctioning Committee (USSC) approved this paper at a USSC meeting held on 1/9/2019

Signature.....Date.....

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



US Sanction Paper

Title:	Gas Capacity Request Database	Sanction Paper #:	USSC-17-387+
Project #:	INVP 4468 Capex: S007781	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	9/4/2018
Author:	Domenick Freda	Sponsor:	John S. Stavrakas VP, Asset Management Gas
Utility Service:	IS	Project Manager:	Domenick Freda

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of INVP 4468 in the amount of \$1.965M with a tolerance of +/- 10% for the purposes of Development and Implementation.

This sanction amount is \$1.965M broken down into:

- \$1.593M Capex*
- \$0.372M Opex*
- \$0.0M Removal*

1.2 Project Summary

The Gas Capacity Request (GCR) Application is a critical application for daily gas operations. Data related to gas capacity requests are generated by the Gas Sales and Marketing department for engineering analysis of the load. The information is used to generate load files for the gas sales models across all National Grid service territories. Sales models are updated daily and used to analyze the gas capacity available on the network. New customer gas load requests are then evaluated and approved based on the network capacity stored in the GCR database.

The current GCR application and supporting database does not satisfy current business scalability and reliability standards. This project will migrate the GCR database to an enterprise level solution, provide additional automated monitoring tools for production assets, and enhance support and application availability.

1.3 Summary of Projects

N/A



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1.4 Associated Projects

N/A

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Potential Investment Tolerance
1/10/18	USSC	\$0.821M	\$1.703M	Partial	+/-10%

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
April 2019	Project Closure Sanction

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	<p>The project aims to improve the gas capacity request process by implementing an enterprise supported front-end and back-end, and bring this application into IS support and monitoring. The GCR application is currently supported by the gas business teams.</p> <p>This change has been proposed in support of gas policy ENG02001, related to the designing of gas services by Gas Operations Engineering.</p>



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1.8 Asset Management Risk Score

Asset Management Risk Score: 36

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability
 Environment
 Health & Safety
 Not Policy Driven

1.9 Complexity Level

- High Complexity
 Medium Complexity
 Low Complexity
 N/A

Complexity Score: 13

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

- Yes
 No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY19/23	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	\$0.557M

1.12 If cost > approved Business Plan how will this be funded?

Re-allocation of budget within the IS business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.



US Sanction Paper

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
CapEx	0.012	1.581	0.000	0.000	0.000	0.000	0.000	1.593
OpEx	0.229	0.144	0.000	0.000	0.000	0.000	0.000	0.372
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.241	1.725	0.000	0.000	0.000	0.000	0.000	1.965

1.14 Key Milestones

Milestone	Target Date: (Month Year)
Partial Sanction	December 2017
Begin Requirements and Design	January 2018
Project Sanction	September 2018
Begin Development and Implementation	September 2018
Move to Production / Last Go Live	February 2019
Project Closure	April 2019

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input type="checkbox"/> Contractor	
Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green



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1.16 Key Issues (include mitigation of Red or Amber Resources)

N/A

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative

1.18 List References

N/A



US Sanction Paper

2 Decisions

I:

- (a) APPROVE this paper and the investment of \$1.965M and a tolerance of +/-10% for the purposes of Development & Implementation.
- (b) APPROVE the run-the-business (RTB) of \$0.060M (per annum) for 5 years.
- (c) NOTED that Michelle McNaught is the Project Manager and has the approved financial delegation.

Signature.....Date.....

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



US Sanction Paper

3 Sanction Paper Detail

Title:	Gas Capacity Request Database	Sanction Paper #:	USSC-17-387+
Project #:	INVP 4468 Capex: S007781	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	9/4/2018
Author:	Domenick Freda	Sponsor:	John Stavrakas VP, Asset Management Gas
Utility Service:	IS	Project Manager:	Domenick Freda

3.1 *Background*

The Gas Capacity Request (GCR) Database Application was built on Microsoft Access which includes a front end and back end database. The purpose of the GCR database is to store all the pertinent information related to GCR requests. The GCR front end application available functions are Add/Update forms, reports and a query tool.

Gas Sales and Marketing representatives generate GCR requests (changes and new requests) which are entered into the GridForce (SalesForce) application. These requests are compiled into load files by region (New York and New England) on a daily basis. The load files are converted to .mdb files and loaded to the database automatically every night.

The GridForce nightly extract data from the previous day is available the next morning by region in .csv format on a shared drive. The Operations Engineers analyze this data to assist in determining approval or rejection of GCR (load) requests. The business has become dependent upon the accuracy of the GCR database for this modelling and analysis.

The application is experiencing failures at an increasing rate due to several factors:

- Failure in daily processes due to update failure and business resource is not available to fix
- No automated monitoring of batch processes
- Failure in daily processes due to password expiration
- Failure due to Access files growing larger than 2 GB

Failures in daily database updates may result in inaccurate load files being sent to the Synergi tool, which is used for gas network modelling, resulting inaccurate gas capacity analysis results.



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3.2 Drivers

The primary drivers for this project are:

- Daily database update failures occur often and result in inaccurate load files being sent to the Stoner Network Distribution models further resulting in erroneous gas capacity analysis results.
- This application is critical for Operations Engineering who need 24/7 availability and support
- Current GCR application is an in house Microsoft Access application without dedicated support resources or disaster recovery capability
- Current software does not support additional functionality and process improvement requirements

3.3 Project Description

The investment will provide the following:

- Migration of the Gas Capacity Request database to an enterprise level solution
- Additional automated monitoring tools for production assets
- Enhanced support and application availability

3.4 Benefits Summary

The following benefits will be achieved:

- Standardized software platform on identified enterprise strategic tools
- Integration and reliability that supports the GCR request process accurately with fewer failures, user issues, and outages
- Enhanced forms and validation processes for the Sales and Marketing department
- Dedicated support and disaster recovery infrastructure
- Standardized business processes across regions

3.5 Business and Customer Issues

There are no significant issues beyond what has been described elsewhere.



US Sanction Paper

3.6 *Alternatives*

Alternative 1: Do Nothing/Defer: This option is not recommended because the application database does not support the current business scalability requirements. As the database grows, the performance and reliability will continue to deteriorate. Also, Microsoft Access does not meet National Grid's criteria for an enterprise solution.

3.7 *Safety, Environmental and Project Planning Issues*

There are no significant issues beyond what has been described elsewhere.

3.8 *Execution Risk Appraisal*

N/A

3.9 *Permitting*

N/A

3.10 *Investment Recovery*

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A



US Sanction Paper

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total	
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +		
4468	Gas Capacity Request Database	+/- 10%	CapEx	0.012	1.581	0.000	0.000	0.000	0.000	0.000	0.000	1.593
			OpEx	0.229	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.372
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.241	1.725	0.000	0.000	0.000	0.000	0.000	0.000	1.965
Total Project Sanction			CapEx	0.012	1.581	0.000	0.000	0.000	0.000	0.000	0.000	1.593
			OpEx	0.229	0.144	0.000	0.000	0.000	0.000	0.000	0.000	0.372
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.241	1.725	0.000	0.000	0.000	0.000	0.000	0.000	1.965

3.11.2 Project Budget Summary Table

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
CapEx	0.012	1.045	0.000	0.000	0.000	0.000	0.000	1.057
OpEx	0.229	0.123	0.000	0.000	0.000	0.000	0.000	0.352
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.241	1.168	0.000	0.000	0.000	0.000	0.000	1.409

Variance (Business Plan-Project Estimate)

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
CapEx	0.000	(0.536)	0.000	0.000	0.000	0.000	0.000	(0.536)
OpEx	0.000	(0.021)	0.000	0.000	0.000	0.000	0.000	(0.021)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	(0.557)	0.000	0.000	0.000	0.000	0.000	(0.557)

3.11.3 Cost Assumptions

The accuracy level of estimate of each project is identified in table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

N/A



US Sanction Paper

3.11.4.2 NPV Assumptions and Calculations

3.11.5 Additional Impacts

N/A

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Syed, Salim	Business Representative
PDM	Rollins, Deborah	Head of PDM
BRM	Sheer, Richard	Relationship Manager
PDM	McNaught, Michelle	Program Delivery Director
IS Finance	Harris, Michelle	Manager
IS Regulatory	DeMauro, Daniel	Director
DR&S	Mandel, Marc	Manager
Service Delivery	Mirizio, Mark	Manager
Enterprise Architecture	Lyba, Svetlana	Manager

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego

4 Appendices

4.1 Sanction Request Breakdown by Project

N/A



US Sanction Paper

4.2 Other Appendices

4.2.1 Project Cost Breakdown

Project Cost Breakdown \$ (millions)					
Cost Category	sub-category	VOWD	FTC	FAC=VOWD+FTC	Name of Firm(s) providing resources
Personnel	NG Resources	0.284	0.269	0.553	
	SDC Time & Materials	0.000	-	-	IBM
		0.000	-	-	WiPro
		0.000	-	-	DXC
		0.000	-	-	Verizon
	SDC Fixed-Price	0.000	-	-	IBM
		0.000	-	-	WiPro
		0.000	-	-	DXC
		0.000	-	-	Verizon
	All other personnel	0.241	0.954	1.195	
TOTAL Personnel Costs	0.525	1.223	1.748		
Hardware	Purchase	0.000	-	-	
	Lease	0.000	-	-	
Software		0.000	0.021	0.021	
Risk Margin			0.117	0.117	
AFUDC		0.008	0.049	0.057	
Other		0.007	0.014	0.021	
	TOTAL Costs	0.540	1.425	1.965	Should match Financial Summary Total

4.2.2 Benefiting Operating Companies

Benefiting Operating Companies	Business Area	State
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
Boston Gas Company	Gas Distribution	MA
Niagara Mohawk Power Corp. - Gas	Gas Distribution	NY
Narragansett Gas Company	Gas Distribution	RI
Colonial Gas Company	Gas Distribution	MA

4.2.3 IS Ongoing Operational Costs (RTB):

This project will increase IS ongoing operations support costs as per the following table. These are also known as Run the Business (RTB) costs.



US Sanction Paper

INV ID:	4468				Forecast Date:	03/05/18
Investment Name:	Gas Capacity Request Database				Go-Live Date:	1/31/2019
Project Manager:	Travis Coleman			PDM:	Michelle McNaught	
All figures in \$ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 18/19	FY 19/20	FY 20/21	FY 21/22	FY 22/23	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB	40.0	60.0	60.0	60.0	60.0	280.0
Last Sanction Business Net Impact to RTB						-
Last Sanction Total Net Impact to RTB	40.0	60.0	60.0	60.0	60.0	280.0
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB	40.0	60.0	60.0	60.0	60.0	280.0
Business Budgeted Net Impact to RTB						-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	9.9	38.6	38.0	37.6	37.4	161.5
Business Funded Net Impact to RTB Forecasted at Go-Live	-	21.0	21.0	21.0	21.0	84.0
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	30.1	21.4	22.0	22.4	22.6	118.5
Business Budgeted Net Impact to RTB Variance	-	(21.0)	(21.0)	(21.0)	(21.0)	(84.0)

4.3 NPV Summary (if applicable)

N/A

4.4 Customer Outreach Plan

N/A



US Sanction Paper

Title:	Active Directory Improvements	Sanction Paper #:	USSC-17-300 V2
Project #:	INVP 4489 Capex: S188606	Sanction Type:	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	April 11, 2018
Author:	Susan Stallard / Tim Schofield / Dan Castonaugy	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	Darren Handford

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of INVP 4489 in the amount of \$2.386M with a tolerance of +/- 10% for the purposes of low level design and detailed application impact assessment.

This sanction amount is \$2.386M broken down into:

- \$2.243M Capex*
- \$0.143M Opex*
- \$0.000M Removal*

NOTE the potential investment of \$8.532M with a tolerance of +/- 25%, contingent upon submittal and approval of a Project Sanction paper following completion of low level Design and Detailed application assessment.

Note this project was sanctioned in September 2017 in the amount of \$1.138M, of which \$0.975M will have been spent in FY18.

Note the delta increase over the original indicative sanction amount of \$2.751M is due to incremental requirement demands not known at the time of the original sanction. This is primarily due to increase in costs for migration of dependent applications to the new Active Directory platform.

1.2 Project Summary

Active Directory (AD) is a key service that supports core authentication for all National Grid computers and servers logging onto the corporate network in both the United States (US) and United Kingdom (UK). Therefore, AD provides access to all National Grid Information Systems (IS).

The scope of this initiative is to implement a refreshed global AD infrastructure and support services. The new AD environment will unify all global applications that use the



US Sanction Paper

AD service. It is critical that National Grid can ensure that the AD service is reliable and supports core authentication requirements to all current and proposed applications.

1.3 Summary of Projects

Project Number	Project Title	Estimate Amount (\$M)
INVP 4489	Active Directory	8.532
Total		8.532

1.4 Associated Projects

N/A

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Paper Title	Sanction Type	Tolerance
Sep 2017	USSC	\$1.138M	\$5.781M	Active Directory Improvements	Partial	+/- 25%

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
Jul 2018	Project Sanction

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	To ensure the reliability of a key service supporting authentication and security of applications logging into the corporate network and internet based services.



US Sanction Paper

1.8 Asset Management Risk Score

Asset Management Risk Score: 49

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability
 Environment
 Health & Safety
 Not Policy Driven

1.9 Complexity Level

- High Complexity
 Medium Complexity
 Low Complexity
 N/A

Complexity Score: 20

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

- Yes
 No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY19-23	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	\$1.317M

1.12 If cost > approved Business Plan how will this be funded?

Re-allocation of budget within the IS business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.



US Sanction Paper

1.13 Current Planning Horizon

		Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
\$M	Prior Yrs	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	0.832	2.702	4.855	0.000	0.000	0.000	0.000	8.389
OpEx	0.143	0.000	0.000	0.000	0.000	0.000	0.000	0.143
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.975	2.702	4.855	0.000	0.000	0.000	0.000	8.532

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	May 2017
Partial Sanction	Sep 2017
Begin Requirements and Design	Sep 2017
Partial Sanction	Apr 2018
Begin Low Level Design and Project Impact Assetment	Apr 2018
Project Sanction	Jul 2018
Begin Development and Implementation	Jul 2018
Move to Production / Last Go Live	Mar 2020
Project Complete	Mar 2020
Sanction Closure	Jul 2020



US Sanction Paper

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green

1.16 Key Issues (include mitigation of Red or Amber Resources)

1	Internal application resources require confirmation of availability.
2	Commitment of suitable vendor resources.

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative

1.18 List References

N/A



US Sanction Paper

2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on April 11, 2018.

- (a) APPROVED the investment of \$2.386M and a tolerance of +/- 10% for the purposes of low level design and detailed project impact assessment.
- (b) NOTED the potential run-the-business (RTB) impact of \$0.059M in FY19, \$0.119M in FY20 and \$0.099M (per annum) for 3 years.
- (c) NOTED the potential investment of \$8.532M and a tolerance of +/-25% contingent upon submittal and approval of a Project Sanction paper following completion of low level design and detailed project impact assessment.
- (d) NOTED that Darren Handford has the approved financial delegation to undertake the activities stated in (a).

Signature.....  Date..... 

David H. Campbell, Vice President, ServCo Business Partnering, USSC Chair



US Sanction Paper

3 Sanction Paper Detail

Title:	Active Directory Improvements	Sanction Paper #:	USSC-17-300 V2
Project #:	INVP 4489 Capex: S188606	Sanction Type:	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	April 11, 2018
Author:	Susan Stallard / Tim Schofield / Dan Castonaugy	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	Darren Handford

3.1 Background

National Grid's Legacy Active Directory (AD) is a component of Microsoft IT infrastructure that underpins access to Business systems. The AD application uses hardware and software that is past the expected end of life. The average life span is 5 years and the current AD application is 15 years old, which could impact security and resiliency and increase risk of failure. Failure of this infrastructure could impede access for National Grid users and applications. If failure were to occur, National Grid would lose its ability to transact regular business, resulting in financial, reputational and productivity loss.

A feasibility and analysis study was conducted on the AD application under the Project INVP 3900 Active Directory Blueprinting.

Project findings include:

- Increased security risk due to aging and unsupported hardware
- Increased complexity and risk due to lack of governance, process and controls in managing the AD environment
- Increased complexity and difficulty in performing business mergers and acquisitions. Due to lack of clarity of application business owners, poorly governed and unowned AD domains
- Increased support costs due to an overly-complex AD environment to maintain multiple AD regions

3.2 Drivers

The key driver is to ensure that access to National Grid corporate network and IS through the directory service (AD) will:

- Be reliable and supported
- Be secure – supporting current and future system requirements
- Meet current and future business requirements through a global solution that adheres to governance, management and process standards



US Sanction Paper

3.3 Project Description

The full program will implement a refreshed global AD infrastructure and support services. The scope of this project is to implement an environment that will unify all global applications dependent on AD.

The initial phase of this work was a Requirements and Design phase, which included:

- Document the current AD infrastructure (hardware, locations, applications, operating systems, and application ownership)
- Define the support model
- Gather requirements for the support process to manage, maintain and govern the new service including interoperability with other services
- Produce the recommendation that a new AD application and infrastructure be built

The next phase of work will produce the low-level design for an implementable architecture that will provide the building blocks for National Grid's current corporate strategy and with an administrative model, to standards agreed with Digital Risk and Security, that allows National Grid to operate the new AD solution without the current enterprise risk.

National Grid will additionally have detailed costed proposals for migration of all the affected applications under management by Wipro and IBM. This will inform the level of work needed for the migration phase with the application owners.

Engagement with Microsoft for low level design will include the following six workshops to produce the translation of the high level design into a low level design that can be passed to the implementation partner for the subsequent build and implementation of the new AD.

- Kick-off and Scope Validation Workshop
- Forest/Domain Name and Domain Name Service (DNS) design workshop
- Logical site design and Domain Controller Physical / Logical hardware design workshop
- Group Policy Object (GPO) design and workshop – Solution Group Policy and account policy settings
- Organisation Unit design workshop – including target organisational unit structure and delegation policies
- Administrative model workshop – including solution administrative model, delegations and role members

Engagement with the application partners, IBM & Wipro, will build upon the initial work carried out on the discovery of applications and their interaction with AD to ascertain the design changes, effort and costs that will be required to migrate the applications to the new environment. This migration will be a very major strand within the overall migration phase and it is important that the program understands the intricacies of the applications and the impact on the end-users. The program will work with the partners



US Sanction Paper

to ensure that they are kept abreast of the evolution of the low-level design so that these impact assessments are as robust as possible.

3.4 Benefits Summary

The benefits of this project include:

- A global AD environment that fits with National Grid's current strategy to deliver global enterprise solutions
- Prepares the environment for true Single Sign On with a unified global user group
- Significantly reduces the risk of failure with the introduction of modern hardware and latest Operating System software
- Consistent standards, governance and processes utilized in the management and administration of AD
- Cloud ready environment for seamless Cloud application integration
- Improved testing with the introduction of new global test environment; and
- Improved identity access management through integration with Digital Risk & Security identity control services

3.5 Business and Customer Issues

There are no significant issues beyond what has been described elsewhere in this paper.

3.6 Alternatives

Alternative 1: Do Nothing / Defer

This option is not recommended because the current AD service is experiencing an increasing number of operational challenges, for which the root cause has been identified as the complexity of the AD infrastructure and data. As mentioned earlier, the AD infrastructure has well exceeded its end of life at 15 years old, whereas such application has an average life span of 5 years. Thus, doing nothing will not fix the potential reliability and security concerns associated with the outdated AD infrastructure.

3.7 Safety, Environmental and Project Planning Issues

There are no significant issues beyond what has been described elsewhere in this paper.



US Sanction Paper

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	There is a risk that the current AD will suffer a severe outage leading to significant business impact due to a security incident or mismanagement due to its current state. This will impact the availability of resources to the project.	3	3	3	9	9	Mitigate	Programme Manager will work with resources when available, to improve the current AD according to approved design.	None	None
2	Basic Documentation of the AD Service does not exist to manage the current, AD service. This is required to enable design of the new service.	3	2	4	6	12	Mitigate	Project Manager will track and monitor the cooperation of 3rd party vendor to mitigate schedule delays.	None	None
3	There is a risk that Currently all services and owners of those services using AD are unknown, identifying full costs and impact of the migration of all services complex and time consuming.	3	4	3	12	9	Mitigate	Project Manager will monitor and track the cooperation of 3rd party vendors in effort to mitigate any potential delays.	None	None
4	There is a risk that there will be a prolonged period of time that the new and legacy services will have to coexist.	4	4	4	16	16	Mitigate	The Programme Manager will manage this coexistence.	None	None
5	There is a risk that decisions made in sourcing strategy work will impact this project.	3	3	3	9	9	Mitigate	Project Sponsor to provide link between sourcing strategy and project.	None	None
6	There is a risk that this project will impact with other projects related to identity management (i.e. Youconnect, Office 365 and Service Now).	3	3	3	9	9	Mitigate	Programme Manager will engage with project sponsors to conduct impact analysis and agree joint approach	None	None



US Sanction Paper

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
INVP 4489	Active Directory	+/- 25%	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	8.389		
			CapEx	0.832	2.702	4.855	0.000	0.000	0.000	0.000	0.143
			OpEx	0.143	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total			0.975	2.702	4.855	0.000	0.000	0.000	0.000	8.532	
Total Project Sanction			CapEx	0.832	2.702	4.855	0.000	0.000	0.000	0.000	8.389
			OpEx	0.143	0.000	0.000	0.000	0.000	0.000	0.143	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	0.975	2.702	4.855	0.000	0.000	0.000	0.000	8.532



US Sanction Paper

3.11.2 Project Budget Summary Table

Project Costs per Business Plan

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
\$M								
CapEx	0.832	2.190	3.900	0.000	0.000	0.000	0.000	6.922
OpEx	0.143	0.060	0.090	0.000	0.000	0.000	0.000	0.293
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.975	2.250	3.990	0.000	0.000	0.000	0.000	7.215

Variance (Business Plan-Project Estimate)

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
\$M								
CapEx	0.000	(0.512)	(0.955)	0.000	0.000	0.000	0.000	(1.467)
OpEx	0.000	0.060	0.090	0.000	0.000	0.000	0.000	0.150
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	(0.452)	(0.865)	0.000	0.000	0.000	0.000	(1.317)

3.11.3 Cost Assumptions

This estimate was developed using the standard IS estimating methodology which includes an assessment of project resource needs. Examples of these resource needs include hardware, software, internal and contract labor required to deliver the project. The accuracy level of estimate for each project is identified in table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

This is not a NPV project.

3.11.4.2 NPV Assumptions and Calculations

3.11.5 Additional Impacts

N/A



US Sanction Paper

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Role	Individual
Business Representative	John Gilbert
Head of PDM	Helen Smith
Relationship Manager	Brian Detota
Program Delivery Director	Darren Handford
IS Finance Management	Michelle Harris
IS Regulatory	Dan DeMauro
DR&S	Elaine Wilson
Service Delivery	Mark Mirizio
Enterprise Architecture	Joe Clinchot

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual	Area
Regulatory	Harvey, Maria	IS
Jurisdictional Delegate(s)	Anand, Sonny	Electric - NE
	Harbaugh, Mark	Electric - NY
	Hill, Terron	FERC
	Currie, John	Gas - NE
	Wolf, Don	Gas - NY
Procurement	Chevere, Diego	All



US Sanction Paper

4 Appendices

4.1 Sanction Request Breakdown by Project

4.1 Sanction Request Breakdown by Project

\$M	INVP 4489	Total
CapEx	2.243	2.243
OpEx	0.143	0.143
Removal		0.000
Total	2.386	2.386

4.2 Other Appendices

4.2.1 Project Cost Breakdown

Project Cost Breakdown \$ (millions)					
Cost Category	sub-category	VOWD	FTC	FAC=VOWD+FTC	Name of Firm(s) providing
Personnel	NG Resources	0	-	-	
	SDC Time & Materials	0	-	-	IBM
		0	-	-	WiPro
		0	-	-	DXC
		0	-	-	Verizon
	SDC Fixed-Price	0	1.724	1.724	IBM
		0	1.724	1.724	WiPro
		0	0.575	0.575	DXC
		0	0.047	0.047	Verizon
	All other personnel	0	0.194	0.194	Microsoft
TOTAL Personnel Costs	0.975	4.264	5.239	FY18 total Personnel costs	
Hardware	Purchase	0	0.047	0.047	
	Lease	0	-	-	
Software		0	-	-	
Risk Margin			0.616	0.616	
AFUDC		0	0.639	0.639	
Other		0	1.991	1.991	NG Fixed labor , shared costs
TOTAL Costs		0.975	7.557	8.532	Should match Financial Summary Total



US Sanction Paper

4.2.2 Benefitting Operating Companies

Allocation will be based on the number of their employees.

Benefitting Operating Companies:

	Business Area	State
Niagara Mohawk Power Corp.- Electric Distr.	Electric Distribution	NY
Massachusetts Electric Company	Electric Distribution	MA
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
Boston Gas Company	Gas Distribution	MA
The Narragansett Electric Company	Electric Distribution	RI
Niagara Mohawk Power Corp. - Transmission	Transmission	NY
Niagara Mohawk Power Corp. - Gas	Gas Distribution	NY
New England Power Company – Transmission	Transmission	MA, NH, RI, VT
KeySpan Generation LLC (PSA)	Generation	NY
The Narragansett Electric Company	Gas Distribution	RI
Colonial Gas Company	Gas Distribution	MA
The Narragansett Electric Company – Transmission	Transmission	RI
National Grid USA Parent	Parent	
Nantucket Electric Company	Electric Distribution	MA
NE Hydro - Trans Electric Co.	Inter Connector	MA, NH
KeySpan Energy Development Corporation	Non-Regulated	NY
KeySpan Port Jefferson Energy Center	Generation	NY
New England Hydro - Trans Corp.	Inter Connector	MA, NH
KeySpan Services Inc.	Service Company	
KeySpan Glenwood Energy Center	Generation	NY
Massachusetts Electric Company – Transmission	Transmission	MA
NG LNG LP Regulated Entity	Gas Distribution	MA, NY, RI
Transgas Inc	Non-Regulated	NY
Keyspan Energy Trading Services	Other	NY
KeySpan Energy Corp.	Service Company	
New England Electric Trans Corp	Inter Connector	MA



US Sanction Paper

4.2.3 IS Ongoing Operational Costs (RTB)

This project IS on-going operations support costs will be determined as part of the low level design phase, and detailed impact analyst phase. These are known as Run the Business (RTB) costs.

INV ID:	INVP 4489					Forecast Date:	02/01/18
Investment Name:	Active Directory Improvements					Go-Live Date:	Apr-20
Project Manager:	Dan Gastonguas / Tim Schofield			PO#: Deb Gears / Darren Hanford			
All figures in \$ thousands	Yr. 1 FY 18/19	Yr. 2 FY 19/20	Yr. 3 FY 20/21	Yr. 4 FY 21/22	Yr. 5 FY 22/23	Total	Notes
Last Sanctioned Net Impact to RTB							
Last Sanction IS Net Impact to RTB							
Last Sanction Business Net Impact to RTB							
Last Sanction Total Net Impact to RTB	-	-	-	-	-	-	
Planned/Budgeted Net Impact to RTB							
IS Investment Plan Net Impact to RTB							
Business Budgeted Net Impact to RTB							
Currently Forecasted Net Impact to RTB							
IS Funded Net Impact to RTB Forecasted at Go-Live	59.6	119.1	99.1	99.1	99.1	476.0	
Business Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-	
Variance to Planned/Budgeted Net Impact to RTB							
IS Investment Plan Net Impact to RTB Variance	(59.6)	(119.1)	(99.1)	(99.1)	(99.1)	(476.0)	
Business Budgeted Net Impact to RTB Variance	-	-	-	-	-	-	



Re-sanction Request

Title:	US O365 Deployment	Sanction Paper #:	USSC-17-154 v2
Project #:	INVP 4491 Capex: S007621	Sanction Type:	Re-sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	10/16/2018
Author:	Donna McGuirk	Sponsor:	Barry Sheils, Vice President, Infrastructure & Operations
Utility Service:	IT	Project Manager:	Donna McGuirk

1 Executive Summary

This paper requests re-sanction of INVP 4491 in the amount of \$10.342M with a tolerance of +/- 10% for the purposes of Resanction.

This re-sanction amount is \$10.342M broken down into:

- \$8.618M Capex*
- \$1.725M Opex*
- \$0.0M Removal*

Note the originally requested sanction amount of \$4.291M

2 Resanction Details

2.1 Project Summary

Deployment of O365, in the US, has been delayed due issues related to aging infrastructure at National Grid. Project team has worked to resolve the issues and are ready to begin deployment in the US. See section 2.8.2 for additional detail.

2.2 Summary of Projects

Project Number	Project Type (Elect only)	Project Title	Estimate Amount (\$M)
4491		US O365 Deployment	10.342
Total			10.342



Re-sanction Request

2.3 Prior Sanctioning History

Describe previous sanctions for the projects included in the scope of this paper (Newest to Oldest).

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Sanction Paper #	Potential Investment Tolerance
4/12/2017	USSC	\$4.291m	N/A	Sanction	USSC-17-154	10%

Over / Under Expenditure Analysis

Summary Analysis (\$M)	Capex	Opex	Removal	Total
Resanction Amount	8.618	1.725	0.000	10.343
Latest Approval	3.316	.974	0.000	4.291
Change*	5.302	0.751	0.000	6.052

*Change = (Re-sanction – Amount Latest Approval)

2.4 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY19 - 23	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> N/A	\$5.484M

2.5 If cost > approved Business Plan how will this be funded?

IS Budget Plan – all project costs are within the IS budget, no budget transfers required from business function areas outside IS (finance, customer, gas, electric).

The additional funding for this project will be allocated from underspent projects within the Infrastructure Solution Delivery (ISD) Portfolio



Re-sanction Request

Re-allocation of budget within the IS business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.

2.6 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total	
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +		
4491	US O365 Deployment	Est Lvl (e.g. +/- 10%)	CapEx	2.467	6.151	0.000	0.000	0.000	0.000	0.000	0.000	8.617
			OpEx	0.892	0.833	0.000	0.000	0.000	0.000	0.000	0.000	1.725
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	3.358	6.984	0.000	0.000	0.000	0.000	0.000	0.000	10.342
Total Project Sanction			CapEx	2.467	0.000	0.000	0.000	0.000	0.000	0.000	2.467	
			OpEx	0.892	0.833	0.000	0.000	0.000	0.000	0.000	1.725	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	3.358	0.833	0.000	0.000	0.000	0.000	0.000	4.191	

2.7 Project Budget Summary Table

Project Costs per Business Plan

\$M	Prior Yrs (Actual)	Current Planning Horizon (\$M)						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
CapEx	2.467	1.190	0.000	0.000	0.000	0.000	0.000	3.657
OpEx	0.892	0.310	0.000	0.000	0.000	0.000	0.000	1.202
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	3.358	1.500	0.000	0.000	0.000	0.000	0.000	4.858

Variance (Business Plan-Project Estimate)

\$M	Prior Yrs (Actual)	Current Planning Horizon (\$M)						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
CapEx	0.000	(4.961)	0.000	0.000	0.000	0.000	0.000	(4.961)
OpEx	0.000	(0.523)	0.000	0.000	0.000	0.000	0.000	(0.523)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	(5.484)	0.000	0.000	0.000	0.000	0.000	(5.484)



Re-sanction Request

2.8 Drivers

2.8.1 Detailed Analysis Table

Detail Analysis	Over/Under Expenditure?	Amount (M's)
Aging Infrastructure – SCCM (System Center Configuration Management) missing subnets/IPs (Internet Protocol)	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	\$1.816M
Aging Infrastructure – Proxy Capabilities	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	\$3.631M
Software performance – removal of Office 2010	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	\$0.605M

2.8.2 Explanation of Key Variations

Aging Infrastructure – National Grid’s Active Directory systems were not ready for cloud enablement at the start of the effort. Direct changes to the environment were required including the deployment of Active Directory File Services and Azure Cloud Active Directory Sync services. Both added additional time and cost to allow for foundational services activation.

Aging Infrastructure – SCCM missing subnets/IPs. During Wave 0, in the US, it was discovered that there were subnets/IP addresses that were not in SCCM. This was impacting the ability to deploy software and security patches to all devices in the US landscape. Subnets/IPs needed to be updated in SCCM prior to continuing deployment of O365.

Aging Infrastructure – Outbound Proxy capabilities. During the Exchange migration in the UK it was discovered that the Internet Gateway proxies did not have enough ports to support Exchange traffic via Outlook. Resolution required a bypass of the proxy in the UK as well as in the US.

Software performance – Removal of Office 2010. Office 2010 performance issues were identified via NGV P2 incident in the UK. All PCs were experiencing slowdowns and



Re-sanction Request

freezes; troubleshooting revealed this was caused by two versions of office installation. Resolution required repackaging install software removing Office 2010 and performing maintenance; virtualize Office 2010 and make available via SCCM.

Scope Change – The original scope was expanded, without additional funding, to account for requirements of a full Office 365 deployment. High-user touch and increased support services were required to enable deployments of Office Pro Plus. Personnel requirements significantly increased due to scope changes, directly affecting costs.

Approach – Using a centralized global model as originally planned was challenging due to technical issues. Problems caused multiple starts and stops in both the US and the UK. Extensive troubleshooting required to reveal infrastructure problems in each region caused misalignment of plans. The US is trailing the UK efforts and requires realignment of the project team and dedicated resources to complete effort within the US reducing economy of scales from a global effort.

2.9 Key Milestones

Milestone	Target Date: (Month Year)
Start Up	January 2017
Begin Requirements and Design	April 2017
Project Sanction	April 2017
Begin Development and Implementation	August 2017
Project Re-sanction	October 2018
Move to Production / Last Go Live	February 2019
Project Closure	May 2019

2.10 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
May 2019	Project Closure Sanction



Re-sanction Request

3 Statements of Support

3.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Andrea Costa	Director
Program Delivery Management (PDM)	Helen Smith	Director
Business Partner (BP)	Caitlin Davidson	Relationship Manager
Program Delivery Management (PDM)	Kenneth Wermann	Director
IT Finance	Michelle Harris	Manager
IT Regulatory	Dan DeMauro	Director
Digital Risk and Security (DR&S)	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Director

3.2 Reviewers

The reviewers have provided feedback on the content/language of the paper

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



Re-sanction Request

4 Decisions

This paper was approved using the fast track approval process and will be noted at the next USSC meeting to be held on 11/14/2018:

Signature.....Date.....

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



Re-sanction Request

5 Appendices

5.1 Benefiting Operating Companies

Operating Company Name	Business Area	State
National Grid USA Parent	Parent	
KeySpan Energy Development Corporation	Non-Regulated	NY
KeySpan Services Inc.	Service Company	
KeySpan Energy Corp.	Service Company	
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
KeySpan Generation LLC (PSA)	Generation	NY
KeySpan Glenwood Energy Center	Generation	NY
KeySpan Port Jefferson Energy Center	Generation	NY
Keyspan Energy Trading Services	Other	NY
Niagara Mohawk Power Corp.- Electric Distr.	Electric Distribution	NY
Niagara Mohawk Power Corp. - Gas	Gas Distribution	NY
Niagara Mohawk Power Corp. - Transmission	Transmission	NY
Massachusetts Electric Company	Electric Distribution	MA
Massachusetts Electric Company – Transmission	Transmission	MA
Nantucket Electric Company	Electric Distribution	MA
Boston Gas Company	Gas Distribution	MA
Colonial Gas Company	Gas Distribution	MA
Narragansett Gas Company	Gas Distribution	RI
Narragansett Electric Company	Electric Distribution	RI
Narragansett Electric Company – Transmission	Transmission	RI
New England Power Company – Transmission	Transmission	MA,NH,RI,VT
New England Hydro - Trans Corp.	Inter Connector	MA, NH
New England Electric Trans Corp	Inter Connector	MA
NG LNG LP Regulated Entity	Gas Distribution	MA,NY,RI
NE Hydro Finance Co.	Inter Connector	
NE Hydro-Trans Elect Co.	Inter Connector	
Trans Gas Inc.	Non-Regulated	NY



Closure Template

Title:	Athena Phase 2	Sanction Paper #:	USSC-16-340C
Project #:	INVP 4529 Capex: S007762	Sanction Type:	Closure
Operating Company:	National Grid USA Svc. Co.	Date of Request:	10/10/2018
Author:	Richard Pedley	Sponsor:	Elaine Hatzis Head of IS Service Strategy
Utility Service:	IS	Project Manager:	Mark Ashworth / Richard Pedley

1 Executive Summary

This paper is presented to close INVP4529 - Athena Phase 2 also known as Service Now Release 2. The total spend was \$5.144m. The sanctioned amount for this project was \$5.160m at +/- 10%.

2 Project Summary

This investment continued the work started by the Athena Project to provide National Grid with fit for purpose, stable, Service Delivery processes supported by a strategic toolset i.e. ServiceNow, which is a leading product in delivering customer request services across multiple industries. The tools deployed allow staff to raise IT related incidents, requests for equipment and access to applications via an online portal replacing spreadsheets and less formal request processes. By providing better user focused tools, the reporting by operational teams providing IT services is also much easier to perform. The resulting management information is also allowing National Grid to manage its IT estate more effectively in terms of asset tracking. This data has in turn enhanced National Grid's ability to respond to internal and external audits concerning Sarbanes Oxley (SoX).

The toolset has also been extended to the IT supply chain allowing better and more visible management of IT service incidents and an increase in requests being resolved 1st time due to the automation that has been deployed.

3 Variance Analysis

3.1 Cost Summary Table



Closure Template

Project Sanction Summary (\$M)				
Title	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
Athena Phase 2	Capex	3.057	0.000	(3.057)
	Opex	2.087	5.160	3.073
	Removal	0.000	0.000	0.000
	Total	5.144	5.160	0.016

3.2 Cost Variance Analysis

During the project the Finance team reassessed the Capex and Opex split of the project based on work carried out and work to be completed. This resulted in a shift from Opex to Capex.

3.3 Schedule Variance Table

Schedule Variance	
Project Grade – Ready for Use Date	31/06/2017
Actual Ready for Use Date	18/09/2017
Schedule Variance	0 years, 2 months, 19 days

4 Final Cost by Project

Actual Spending (\$M) vs. Sanction (\$M)				
Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
4529	Capex	3.057	0.000	(3.057)
	Opex	2.087	5.160	3.073
	Removal	0.000	0.000	0.000
	Total	5.144	5.160	0.016

5 Improvements / Lessons Learned/Root Cause

1. A number of end to end design issues were identified later in the solution delivery resulting in change requests. More end to end solution design work across SRM, Incident Management and Portal would have prevented this. KM Ref. 2018-LL-476



Closure Template

2. The project used a number of innovative communication channels which were received well including the use of Yammer and recording video content on priority features. KM Ref. 2018-LL-477
3. The solution architecture of the data solution wasn't sufficiently locked down in the earlier stages of the project and was under estimated in terms of complexity. KM Ref. 2018-LL-478

6 Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	<input checked="" type="radio"/> Yes <input type="radio"/> No
Gate E checklist completed (appl. only to CCD)	<input type="radio"/> Yes <input checked="" type="radio"/> N/A
All relevant costs have been charged to project	<input checked="" type="radio"/> Yes <input type="radio"/> No
All work orders and funding projects have been closed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All unused materials have been returned	<input checked="" type="radio"/> Yes <input type="radio"/> No
All IS Service Transition activities have been completed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All lessons learned have been entered appropriately into the IS Knowledge Management Tool (KMT) lesson learned database	<input checked="" type="radio"/> Yes <input type="radio"/> No

7 Statements of Support

7.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Ali Fakhouri	Business Representative
PDM	Helen Smith	Head of PDM
BRM	Graham Pool	Relationship Manager
PDM	Richard Pedley	Program Delivery Director
IS Finance	Michelle Harris	Manager
IS Regulatory	Daniel DeMauro	Director
DR&S	Satya Kudupudi	Director
Service Delivery	Dave Westwood	Director



Closure Template

Enterprise Architecture	Gareth Harrison	Director
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7.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Anand, Sonny
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



Closure Template

8 Decisions

The US Sanctioning Committee (USSC) approved this paper at a USSC meeting held on 09/19/2018.

Signature.....Date.....
David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



Closure Paper

Title:	Concur Expenses	Sanction Paper #:	USSC-17-301 v2
Project #:	INVP 4662 Capex: S007732	Sanction Type:	Closure
Operating Company:	National Grid USA Svc. Co.	Date of Request:	2/5/2019
Author / NG Representative:	Anil Garg / Ella Weisbord	Sponsor:	Christopher McConnachie, VP Finance Services
Utility Service:	IT	Project Manager:	Samir Parikh

1 Executive Summary

This paper is presented to close INVP 4662. The total spend was \$3.058M. The original sanctioned amount for this project was \$3.418M at +/- 10%.

2 Project Summary

This project allows National Grid to implement an end-to-end corporate travel booking and expense process. Concur allows setup of customizable audit rules which should reduce review time of expense items. It also will auto-generate notifications out to end users on outstanding expense items, which currently is manually triggered. Both the audit rules and automated notifications should cut down on administrative efforts. This is the second phase of the investment, following last year's license agreement which was completed as part of a broader negotiation with SAP, via a discounted pricing model.

3 Variance Analysis

3.1 Cost Summary Table

Actual Spending (\$M) vs. Sanction (\$M)				
Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
INVP 4662 Concur Expenses Capex: S007732	Capex	2.498	2.456	(0.042)
	Opex	0.560	0.962	0.402
	Removal	0.000	0.000	0.000
	Total	3.058	3.418	0.360



Closure Paper

3.2 Cost Variance Analysis

The original go-live date in February 2018 was recognized as a risk to the year-end close activities and potential for additional audits. The project was asked to move the go-live date out to April 2018 and the related costs were covered by US Finance in the budget.

Project was delivered under budget by \$0.360M, which was driven by effective risk mitigations as well as the post Go-Live costs of \$0.374M provided by US Finance in the budget.

3.3 Schedule Variance Table

Schedule Variance	
Project Grade - Ready for Use Date	5/31/2018
Actual Ready for Use Date	4/23/2018
Schedule Variance	- 0 years, 1 months, 8 days

3.4 Schedule Variance Explanation

N/A

4 Final Cost by Project

Actual Spending (\$M) vs. Sanction (\$M)				
Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
INVP 4662 Concur Expenses Capex: S007732	Capex	2.498	2.456	(0.042)
	Opex	0.560	0.962	0.402
	Removal	0.000	0.000	0.000
	Total	3.058	3.418	0.360

5 Improvements / Lessons Learned / Root Cause

- 2018-LL-630 Gain approval from Finance before selecting a go-live date in Q4 (Jan- Mar).
- 2019-LL-631 Need to account for additional network and security vendors (budget and resources) when implementing/upgrading cloud applications.



Closure Paper

6 Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	<input checked="" type="radio"/> Yes <input type="radio"/> No
Gate E checklist completed (appl. only to CCD)	<input type="radio"/> Yes <input checked="" type="radio"/> N/A
All relevant costs have been charged to project	<input checked="" type="radio"/> Yes <input type="radio"/> No
All work orders and funding projects have been closed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All unused materials have been returned	<input checked="" type="radio"/> Yes <input type="radio"/> No
All IT Service Transition activities have been completed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All lessons learned have been entered appropriately into the IT Knowledge Management Tool (KMT) lesson learned database	<input checked="" type="radio"/> Yes <input type="radio"/> No

7 Statements of Support

7.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Elisabeth Ziankoski	Business Representative
Business Partner (BP)	Joel Semel	Relationship Manager
Program Delivery Management (PDM)	Samir Parikh	Program Delivery Director
IT Finance	Michele Harris	Manager
IT Regulatory	Daniel DeMauro	Director
Digital Risk and Security (DR&S)	Peter Shattuck	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Director



Closure Paper

7.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



Closure Paper

8 Decisions

I approve this paper.

Signature.....Date.....

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



Closure Paper

Title:	Mobile Device Refresh – FY17	Sanction Paper #:	USSC-17-023C
Project #:	INVP 4671 Capex: S007571	Sanction Type:	Closure
Operating Company:	National Grid USA Svc. Co.	Date of Request:	6/12/2018
Author:	Craig Costanzo	Sponsor:	John Bruckner, SVP Operations and Engineering
Utility Service:	IS	Project Manager:	Craig Costanzo

1 Executive Summary

This paper is presented to close INVP 4671. The total spend was \$3.954M. The sanctioned amount for this project was \$4.657M at +/- 10% (project grade).

Project Sanction Summary (\$M)				
Title	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance
Mobile Device Refresh - FY17	Capex	3.954	4.657	0.703
	Opex	0.000	0.000	0.000
	Removal	0.000	0.000	0.000
	Total	3.954	4.657	0.703

1.1 Variance Analysis

The underspend was due to the following:

- The risk amount of \$297k not being used because we did not encounter any unexpected requirements or charges;
- Remaining underspend (\$406k) was due to:
 - CSC charges were \$17k less than originally anticipated in project planning;
 - The equipment purchases cost \$389k less than originally estimated.



Closure Paper

1.2 Schedule Variance

Schedule Variance	
Project Grade - Ready for Use Date	3/31/2017
Actual Ready for Use Date	3/31/2017
Schedule Variance	- 0 years, 0 months, 0 days

2 Project Summary

This policy-driven project aimed to secure 750 mobile devices, docks, modems and antennas. An additional 150 modems were purchased for distribution and deployed in FY18 under a separate project. All of these devices replaced existing old mobile devices in the US that are no longer supported by manufacturing vendor or were more than 7 years old.

A majority of old devices in the field impacted day-to-day operations. These old devices broke down frequently and could not be easily repaired due to unavailability of parts and accessories (in some cases manufacturers had stopped supporting the devices).

The replacement units delivered under this project allowed field technicians to have the reliable equipment and data required to perform their work in a safe and effective manner. The implementation standardized National Grid infrastructure by rolling out Windows 7 or virtualizing applications running on Windows XP to run on Windows 7 devices.

3 Final Cost by Project

Actual Spending (\$M) vs. Sanction (\$M)				
Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance
INVP 4671	Capex	3.954	4.657	0.703
	Opex	0.000	0.000	0.000
	Removal	0.000	0.000	0.000
	Total	3.954	4.657	0.703



Closure Paper

4 Improvements / Lessons Learned/Root Cause

#	Lesson Learned	Recommended Action
1	More lead time is required for certain equipment purchases that the business requests	Contact the vendor or Procurement to determine the lead time required of the hardware purchase to determine if it would arrive prior to the end of the Fiscal Year.

5 Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	<input checked="" type="radio"/> Yes <input type="radio"/> No
All relevant costs have been charged to project	<input checked="" type="radio"/> Yes <input type="radio"/> No
All work orders and funding projects have been closed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All unused materials have been returned	<input checked="" type="radio"/> Yes <input type="radio"/> No
All IS Service Transition activities have been completed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All lessons learned have been entered appropriately into the IS Knowledge Tool lesson learned database	<input checked="" type="radio"/> Yes <input type="radio"/> No



Closure Paper

6 Statements of Support

6.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
PDM	Deb Rollins	Head of PDM
BRM	Rick Sheer	Relationship Manager
PDM	Sally Seltzer	Program Delivery Director
IS Finance	Michelle Harris	Director
IS Regulatory	Dan DeMauro	Director
DR&S	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Director
Enterprise Architecture	Svetlana Lyba	Director

6.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Anand, Sonny
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



Closure Paper

7 Decisions

I approve this paper.

Signature.....Date.....
David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



Closure Paper

Title:	PI Enterprise Deployment	Sanction Paper #:	USSC-17-027
Project #:	INVP 4673 Capex: S007581	Sanction Type:	Closure
Operating Company:	National Grid USA Svc. Co.	Date of Request:	5/9/2018
Author:	Douglas McCarthy	Sponsor:	John Spink, VP, Control Center Operations
Utility Service:	IS	Project Manager:	Aman Aneja

1 Executive Summary

This paper is presented to close INVP4673. The total spend was \$8.669M. The sanctioned amount for this project was \$8.184M at +/- 10% (project grade).

Project Sanction Summary (\$M)				
Title	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance
PI Enterprise Deployment	Capex	8.669	8.184	(0.485)
	Opex	0.000	0.000	0.000
	Removal	0.000	0.000	0.000
	Total	8.669	8.184	(0.485)

1.1 Variance Analysis

The actual costs of this project exceeded the sanction amount by \$0.485M, or approximately 6%, and within the 10% tolerance allowance. The additional project costs were due to the application of sales tax to the license purchase which was not included in the sanction estimate.

1.2 Schedule Variance

Schedule Variance	
Project Grade - Ready for Use Date	3/31/2017
Actual Ready for Use Date	3/31/2017
Schedule Variance	- 0 years, 0 months, 0 days



Closure Paper

2 Project Summary

The Plant Information (PI) application from OSIsoft is used to collect and analyze interval data from field devices and Remote Telemetry Units (RTU) installed on National Grid’s electric and gas transmission and distribution networks. This data is used by operations, asset management, and engineering personnel to manage the electric and gas transmission and distribution systems, identify operating issues, and understand system performance over time. A growing need for this information is being driven by work associated with the Grid Modernization Program (GMP) and Distributed System Implementation Plan (DSIP) initiatives. Previous licensing for OSIsoft PI software was limited by the number of users and measurement points and therefore restricted the growth of this critical application.

This investment provided the funding required to secure an Enterprise license for the OSIsoft PI software allowing additional users and measurement points to be added to the existing Energy Management Systems (EMS) in New York and New England. During fiscal year 17/18, the business added 15,000 additional measurement points to the EMS NY and EMS NE systems . Note that future investments will expand on the scope of the PI infrastructure further expanding its capabilities and value to the business.

2.1 In-Service Date

March 31, 2017.

3 Final Cost by Project

Actual Spending (\$M) vs. Sanction (\$M)				
Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance
INVP 4673	Capex	8.669	8.184	(0.485)
	Opex	0.000	0.000	0.000
	Removal	0.000	0.000	0.000
	Total	8.669	8.184	(0.485)

4 Improvements / Lessons Learned/Root Cause

Future sanctions will include allowance for sales tax on license purchases.



Closure Paper

5 Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	<input checked="" type="radio"/> Yes <input type="radio"/> No
All relevant costs have been charged to project	<input checked="" type="radio"/> Yes <input type="radio"/> No
All work orders and funding projects have been closed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All unused materials have been returned	<input checked="" type="radio"/> Yes <input type="radio"/> No
All IS Service Transition activities have been completed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All lessons learned have been entered appropriately into the IS Knowledge Tool lesson learned database	<input checked="" type="radio"/> Yes <input type="radio"/> No

6 Statements of Support

6.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	John Spink	Business Representative
PDM	Deb Rollins	Head of PDM
BRM	Aman Aneja	Relationship Manager
PDM	Sally Seltzer	Program Delivery Director
IS Finance	Michelle Harris	Director
IS Regulatory	Dan DeMauro	Director
DR&S	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Director
Enterprise Architecture	Joe Clinchot	Director



Closure Paper

6.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Anand, Sonny
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



Closure Paper

7 Decisions

The US Sanctioning Committee (USSC) approved this paper at a USSC meeting held on May 9, 2018.

Signature.....Date.....
David H. Campbell, Vice President, ServCo Business Partnering, USSC Chair

USSC Closure Paper



Title:	Acquisition of Remote Sensing NY Areal Data	Sanction Paper #:	USSC-17-138C
Project #:	INVP 4729 Capex: S007601	Sanction Type:	Closure
Operating Company:	National Grid USA Svc. Co.	Date of Request:	April 11, 2018
Author:	Dale Kruchten / Jorge Calzada	Sponsor:	Kenneth Daly, President NY Jurisdiction
Utility Service:	IS	Project Manager:	Michael De Matteo

1 Executive Summary

This paper is presented to close INVP 4729. The total spend was \$7.945M. The sanctioned amount for this project was \$8.632M at +/- 10%.

The final spend amount is \$7.945M broken down into:

- \$7.945M Capex
- \$0.000M Opex
- \$0.000M Removal

2 Project Summary

The project built an inventory of high resolution, and Light Detection and Ranging (LIDAR) data of the building stock of our customers by performing flyovers of our service territory to capture a current vintage of all data.

High Resolution images provide greater detail than any current image available to National Grid, and are necessary to aid in the determination of building characteristics that are relevant to servicing our customers. LIDAR data measures the height of various above ground structures, and is used to help characterize current building stock on the territory for the purposes of understanding energy consumption and roof characteristics.

This data is maintained by Advanced Data & Analytics in its cloud environment and enables the opportunity to conduct more accurate and complete advanced analytics that benefit Operations and Energy Efficiency, such as:

- To support the data correction activities within the Gas Business Enablement program;
- To assess the operational condition of above ground assets;
- To design and site customer gas services quicker and more efficiently;

USSC Closure Paper



- To improve comprehensive understanding of the relationship between energy usage, square footage of buildings, construction characteristics of buildings, heat maps of buildings, etc.
- To support the transformation of Load and DER Forecasting;
and
- Specifically enabling a superior modeling paradigm to understand distributed energy resources and how they will impact the electric distribution system.

2.1 In-Service Date

March 31, 2017

3 Over / Under Expenditure Analysis

3.1 Summary Table

Actual Spending (\$M)			
Project #	Description		Total Spend
INVP 4729	Acquisition of Remote Sensing NY Areal Data	Capex	7.945
		Opex	0.000
		Removal	0.000
		Total	7.945
Total		Capex	7.945
		Opex	0.000
		Removal	0.000
		Total	7.945

Project Sanction Summary Table			
Project Sanction Approval (\$M)			Total Spend
		Capex	8.632
		Opex	0.000
		Removal	0.000
		Total Cost	8.632
Sanction Variance (\$M)			Total Spend
		Capex	0.687
		Opex	0.000
		Removal	0.000
		Total Variance	0.687

USSC Closure Paper



3.2 Analysis

This project did not fully utilize the authorized project spend resulting in an underspend of \$0.687M. The underspend was due to continuous negotiation between National Grid and imaging service provider. The project was sanctioned using what was thought to be the final estimate, but due to continued negotiations, a lower total cost was ultimately agreed between the parties.

3.3 Schedule Variance

Schedule Variance	
Project Grade - Ready for Use Date	3/31/2017
Actual Ready for Use Date	3/31/2017
Schedule Variance	- 0 years, 0 months, 0 days

4 Improvements / Lessons Learned/Root Cause

#	Lesson Learned	Recommended Action
1	Need to allow extra time when contractual issues are involved.	Follow this approach where applicable in all future projects.

5 Closeout Activities

The following closeout activities have been completed.

Activity	Completed
All work has been completed in accordance with all National Grid policies	<input checked="" type="radio"/> Yes <input type="radio"/> No
All relevant costs have been charged to project	<input checked="" type="radio"/> Yes <input type="radio"/> No
All work orders and funding projects have been closed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All unused materials have been returned	<input checked="" type="radio"/> Yes <input type="radio"/> No
All IS Service Transition activities have been completed	<input checked="" type="radio"/> Yes <input type="radio"/> No

USSC Closure Paper



All lessons learned have been entered appropriately into the IS Knowledge Tool lesson learned database	<input checked="" type="radio"/> Yes <input type="radio"/> No
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6 Statements of Support

6.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Function	Individual
Business Representative	Ken Daly
Head of PDM	Deb Rollins
Relationship Manager	Aman Aneja
Program Delivery Director	N/A
IS Finance Management	Michelle Harris
IS Regulatory	Dan DeMauro
DR&S	Elaine Wilson
Service Delivery	Mark Mirizio
Enterprise Architecture	Joe Clinchot

6.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual	Area
Regulatory	Harvey, Maria	IS
Jurisdictional Delegate(s)	Anand, Sonny	Electric - NE
	Harbaugh, Mark	Electric - NY
	Hill, Terron	FERC
	Currie, John	Gas - NE
	Wolf, Don	Gas - NY
Procurement	Chevere, Diego	All

USSC Closure Paper



7 Decisions

The US Sanctioning Committee (USSC) approved this paper at a USSC meeting held on April 11, 2018.

Signature.....Date.....

David H. Campbell, Vice President, ServCo Business Partnering, USSC Chair



US Sanction Paper

Title:	Customer Experience Transformation Technology Program	Sanction Paper #:	USSC-17-276 v2
Project #:	INVP 4750 Capex: S007692	Sanction Type:	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	12/12/2018
Author:	Suzanne Rodriques	Sponsor:	Kelly Carney, VP Customer Exp and Systems Transformation
Utility Service:	IT	Project Manager:	Jeffrey Dailey

1 Executive Summary

1.1 Sanctioning Summary

This paper requests partial sanction of INVP 4750 in the amount of \$12.569M with a tolerance of +/- 10% for the purposes of Partial Development and Implementation (D-I).

This sanction amount is \$12.569M broken down into:

- \$9.730M Capex*
- \$2.839M Opex*
- \$0.000M Removal*

NOTE the potential investment of \$18.775M with a tolerance of +/- 25%, contingent upon submittal and approval of a Project Sanction paper following completion of Partial Development and Implementation (D-I).

1.2 Project Summary

This program will replace out-of-support platforms to mitigate existing risk to National Grid's self-service billing, payment and communications portals. It will set the foundation for the processes and technology changes needed to drive step improvements to the customer experience. The program will help manage increasing future operating costs through the migration of customers to self-service channels, and through re-engineering of processes and transactions. The program will focus on re-engineering the customer's digital interactions to create a universal and seamless customer experience through multiple service options: Web, Mobile, Text, Email, and future emerging channels.



US Sanction Paper

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
4750		Customer Transformation Technology Program	18.775
Total			18.775

1.4 Associated Projects

N/A

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Potential Investment Tolerance
8/9/17	USSC	\$6.730M	\$11.616M	Partial	25%

This is a partial sanction of a program that is continually being refined to deliver the best value to National Grid’s customers while aligning to the Company’s architecture strategy. The Strategic Alignment project within the program has revealed the following impacts that attribute to the increase in the program cost estimate:

- Architecture strategy decision to use Salesforce Marketing Cloud for Communications Management (20%)
- Determination of best-in-class architectural platform for customer self-service (45%)
- Partnering with a 3rd party vendor to design and deliver on Content Web and Transaction Web (10%)
- Resources and Administrative costs – (25%)

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
June 2019	Project Sanction



US Sanction Paper

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	This program will address strategic business priorities to address the customer experience (CXT) and ensure reliability of the IT infrastructure that supports it.

1.8 Asset Management Risk Score

Asset Management Risk Score: 41

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability
 Environment
 Health & Safety
 Not Policy Driven

1.9 Complexity Level

- High Complexity
 Medium Complexity
 Low Complexity
 N/A

Complexity Score: N/A

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

- Yes
 No



US Sanction Paper

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IT Investment Plan FY19 - 23	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	\$5.632M

1.12 If cost > approved Business Plan how will this be funded?

Re-allocation of budget within the IT business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
CapEx	0.000	0.160	6.459	9.082	0.000	0.000	0.000	15.700
OpEx	0.000	1.426	1.241	0.408	0.000	0.000	0.000	3.075
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	1.586	7.700	9.489	0.000	0.000	0.000	18.775

1.14 Key Milestones

Milestone	Target Date: (Month Year)
Start Up	April 2017
Partial Sanction	August 2017
Begin Requirements and Design	August 2017
Partial Sanction	December 2018
Program Sanction	June 2019
Move to Production	February 2020
Program Closure	June 2020



US Sanction Paper

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input type="checkbox"/> Contractor	
Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green

1.16 Key Issues (include mitigation of Red or Amber Resources)

N/A

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative

1.18 List References

N/A



US Sanction Paper

2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on 12/12/2018:

- (a) APPROVED the investment of \$12.569M and a tolerance of +/- 10% for the purposes of Partial Development and Implementation.
- (b) NOTED the potential run-the-business (RTB) impact of \$0.341M (per annum) for 5 years.
- (c) NOTED the potential investment \$18.775M and a tolerance of +/- 25%, contingent upon submittal and approval of a Project Sanction paper following completion of final requirements and design.
- (d) NOTED that Jeffrey Dailey has the approved financial delegation to undertake the activities stated in (a).
- (e) NOTE: In the event that any Blanket/Programs are not approved prior to the start of the FY19/20 fiscal year, the FY19/20 approval limits will remain in effect until such time as the FY19/20 Blanket/Programs are approved by USSC and/or other appropriate authority for approval.

Signature.....Date.....

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



US Sanction Paper

3 Sanction Paper Detail

Title:	Customer Experience Transformation Technology Program	Sanction Paper #:	USSC-17-276 v2
Project #:	INVP 4750 Capex: S007692	Sanction Type:	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	12/12/2018
Author:	Suzanne Rodriques	Sponsor:	Kelly Carney, VP Customer Exp and Systems Transformation
Utility Service:	IT	Project Manager:	Jeffrey Dailey

3.1 *Background*

National Grid has embarked on a comprehensive Customer Experience Transformation (CXT) program to change how we interact, serve and communicate with customers. This technology enabling program is a key element and building block to our Customer strategy.

National Grid has approximately 7 million gas and electric customers in New York, Massachusetts and Rhode Island, and was formed from of a series of mergers and acquisitions. Although a number of system and infrastructure consolidations have taken place, there are essentially two legacy infrastructures for Billing/Customer Information Systems and corresponding digital channels (Web and Interactive Voice Response) implementations that enable self-serve functions for our customers. National Grid is re-engineer the customer digital experience and supporting processes into a single set of digital channels while mitigating risks associated with using out-of-support legacy customer self-service platforms.

3.2 *Drivers*

The key drivers of this investment are to:

- Improve customer satisfaction (C-SAT) through consistent processes across all digital channels
- Manage operating cost through the migration of customer transactions to self-serve digital platforms



US Sanction Paper

- Create systems and processes capable of adapting to changing customer needs and expectations in support of furthering National Grid's reputation and position as a leader within the utility sector
- Mitigate operational risk associated with outdated technology platforms

3.3 Project Description

The CXT technology program includes developing a roadmap for the future state of customer related system capabilities as well as the number of projects needed to support the US Customer strategy. A key guiding principle of the program is to ensure stability and enhance functionality in the shortest timeline to improve how we service customers. In some cases, tactical decisions are made and implemented while the end state roadmap is still under development. These short term improvements are vetted against the end state vision and for alignment to other strategic projects, such as GBE.

The program has the following components:

4750A – CXT Strategic Assessment was completed in June 2018.

This Feasibility and Analysis study performed a detailed assessment of the customer facing website requirements, known as My Account. It identified interdependencies and synergies of the My Account Program with GBE and Agent Interaction Management System (AIMS). The project evaluated three solution architectures, data model development, release management, and communication fulfillment options. The project delivered a Program Roadmap that aligns to GBE and AIMS.

4750B – CXT-Tactical Customer Web Transaction Improvements was completed in October 2018.

This project delivered on improvements in Customer Experience and Satisfaction through re-engineering of web processes for low customer satisfaction (C-SAT) transactions to provide customers more access to the self-service channels. The updates included:

- Account Overview: Modification to Account Overview and Budget Plan enrollment webpages to allow customers to view more detailed information about their account status, budget enrollment status and the reason for ineligibility from the Budget Plan.
- Budget Bill Arrears and Suspended Charges: Modification to the existing eligibility criteria and messaging to reduce the number of self-service failures.
- Office Meter Off: increase the number of automated meter on/off processes which currently require back-office work.
- POS ID: Increase successful start service self-service by providing enhanced ID verification processes.



US Sanction Paper

- Check Svc Availability: increase usability by allowing a customer to check if an address is within our service territory prior to being required to create an online profile.

4750C – CXT IAM POC was completed in July 2018.

This Proof of Concept (POC) project for Identity Access Management (IAM) successfully determined the feasibility for using the Microsoft Azure Business-To-Customer (B2C) platform for the CXT 'MyAccount' Strategic Alignment implementation effort.

4750D – CXT MyAccount MVP

This project is focused on providing a better User Experience Portal (UXP) for desktop and mobile devices. The solution will align with GBE's current tactical and future strategic platforms. The program will accomplish the following:

- **Stable and Secure Infrastructure:**
 - Replace legacy downstate Siebel infrastructure that supports customer facing functions for the downstate New York Customers (CRIS). The updated site will be designed and built as a responsive website, and will be the basis for future conversion of the customers served by the CSS customer service system
 - Provide customer system integration services to support the new user experience. The existing services which are used to support the contact center agent desktop, Interactive Voice Response system (IVR) and web self-service channels depend on unsupported middleware infrastructure and out of date technology platforms
- **Improved Usage and Insights:** Seamlessly incorporate the Opower custom widgets for downstate New York and Massachusetts gas residential customers to provide enhanced usage information, bill comparison and energy savings tips, eliminating the need for a separate login.
- **User Experience across Multiple Device Types:** Provide a best-in-class responsive content website for all regions, eliminating the need for separately maintained content on the mobile website.
- **Identity Access Management (IAM):** Implementation of a strategic IAM solution integrated with the Business-to-Customer (B2C) Retail Web Portal. This new IAM solution will serve as a replacement for the legacy authentication and web account management solutions across National Grid territories, and include single-sign-on (SSO) for services provided to third-party partners who provide information to National Grid's customers through the self-service website (O-Power, Simple Energy, etc.)
- **Preference Management:** A new operational data store will be used to maintain and store a limited set of (as-is) account preferences for customers.



US Sanction Paper

- **Improved Availability:** Provide a 24x7 customer web experience for the downstate NY region through the creation of an operational data store (ODS) to replace the currently isolated information that is unavailable to process customer transactions while batch processes are running overnight.
- **Communication Engine:** A new communication engine will be established to replace the unsupported Siebel web email communication for CRIS customers and enable future multi-channel communication capabilities.

4750E – Two Way Text Notification for Appointment Scheduling F&A

This Feasibility and Analysis project will evaluate cost, timeline and vendor involvement for providing Customer Service Representatives a method to send appointment notifications to customers and allow customers to cancel or modify their appointment with National Grid.

4750G – CXT MyAccount Two Way Outage Communications

This project will enable two-way text capabilities for electric outage information. It will provide customers with two-way outage communication and notifications, enabling National Grid to increase customer satisfaction and trust, while shifting calls to the contact center to a more efficient method for providing critical information to customers during major storms.

3.4 Benefits Summary

This investment will deliver the following benefits:

- Improve customer satisfaction through improved and standardized processes across all digital channels
 - External research from AnswerLab and JD Power indicates that customers are more satisfied overall when they are successful at completing their transaction online, find websites easy to navigate, have mobile options available to them
 - Improving the overall experience builds trust and willingness to participate in programs offered
- Deliver Customer Value through Improved Experience
 - Create systems and processes capable of adapting to changing customer needs and expectations, and evolving National Grid vision
 - Improve two-way communications which allows near real time updates available to customers through their preferred channel
 - Expand availability of self-service options by mitigating problems with legacy back end systems
 - One view of all billing, services, transactions and communications no matter the channel for both the customer and company



US Sanction Paper

- Regulatory
 - Improved customer self-service and regulatory goodwill
- Operating Costs
 - Manage increase in future operating cost through the migration of customer transactions to self-serve digital platforms
- Risk Remediation
 - Mitigate operational risk associated with outdated technology platforms which provide support for over 3.5 million registered users, 1.3 million customers enrolled in paperless billing and \$1.5 billion per year in payments via the web self-serve and mobile channels representing 13% of National Grid's US revenue.
 - Mitigate cyber security exposure to National Grid and its customers from vendors not providing patches for out of support software
- Prepare for Future Demand
 - Support new demand for customer self-serve capabilities coming from large change programs including: Gas Business Enablement, NY REV, MA Grid Modernization, etc.

3.5 Business and Customer Issues

There are no significant business issues beyond what has been described elsewhere.

3.6 Alternatives

Alternative 1: Do Nothing or Defer

Rejected. The Company is currently operating key areas of the business on technology that is outdated and no longer supported. The ability to service the entire legacy KeySpan segment that includes gas customers in MA and New York City is at risk. Furthermore, the C-SAT scores of all regions online self-service are not consistent with National Grid's vision. Deferring this program will also increase cyber security exposure due to vendors no longer supporting security patching of legacy versions of software.

Alternative 2: Convert Entire Self-Service to Responsive Now

Rejected. The increase in complexity and timeline would not allow delivery of environment stabilization in a timely manner.

Alternative 3: Utilize Existing Communication Methods



US Sanction Paper

Rejected. Although this option could allow delivery of the overall solution in a shorter timeline, there would be future rework to implement strategic initiatives within the company to streamline all communication.

Alternative 4: Convert the Downstate NY Customers Only to the new IAM Solution at this Time

Rejected. The effort to convert all customers during the 4750D CXT MyAccount MVP project will provide a significant benefit to the experience of customers who have accounts managed across the various back-end customer systems and reduce the learning curve of deploying the functionality in waves.

3.7 Safety, Environmental and Project Planning Issues

There are no significant business issues beyond what has been described elsewhere.

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	Implementation plan and final budget is pending agency UX design and ODS effort/timeline. It is a risk that this could lead to the project running longer than planned and the budget is underfunded.	4	3	3	12	12	Mitigate	Team is working to refine and update the current MyAccount MVP provisional plan based on the schedule provided by Design Vendor. We are working closely with the Design Vendor to make sure that we can support that schedule.	Possible delays in planned efforts	Escalate to Senior Leadership
2	Project is being delivered in an agile manner, a new methodology in practice for the National Grid Team	4	2	2	8	8	Mitigate	National Grid IT has embedded resources experienced with agile delivery into the project team. Additionally, the business has secured an Agile Coach to support the project in defining overall structure	Possible delays in planned efforts	Escalate to Senior Leadership
3	Project does not have an understanding of the Marketing Cloud scope, schedule, and cost to be managed by MyAccount	4	2	2	8	8	Accept	Conduct accelerator workshops with Salesforce Marketing Cloud, Marketing, and MyAccount to define governance structure and scope.	Possible delays in planned efforts	Escalate to Senior Leadership

3.9 Permitting

N/A



US Sanction Paper

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will be reflected at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
INVP 4750	Customer Transformation Technology Program	25%	CapEx	0.000	0.160	6.459	9.082	0.000	0.000	0.000	15.700
			OpEx	0.000	1.426	1.241	0.408	0.000	0.000	0.000	3.075
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	1.586	7.700	9.489	0.000	0.000	0.000	18.775
Total Project Sanction			CapEx	0.000	0.160	6.459	9.082	0.000	0.000	0.000	15.700
			OpEx	0.000	1.426	1.241	0.408	0.000	0.000	0.000	3.075
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	1.586	7.700	9.489	0.000	0.000	0.000	18.775



US Sanction Paper

3.11.2 Project Budget Summary Table

Project Costs per Business Plan

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
\$M								
CapEx	0.000	0.160	9.981	0.000	0.000	0.000	0.000	10.141
OpEx	0.000	1.426	1.575	0.000	0.000	0.000	0.000	3.002
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	1.586	11.556	0.000	0.000	0.000	0.000	13.143

Variance (Business Plan-Project Estimate)

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
\$M								
CapEx	0.000	0.000	3.522	(9.082)	0.000	0.000	0.000	(5.559)
OpEx	0.000	0.000	0.334	(0.408)	0.000	0.000	0.000	(0.073)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.000	3.857	(9.489)	0.000	0.000	0.000	(5.632)

3.11.3 Cost Assumptions

This estimate was developed in 2018 using the standard IS estimating methodology, which includes an assessment of project costs. Examples of these project costs are internal and contract labor, hardware and software to deliver the project, cost of living adjustments for multi-year projects, AFUDC for capital investments, risk, and ongoing support costs. Standard rates are used in the estimate to promote consistency (ex: internal labor rates, cost of living adjustments %, AFUDC % and risk %). The accuracy level of estimate is identified in Table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

This is not an NPV project.

3.11.5 Additional Impacts

None.



US Sanction Paper

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Kelly Carney	Business Representative
Program Delivery Management (PDM)	Narayan Devireddy	VP Solution Delivery
Business Partner (BP)	Orla Daly	Relationship Manager
Program Delivery Management (PDM)	Jeffrey Dailey	Program Delivery Director
IS Finance	Michelle Harris	Manager
IS Regulatory	Daniel DeMauro	Director
Digital Risk and Security (DR&S)	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joseph Clinchot	Director

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



US Sanction Paper

4 Appendices

4.1 Sanction Request Breakdown by Project

\$M	INVP 4750	Total
CapEx	9.730	9.730
OpEx	2.839	2.839
Removal	0.000	0.000
Total	12.569	12.569

4.2 Other Appendices

4.2.1 Project Cost Breakdown

Project Cost Breakdown \$ (millions)						
Cost Category	sub-category	VOWD	FTC	FAC=VOWD+FTC	Name of Firm(s) providing	
Personnel	NG Resources	1.164	2.347	3.511		
	SDC Time & Materials		1.464	2.294	3.758	IBM
			0.241	0.612	0.853	WiPro
			0.000	-	-	DXC
			0.000	-	-	Verizon
	SDC Fixed-Price		0.000	-	-	IBM
			0.000	-	-	WiPro
			0.000	-	-	DXC
			0.000	-	-	Verizon
	All other personnel	0.784	-	0.784		
TOTAL Personnel Costs	3.653	5.253	8.906			
Hardware	Purchase	0.000	0.005	0.005		
	Lease	0.000	-	-		
Software		0.000	0.141	0.141		
Risk Margin			0.177	0.177		
AFUDC		0.000	0.999	0.999		
Other		0.000	8.547	8.547		
TOTAL Costs		3.653	15.122	18.775	Should match Financial Summary Total	



US Sanction Paper

4.2.2 Benefiting Operating Companies

The following companies will benefit from this program. The allocation of these benefits will be based upon the number of customers, and will vary for each project within the program. The individual project sanction papers will include the actual allocation.

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp - Electric	Electric Distribution	NY
Niagara Mohawk Power Corp – Gas	Gas Distribution	NY
Massachusetts Electric Company	Electric Distribution	MA
Nantucket Electric Company	Electric Distribution	MA
Narragansett Gas Company	Gas Distribution	RI
Narragansett Electric Company	Electric Distribution	RI
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
Boston Gas Company	Gas Distribution	MA
Colonial Gas Company	Gas Distribution	MA

4.2.3 IS Ongoing Operational Costs (RTB):

This project will increase IS ongoing operations support costs as per the following table. These are also known as Run the Business (RTB) costs.

RTB costs are high level estimates at this time for the program. Individual projects within the program will identify their own RTB impacts in the respective sanction papers.

INV ID:	4750				Forecast Date:	08/16/18
Investment Name:	CXT Program				Go-Live Date:	9/1/2020
Project Manager:	Tom Towne			PDM:	Jeff Dailey	
All figures in \$ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB						-
Last Sanction Business Net Impact to RTB						-
Last Sanction Total Net Impact to RTB	-	-	-	-	-	-
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB						-
Business Budgeted Net Impact to RTB						-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	78.0	276.4	331.4	341.0	351.0	1,377.8
Business Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	(78.0)	(276.4)	(331.4)	(341.0)	(351.0)	(1,377.8)
Business Budgeted Net Impact to RTB Variance	-	-	-	-	-	-



US Sanction Paper

4.3 *NPV Summary (if applicable)*

N/A

4.4 *Customer Outreach Plan*

N/A

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Date: 02/01/2019

**Investment Proposal Summary Sheet
 INVP 4750D – CXT ‘MyAccount’ MVP Project**

Request Date: 02/01/2019	Relationship Manager: Orla Daly	Author: Jennifer Schaub
Project Manager: Alexia Richardson / Tom Towne	Program Delivery Director: Jeffrey Dailey	Sanction Type: Partial Sanction
Region: US	Category: Policy	Legal Entity: IT
Risk Score: 41	Primary Driver: Reliability	Project Classification: H
Project Sponsor: Kelly Carney	Program INVP – Description: INVP 4750 – Customer Experience Transformation Technology Program (CXT)	

Sanction Summary:

This paper requests partial sanction of INVP 4750D the amount \$10.126M with a tolerance of +/- 10% for the purposes of Partial Development and Implementation (D-I).

This partial sanction amount of \$10.126M is broken down into:

\$9.451M	CapEx
\$0.675M	OpEx
\$0.000M	Removal

NOTE the potential investment of \$17.427M with a tolerance of +/- 25%, contingent upon submittal and approval of a Project Sanction paper following completion of Partial Development and Implementation.

Project Summary

This policy-driven project is targeted to deploy the first major release of the Customer Experience Transformation Technology (CXT) Program, referred to as the Minimum Viable Product (MVP). The primary objective of the MVP release is to remediate the security and stability risks associated with the use of the outdated Siebel web platform, as well as to deliver the following new technologies and capabilities to New York City Gas and Massachusetts Gas customers.

Content Web: A new Content Web platform to support the enablement of responsive templates and the conversion of existing content into a fully responsive viewing experience.

Transaction Web: A new Transaction Web Portal to support MyAccount MVP functionality and planned enhancements.

Identity Access Management (IAM):

A new IAM solution to facilitate the conversion journey for CRIS (Customer Relations Information System) and CSS (Customer Service System)

Preference Management:

A new Preference Management solution to support MyAccount MVP and Gas Business Enablement (GBE) Appointment Reminder Functionality.

Operational Data Store (ODS):

A new database and data synchronization strategy to provide a mechanism for supporting CRIS web customers while the backend CRIS system is down.

Communication Engine:

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Date: 02/01/2019

A new Communication Engine to support GBE Appointment Reminder functionality and MyAccount MVP capabilities.

Integration Services:

New web services and middleware to support integration of the new Transaction Web Portal and the backend customer systems.

Project Description

During the Partial Development and Implementation (D&I phase) of the project, the following will be accomplished:

- Partial build, configure, test and deploy of the new Transaction Web Portal as per the approved design (in a non-production environment)
- Provision of the solution hosting environment for the new Transaction Web Portal and Operational Data Store (in a non-production environment)
- Partial Development and Testing of the interfaces in scope for integration of the new Transaction Web Portal with the backend customer systems (in a non-production environment)
- Demonstrate successful testing of the data conversion and migration of customer identities from the legacy CELO system to the new Identity Access Management (IAM) solution
- Partial testing of end-to-end system connectivity and solution setup

Background

National Grid has embarked on a comprehensive Customer Experience Transformation (CXT) Program to fundamentally change how we interact, serve and communicate with our customers. Although a number of system and infrastructure consolidations have taken place, there are essentially two systems that support billing and customer service (CSS & CRIS) – see Table 1 below. The web experience provided by the current web platform is fragmented and supported by outdated technology.

Table 1:

Customer Billing System	Web System	Regions Served
CSS (Customer Service System)	CSS Web	Massachusetts - Electric Rhode Island - Electric & Gas Upstate New York - Electric & Gas Long Island – Gas
CRIS (Customer Relations Information System)	CRIS Web (SIEBEL)	Massachusetts - Gas New York City – Gas

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Date: 02/01/2019

Project Costs [\$M]	Prior Fys	FY 1 18/19	FY 2 19/20	FY 3 20/21	FY 4 21/22	FY 5 22/23	FY 6 23/24	Total
Start-Up OPEX	-	0.105	-	-	-	-	-	0.105
Start-Up CAPEX	-	-	-	-	-	-	-	-
Start-Up - Risk OPEX	-	-	-	-	-	-	-	-
Start-Up - Risk CAPEX	-	-	-	-	-	-	-	-
Start-Up SUBTOTAL	-	0.105	-	-	-	-	-	0.105
R&D OPEX	-	0.371	-	-	-	-	-	0.371
R&D CAPEX	-	4.158	-	-	-	-	-	4.158
R&D Risk OPEX	-	-	-	-	-	-	-	-
R&D Risk CAPEX	-	-	-	-	-	-	-	-
R&D SUBTOTAL	-	4.529	-	-	-	-	-	4.529
Development & Implementation – OPEX								
People	-	-	0.057	0.101	-	-	-	0.158
Software	-	0.010	0.110	-	-	-	-	0.120
Hardware	-	-	-	-	-	-	-	-
Other	-	0.021	0.710	-	-	-	-	0.731
Risk Margin	-	-	0.070	-	-	-	-	0.070
Development & Implementation – CAPEX								
People	-	0.393	3.866	-	-	-	-	4.259
Software	-	-	-	-	-	-	-	-
Hardware	-	-	-	-	-	-	-	-
AFUDC	-	0.029	0.840	-	-	-	-	0.869
Other	-	0.381	5.694	-	-	-	-	6.075
Risk Margin	-	-	0.511	-	-	-	-	0.511
D&I SUBTOTAL	-	0.834	11.858	0.101	-	-	-	12.793
Total Project Opex	-	0.507	0.947	0.101	-	-	-	1.555
Total Project Capex	-	4.961	10.911	-	-	-	-	15.872
Total Project Cost	-	5.468	11.858	0.101	-	-	-	17.427
Non-regulated project UPLIFT	-	-	-	-	-	-	-	-
Non-regulated project TOTAL	-	-	-	-	-	-	-	-
IS Investment Plan FY19 thru FY23								
Budget OPEX	-	-	-	-	-	-	-	-
Budget CAPEX	-	-	-	-	-	-	-	-
Total Budget Cost	-	-	-	-	-	-	-	-
Total Cost Variance								
Total Variance Opex	-	(0.507)	(0.947)	(0.101)	-	-	-	(1.555)
Total Variance Capex	-	(4.961)	(10.911)	-	-	-	-	(15.872)
Total Variance Cost	-	(5.468)	(11.858)	(0.101)	-	-	-	(17.427)
Impact on RTB costs	-	-	0.185	2.111	2.121	2.131	2.131	8.679

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Benefiting Operating Companies

See Appendix A

Alternatives

Alternative 1: Do Nothing or Defer: National Grid is currently operating a key area of the business on technology that is outdated or no longer supported. The ability to service CRIS customers is at risk if nothing is done. Deferring this project will also increase cyber security exposure due to vendors no longer supporting security patching of legacy systems, as well as further delay the opportunity to improve the current level of customer satisfaction.

TOTAL BENEFITS \$M						
Key Business Benefits:						
1) Increased Customer Satisfaction - Customer PQR (Power Quality and Reliability) satisfaction as measured by JD Power is noticeably higher when there is an outage if customers receive accurate estimated time of restoration and they are informed when power is restored.						
2) Reduced Call Volume: Calls to the Contact Center will be reduced through providing the customer with real-time updates of important outage information via the text channel.						

Key Risks:	Key Dates	Date
1. Implementation - Implementation Plan to support of full sanction event is being further refined while the User Experience Design for Transaction and Content Web is being confirmed with the Design Vendor.	Start Up	Jun/2018
	Partial Sanction	Jul/2018
	Requirements & Design	Aug/2018
	Partial Sanction	Feb/2019
	Develop & Implement	Mar/2019
	Move to Production / Last Go Live	Feb/2020
	2. Managing External Scope - There is risk that external project scope and requirements could impact MVP scope and budget.	
3. Oracle Fusion Environment - There is risk that the Oracle Fusion environment is not yet capable of meeting MyAccount Service Level Agreement (SLA) requirements.		Closure Sanction

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Date: 02/01/2019

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Nancy Concerni	Business Representative
Business Partner	Orla Daly	Relationship Manager
Program Delivery Management (PDM)	Jeffrey Dailey	Program Delivery Director
IT Finance Management	Michelle Harris	Manager
IT Financial Analyst	Denise Zacchilli	Analyst
IT Regulatory	Dan DeMauro	Director
Digital Risk and Security (DR&S)	Elaine Wilson	Director
Enterprise Architecture	Joe Clinchot	Director
Service Delivery	Mark Mirzio	Manager

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Date: 02/01/2019

RECOMMENDATIONS

The Sanctioning Authority is invited to:

- a) APPROVE the investment of \$10.126M including a risk margin of \$0.100M for this partial sanction
- b) APPROVE the run-the-business (RTB) costs of \$2.100M (per annum) for 5 years
- c) NOTE the potential investment of \$17.427M and a tolerance of +/-25% contingent upon submittal and approval of a Project Sanction paper following Partial Development and Implementation (D-I)
- d) NOTE that Kelly Carney, VP-Customer Process Enablement, is the Project Sponsor
- e) NOTE that Tom Towne, is the Project Manager and has the approved financial delegation to deliver the project

Decision of the Sanctioning Authority

I hereby approve the recommendations made in this paper.

Signature..... Date.....
Kelly Carney
VP-Customer Process Enablement

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Date: 02/01/2019

Appendix A: Benefiting Operating Companies

Benefiting Operating Companies
Niagara Mohawk Power Corp – Electric
Niagara Mohawk Power Corp – Gas
Massachusetts Electric Company
Nantucket Electric Company
Narragansett Gas Company
Narragansett Electric Company
KeySpan Energy Delivery New York
KeySpan Energy Delivery Long Island
Boston Gas Company
Colonial Gas Company

Appendix A: RTB Costs

All figures in \$ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB	-	-	-	-	-	-
Last Sanction Business Net Impact to RTB	-	-	-	-	-	-
Last Sanction Total Net Impact to RTB	-	-	-	-	-	-
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB	-	-	-	-	-	-
Business Budgeted Net Impact to RTB	-	-	-	-	-	-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	136.2	1,611.1	1,621.1	1,631.1	1,631.1	6,630.6
Business Funded Net Impact to RTB Forecasted at	38.0	500.0	500.0	500.0	500.0	2,038.0
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	(136.2)	(1,611.1)	(1,621.1)	(1,631.1)	(1,631.1)	(6,630.6)
Business Budgeted Net Impact to RTB Variance	(38.0)	(500.0)	(500.0)	(500.0)	(500.0)	(2,038.0)



Re-sanction Request

Title:	US Foundation Hosting Renewal	Sanction Paper #:	USSC-17-333 v2
Project #:	INVP 4761 Capex: S007739	Sanction Type:	Re-sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	10/10/2018
Author:	David P. Petrick / Keith Gutchess	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	David P. Petrick

1 Executive Summary

This paper requests re-sanction of INVP 4761 in the amount of \$8.361M with a tolerance of +/- 10% for the purposes of full implementation

This re-sanction amount is \$8.361M broken down into:

- \$6.624 M Capex*
- \$1.737 M Opex*
- \$0.000 M Removal*

Note the originally requested sanction amount of \$6.193 M

2 Resanction Details

2.1 Project Summary

To address its growing business environment, National Grid must enhance its SAP and High Performance Analytic Appliance (HANA) application support and hosting services. Currently, the application hosting support is provided by T-Systems out of Houston, Texas and SAP HANA services are provided by SAP HANA Enterprise Cloud (HEC) out of Virginia. This project and Freudenberg Information Technology (FIT) will consolidate these two datacenters under one platform for both primary and Disaster Recovery (DR) in the US. The new service provider FIT was selected through a formal Request For Proposal (RFP) process supported by INVP 3924.

FIT will supply Platform as a Service (PaaS) for SAP and HANA applications, and ancillary applications including PowerPlan, Open Text, uPerform and SABRIX. National Grid IS will work with FIT to move the SAP application portfolio to a new datacenter.

By moving to the new platform, National Grid will eliminate the need to renegotiate contract extensions with current hosting providers SAP, T-Systems and Wipro as well as having to conduct costly upgrades of the existing SAP infrastructure hosted by T-Systems.



Re-sanction Request

The Master Service Agreement (MSA) contract negotiations with FIT took longer than expected (6 months to complete) causing the initial go-live date to shift. Also, timing and scheduling challenges given the large volume of SAP-related development activity like YouConnect, coupled with production payroll window conflicts, have contributed to expanded testing scope and cost.

2.2 Summary of Projects

Project Number	Project Type (Elect only)	Project Title	Estimate Amount (\$M)
INVP 4761	Project type	US SAP Foundation Hosting Renewal	8.361

2.3 Prior Sanctioning History

Describe previous sanctions for the projects included in the scope of this paper (Newest to Oldest).

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Sanction Paper #	Potential Investment Tolerance
10/11/2017	USSC	\$6.193M	\$6.193M	Full	USSC-17-333	+/- 10%

Over / Under Expenditure Analysis

Summary Analysis (\$M)	Capex	Opex	Removal	Total
Resanction Amount	6.624	1.737	0.000	8.361
Latest Approval	4.821	1.372	0.000	6.193
Change*	1.803	0.365	0.000	2.168

*Change = (Re-sanction – Amount Latest Approval)

2.4 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY19 - 23	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> N/A	\$4.066M



Re-sanction Request

2.5 If cost > approved Business Plan how will this be funded?

Re-allocation of budget within the IS business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.

2.6 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs.	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total	
					2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
INVP 4761	US SAP Foundation Hosting Renewal	Est Lvl (e.g. +/- 10%)	CapEx	0.613	6.011	0.000	0.000	0.000	0.000	0.000	0.000	6.624
			OpEx	0.659	1.078	0.000	0.000	0.000	0.000	0.000	0.000	1.737
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	1.272	7.089	0.000	0.000	0.000	0.000	0.000	0.000	8.361

2.7 Project Budget Summary Table

Project Costs per Business Plan

	Prior Yrs. (Actual)	Current Planning Horizon (\$M)						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
\$M		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	0.613	2.618	0.000	0.000	0.000	0.000	0.000	3.231
OpEx	0.659	0.405	0.000	0.000	0.000	0.000	0.000	1.064
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	1.272	3.023	0.000	0.000	0.000	0.000	0.000	4.295

Variance (Business Plan-Project Estimate)

	Prior Yrs. (Actual)	Current Planning Horizon (\$M)						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
\$M		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	0.000	(3.393)	0.000	0.000	0.000	0.000	0.000	(3.393)
OpEx	0.000	(0.673)	0.000	0.000	0.000	0.000	0.000	(0.673)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	(4.066)	0.000	0.000	0.000	0.000	0.000	(4.066)



Re-sanction Request

2.8 Drivers

2.8.1 Detailed Analysis Table

Detail Analysis	Over/Under Expenditure?	Amount (\$M)
Timeline Extension – Labor	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	0.551M
Verizon Network Needs	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	0.401M
Cognizant Technology Solutions Labor due to Wipro risk	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	0.285M
T-Systems Migration Cost	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	0.484M
Wipro Workpack Support Cost	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	1.350M
IBM PowerPlan	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	0.241M
Sabrix Support	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	0.103M
FIT Migration Serv.	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	1.357M
DXC Support	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	0.042M
CA-ESP	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	0.025M

2.8.2 Explanation of Key Variations

- ✓ Extended Timeline Due to MSA negotiations:
 - The time required to document, assemble and negotiate the MSA took six months instead of the two that were initially planned. This led to the production go-live being pushed from the end of June to early December due to conflicts with other SAP related financial projects and financial change freeze periods. Because of this extension, project labor was increased to cover the period from July through February.
 - ❖ Under the agreed contract, we were able to secure an arrangement with FIT that combined the SAP related services of T-Systems and HEC under one provider; while reducing the service cost overall from what is paid today for these same services. The deal is for three years with a National Grid option to extend it to five.
 - Along with extending the overall timeline of the project go-live, much of the significant project spend shifted from FY18 to FY19. It also delayed FIT's ability to submit the HP Equipment Order for our NG Environment Buildout until June of 2018. (FY19)



Re-sanction Request

- ✓ Verizon Network:
 - A scope modification has required the building of a bigger network pipe to be used for data transfer and testing between T-Systems and FIT. This was necessary due to:
 - a) The need for more bandwidth to support the production data transfers to keep the systems in sync during testing. This will also provide a quicker go-live migration path to FIT at the time of true cut-over.
 - b) Current usage statistics showed a need for more general bandwidth over what was currently in place.
 - c) The network upgrade also positions National Grid for future planned increases in SAP services going forward.

- ✓ T-Systems Support:
 - Migration equipment and labor cost have proven to be higher than originally expected based on revised scope definition for the number of data migration instances needed.
 - a) We will be doing practice cut-over drills to verify the steps and timing needed for the cut-over to FIT. We refer to this as a Full Dress-Rehearsal test. To execute this, we need an additional environment with a full production copy to support Full-Dress-Rehearsal testing so it can be executed in parallel with our Prod-POC regression testing activities.
 - b) Increased network connection requirements to support the data transfer design for migration.
 - c) Increased file storage capacity to support the file transfer process as well.

- ✓ Cognizant Labor:
 - Due to current IS business and legal issue pertaining to Wipro Consulting, a decision was made to bring in three additional resources to participate and monitor Wipro project activity for accuracy and completeness.

- ✓ Wipro Workpack:
 - The US SAP Application support is heavily dependent on Wipro services. This coupled with the need for more extensive Knowledge Transfer Services than expected due to Wipro contractual issues, increased the fixed-price quote beyond the original forecast.



Re-sanction Request

2.9 Key Milestones

Milestone	Target Date:
Start Up	August 2017
Begin Requirements and Design <small>*Requirements done under INVP 3924RFP effort</small>	April 2017
Project Sanction	October 2017
Begin Development and Implementation	January 2018
Project Resanction	October 2018
Move to Production / Last Go Live	December 2018
Project Closure	March 2019

Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
March 2019	Project Closure Sanction

3 Statements of Support

3.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Role	Individual
Global Head of Service Delivery	Business Representative	John Gilbert
Head of Global Infrastructure Program Deliver	Head of PDM	Helen Smith
Acting IS Governance CoE	Governance Manager	Brian Detota
Infrastructure Project Deliver	Program Delivery Director	Chris Granata
IS Regulatory	Director - IS Regulatory	Daniel DeMauro
IS Digital Risk & Security	Director - DR&S	Elaine Wilson
IS Architecture	Director – IS Enterprise Architecture	Joe Clinchot

3.2 Reviewers

The reviewers have provided feedback on the content/language of the paper

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego
Financial	Michelle Harris



Re-sanction Request

4 Decisions

The US Sanctioning Committee (USSC) at a meeting held on 10/10/2018:

- (a) APPROVED this paper and the investment of \$8.361M and a tolerance of +/-10% for the purposes of Requirements | Design | Development | Implementation
- (b) APPROVED the run-the-business (RTB) of (\$1.701M) (per annum) for 5 years.
- (c) NOTED that David Petrick is the Project Manager and has the approved financial delegation.

Signature.....Date.....

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



US Sanction Paper

Title:	Data Visualization Evolution	Sanction Paper #:	USSC-18-232
Project #:	INVP 4768 Capex: S007892	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	6/19/2018
Author:	Martin McDermott	Sponsor:	John Gilbert Interim US CIO
Utility Service:	IS	Project Manager:	Frank Marullo

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of INVP 4768 in the amount of \$2.868M with a tolerance of +/- 10% for the purposes of full implementation.

This sanction amount is \$2.868M broken down into:

- \$2.700M Capex*
- \$0.168M Opex*
- \$0.000M Removal*

1.2 Project Summary

National Grid is gaining momentum with the modernization of its data management and analytics capabilities, with the culmination of benefits being driven by the Data Visualization Program. This project is designed to give National Grid the tools, processes and expertise needed for transforming raw data into meaningful actionable insights.

This project proposes that National Grid will partner with a vendor to allow data visualization efforts to evolve on an experienced based approach and to provide continued services in support of developing new capabilities, scaling National Grid's technology ecosystem and promoting the delivery of highly effective technical support.

This investment will enhance and add to the capabilities of data visualization within National Grid to include:

- Advanced Data Analytics and reporting
- Provide access and storage of data types currently not accessible within the current platform
- Assist in determining electric/gas load growth, predict possible system failure and assist in operational excellence

This investment will advance and build on the foundation created as part of the Data Visualization core and expansion projects.



US Sanction Paper

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
INVP 4768		Data Visualization Evolution	2.868
Total			2.868

1.4 Associated Projects

Project Number	Project Title	Estimate Amount (\$M)
INVP 4464	Data Visualization	7.934
INVP 4606	Data Visualization Expansion	3.815
INVP 5267	Data Visualization Evolution F&A	0.045
Total		11.794

1.5 Prior Sanctioning History

N/A

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
July 2019	Project Closure Sanction

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input checked="" type="radio"/> Other	This investment will enhance the capabilities of data visualization within National Grid to include: <ul style="list-style-type: none"> Advanced Data Analytics and reporting Provide access and storage of data types currently not accessible within the current platform Assist in determining load growth, predict failure and assist in operational excellence This investment will advance and build on the foundation created as part of the Data Visualization core and expansion projects.



US Sanction Paper

1.8 Asset Management Risk Score

Asset Management Risk Score: N/A

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability
 Environment
 Health & Safety
 Not Policy Driven

1.9 Complexity Level

- High Complexity
 Medium Complexity
 Low Complexity
 N/A

Complexity Score: 18

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

- Yes
 No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY19 -23	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input type="radio"/> Under <input checked="" type="radio"/> NA	\$0.000M

1.12 If cost > approved Business Plan how will this be funded?

N/A



US Sanction Paper

1.13 Current Planning Horizon

	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
\$M								
CapEx	0.000	2.300	0.400	0.000	0.000	0.000	0.000	2.700
OpEx	0.000	0.118	0.050	0.000	0.000	0.000	0.000	0.168
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	2.418	0.450	0.000	0.000	0.000	0.000	2.868

1.14 Key Milestones

Milestone	Target Date: (mm/dd/yyyy)
Start Up	May 2018
Project Sanction	June 2018
Begin Requirements and Design	June 2018
Begin Development and Implementation	August 2018
Move to Production / Last Go Live	April 2019
Project Complete	April 2019
Project Closure	July 2019

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input type="checkbox"/> Contractor	
Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green



US Sanction Paper

1.16 Key Issues (include mitigation of Red or Amber Resources)

N/A

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative

1.18 List References

N/A



US Sanction Paper

2 Decisions

I:

- (a) APPROVE this paper and the investment of \$2.868M and a tolerance of +/-10%
- (b) APPROVE the run-the-business (RTB) of \$0.450M (per annum) for 5 years.
- (c) NOTED that Frank Marullo is the Project Manager and has the approved financial delegation.

Signature.....Date.....
David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



US Sanction Paper

3 Sanction Paper Detail

Title:	Data Visualization Evolution	Sanction Paper #:	USSC-18232
Project #:	INVP 4768 Capex: S007892	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	6/19/2018
Author:	Martin McDermott	Sponsor:	John Gilbert Interim US CIO
Utility Service:	IS	Project Manager:	Frank Marullo

3.1 Background

Over the past several years National Grid has been developing and enhancing its Data Visualization capabilities. Data Visualization tools enable the quick presentation of data to allow meaningful summarization, reveal trends, provide detail into areas of concern and assist in decision-making. Initial investments in Data Visualization (INVP 4464) put the base environment, platform, licensing and dashboards in place. Data Visualization Expansion (INVP 4606) provided additional functionality and expanded the use to more areas of National Grid. This investment will further enhance the Data Visualization environment with additional tools and capabilities including: Advanced Data Analytics, access data lakes and other data types, data cleaning and definition of relationships.

3.2 Drivers

This project will enhance the use and delivery of additional capabilities that provide the opportunity to:

- Allow greater insight through data analytics for decision-making
- Provide an enhanced enterprise platform for processing and analyzing data
- Automatic and real-time updates to critical reporting and dash boards
- Ensure system capabilities are maximized and configured to optimize performance

3.3 Project Description

This investment will bring additional functionality into the Data Visualization environment allowing the access to additional types of data including internal stored, cloud hosted and publicly available. The environment will be extended to store cleansed and combined data for further analytics and trending analysis and address data retention obligations.



US Sanction Paper

The investment will streamline how data is managed, cleaned, prepared and consumed by maximizing tool functionality and eliminating the need for teams to work together to accomplish the same task. Business users will be empowered to generate reports as needed without the need to coordinate efforts with IT or other business units. Business users will be able to collaborate and share relevant content providing critical insights to key business contacts without the need for in depth system knowledge.

This project will allow National Grid to partner with a vendor to allow data visualization efforts to evolve on an experienced-based approach and to provide continued services in support of developing new capabilities, scaling National Grid’s technology ecosystem and promoting the delivery of highly effective technical support.

3.4 Benefits Summary

Type	Benefit	Description
Direct	Increased reporting self Service	Allow the ability for business managers to easily create ad hoc reports without the need to execute solutions that require a team that possesses cross-functional skills
Direct	Risk reduction on current tools	This investment will continue the transition of reporting to the newly developed environment reducing the potential for a loss of reporting capability and data.
Intangible (Indirect benefits)	Enable deeper insights and promote and enable decisions based upon data analytics	Automatic and real-time updates to critical reporting dashboards allowing National Grid leaders and managers to make timely decisions based on accurate information.
Intangible (Indirect benefits)	Increase automation	Increase automation to provide immediate access to the right information by the right people and at the right time.

3.5 Business and Customer Issues

None

3.6 Alternatives

Alternative 1: Do Nothing

Doing nothing was considered and rejected. Implementation of the Data Visualization environment and the information it is currently providing indicates that the company can benefit from enhancing the environment to better address reporting requirements. This investment also provides the foundation for long term support of the Data Visualization environment.



US Sanction Paper

Alternative 2: Delay the Investment

Delaying the Investment would not be a prudent option. Given the existing Data Visualization environment already in place, this investment is needed now for continued support and to help meet the company’s data analytics needs. The resources are currently in place to effectively move this investment forward; a delay would lead to a loss of key resources and increased costs.

Alternative 3: Invest in an Alternate tool set for Data Visualization

Investing in an Alternate tool set for Data Visualization would undermine the effectiveness of the investment in the creation of the core and expanded Data Visualization environment. Although there may be a future need to augment the tool set, the environment should be utilized to its full capabilities to provide analytics and reporting the business requires.

3.7 Safety, Environmental and Project Planning Issues

None

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	There is risk that the selected vendor will not be on board by end of June, leaving a gap in support for the Data Visualization environment	1	2	2	2	2	Mitigate	Team engaged with Procurement to ensure efficient evaluation and selection	Pursue change request for existing project to extend support	Execute change request for resource extension
2	There is risk that the budget for the implementation project is not yet understood.	2	2	1	4	2	Mitigate	Work with vendors to better define the understanding of scope to ensure appropriate budget	Tightly Control Scope to ensure it can be contained within budget	Work with Project Board to ensure all important items are delivered
3	There is a risk due to the fact that the timeline is aggressive	2	2	2	4	4	Mitigate	Team will proactively monitor issues and impact to schedule	Define and Track Critical path items to prevent delays	Escalate to board and leadership

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.



US Sanction Paper

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
INVP 4768	Data Visualization Evolution	Est LV (+/- 10%)	CapEx	0.000	2.300	0.400	0.000	0.000	0.000	0.000	2.700
			OpEx	0.000	0.118	0.050	0.000	0.000	0.000	0.168	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	0.000	2.418	0.450	0.000	0.000	0.000	2.868	

3.11.2 Project Budget Summary Table

Project Costs per Business Plan

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
CapEx	0.000	2.300	0.400	0.000	0.000	0.000	0.000	2.700
OpEx	0.000	0.118	0.050	0.000	0.000	0.000	0.000	0.168
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	2.418	0.450	0.000	0.000	0.000	0.000	2.868

Variance (Business Plan-Project Estimate)

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
CapEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OpEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

3.11.3 Cost Assumptions

- This investment will be managed by a National Grid Project Manager.
- Project will utilize internal National Grid Resources, external consultants, Verizon, DXC and IBM technical resources
- Costs of license and services have been confirmed
- The accuracy level of estimate for each project is identified in table 3.11.1



US Sanction Paper

3.11.4 Net Present Value / Cost Benefit Analysis

This is not an NPV Investment

3.11.5 Additional Impacts

N/A

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Rory Abbazio	Business Representative
PDM	Deborah Rollins	Head of PDM
BRM	Richard Sheer	Relationship Manager
PDM	Jeffrey Dailey	Program Delivery Director
IS Finance	Michelle Harris	Director
IS Regulatory	Daniel DeMauro	Director
DR&S	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Director
Enterprise Architecture	Svetlana Lyba	Director

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Anand, Sonny
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



US Sanction Paper

4 Appendices

4.1 Sanction Request Breakdown by Project

N/A

4.2 Other Appendices

4.2.1 Project Cost Breakdown

Project Cost Breakdown \$ (millions)					
Cost Category	sub-category	VOWD	FTC	FAC=VOWD+FTC	Name of Firm(s) providing
Personnel	NG Resources	0.000	0.176	0.176	
	SDC Time & Materials	0.000	-	-	IBM
		0.000	-	-	WiPro
		0.000	-	-	DXC
		0.000	-	-	Verizon
	SDC Fixed-Price	0.000	-	-	IBM
		0.000	-	-	WiPro
		0.000	-	-	DXC
		0.000	-	-	Verizon
	All other personnel	0.000	2.175	2.175	ClearTelligence
TOTAL Personnel Costs	-	2.350	2.350		
Hardware	Purchase	0.000	-	-	
	Lease	0.000	-	-	
Software		0.000	-	-	
Risk Margin			-	-	
AFUDC		0.000	0.089	0.089	
Other		0.000	0.427	0.427	
TOTAL Costs		-	2.866	2.866	Should match Financial Summary Total

4.2.2 Benefiting Operating Companies

This project will benefit all the companies listed below.

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp.- Electric Distr.	Electric Distribution	NY
Massachusetts Electric Company	Electric Distribution	MA
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
Boston Gas Company	Gas Distribution	MA
Narragansett Electric Company	Electric Distribution	RI
Niagara Mohawk Power Corp. - Transmission	Transmission	NY
Niagara Mohawk Power Corp. - Gas	Gas Distribution	NY



US Sanction Paper

New England Power Company – Transmission	Transmission	MA, NH, RI, VT
KeySpan Generation LLC (PSA)	Generation	NY
Narragansett Gas Company	Gas Distribution	RI
Colonial Gas Company	Gas Distribution	MA
Narragansett Electric Company – Transmission	Transmission	RI
National Grid USA Parent	Parent	
Nantucket Electric Company	Electric Distribution	MA
NE Hydro - Trans Electric Co.	Inter Connector	MA, NH
KeySpan Energy Development Corporation	Non-Regulated	NY
KeySpan Port Jefferson Energy Center	Generation	NY
New England Hydro - Trans Corp.	Inter Connector	MA, NH
New England Hydro Finance Company Inc.	Inter Connector	MA, NH
KeySpan Services Inc.	Service Company	
KeySpan Glenwood Energy Center	Generation	NY
Massachusetts Electric Company – Transmission	Transmission	MA
NG LNG LP Regulated Entity	Gas Distribution	MA, NY, RI
Transgas Inc	Non-Regulated	NY
Keyspan Energy Trading Services	Other	NY
KeySpan Energy Corp.	Service Company	
New England Electric Trans Corp	Inter Connector	MA

4.2.3 IS Ongoing Operational Costs (RTB):

all figures in \$ thousands						
INV ID:	INVP 4768				Forecast Date:	05/01/19
Investment Name:	Data Visualization Evolution				Go-Live Date:	
Project Manager:	Frank Marullo			PDM:	Jeffrey Dailey	
All figures in \$ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB						-
Last Sanction Business Net Impact to RTB						-
Last Sanction Total Net Impact to RTB	-	-	-	-	-	-
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB	450.0	450.0	450.0	450.0	450.0	2,250.0
Business Budgeted Net Impact to RTB						-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	450.0	450.0	450.0	450.0	450.0	2,250.0
Business Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	-	-	-	-	-	-
Business Budgeted Net Impact to RTB Variance	-	-	-	-	-	-



US Sanction Paper

4.3 *NPV Summary (if applicable)*

N/A

4.4 *Customer Outreach Plan*

N/A



Re-sanction Request

Title:	Time Entry and Approval Mobility Enablement	Sanction Paper #:	USSC-17-302 v3
Project #:	INVP 4779 Capex: S007730	Sanction Type:	Re-sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	1/8/2019
Author / NG Representative:	Anil Garg / Ella Weisbord	Sponsor:	Chris McConnachie, VP Finance Services
Utility Service:	IT	Project Manager:	Samir Parikh

1 Executive Summary

This paper requests re-sanction of INVP 4779 in the amount of \$4.963 with a tolerance of +/- 10% for the purposes of Full Implementation.

This re-sanction amount is \$4.963M broken down into:

- \$4.360M Capex*
- \$0.603M Opex*
- \$0.000M Removal*

Note the originally requested sanction amount of \$4.405M

2 Resanction Details

2.1 Project Summary

This project allows National Grid to improve its end-to-end time entry and time approval process across the US organization. Through the deployment of mobile technology, National Grid will be able to eliminate its current manual time capture processes, and will enable supervisors to efficiently review and approve employee time entry. In addition, this project will benefit National Grid by improving the quality of data; the timeliness of time entry by eliminating the lag inherent in paper-based time entry process; efficiency of time approval process and improving overall payroll processing time by reducing data entry errors.



Re-sanction Request

2.2 Summary of Projects

Project Number	Project Title	Estimate Amount (\$M)
INVP 4779	Transform Timekeeping and Employee Time Entry	4.963
Total		4.963

2.3 Prior Sanctioning History

Describe previous sanctions for the projects included in the scope of this paper (Newest to Oldest).

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Sanction Paper #	Potential Investment Tolerance
1/10/2018	USSC	4.405M	\$4.400M	Sanction	INVP4779	10%
9/13/2017	USSC	3.047M	\$4.100M	Partial	INVP4779	25%

Over / Under Expenditure Analysis

Summary Analysis (\$M)	Capex	Opex	Removal	Total
Resanction Amount	4.360	0.603	0.000	4.963
Latest Approval	3.865	0.540	0.000	4.405
Change*	0.495	0.063	0.000	0.558

*Change = (Re-sanction – Amount Latest Approval)



Re-sanction Request

2.4 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IT Investment Plan FY18 - 22	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> N/A	4.963

2.5 If cost > approved Business Plan how will this be funded?

Re-allocation of budget from the US Finance to the IT business and within the IS business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.

2.6 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total	
					Yr.1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +		
					2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
INVP 4779	Transform Timekeeping and Employee Time Entry	Est LM +/- 10%	CapEx	2.855	1.505	0.000	0.000	0.000	0.000	0.000	0.000	4.360
			OpEx	0.373	0.230	0.000	0.000	0.000	0.000	0.000	0.000	0.603
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	3.228	1.735	0.000	0.000	0.000	0.000	0.000	0.000	0.000



Re-sanction Request

2.7 Project Budget Summary Table

Project Costs per Business Plan

	Prior Yrs (Actual)	Current Planning Horizon (\$M)						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
\$M								
CapEx	2.855	1.010	0.000	0.000	0.000	0.000	0.000	3.865
OpEx	0.373	0.167	0.000	0.000	0.000	0.000	0.000	0.540
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	3.228	1.177	0.000	0.000	0.000	0.000	0.000	4.405

Variance (Business Plan-Project Estimate)

	Prior Yrs (Actual)	Current Planning Horizon (\$M)						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
\$M								
CapEx	0.000	(0.495)	0.000	0.000	0.000	0.000	0.000	(0.495)
OpEx	0.000	(0.063)	0.000	0.000	0.000	0.000	0.000	(0.063)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	(0.558)	0.000	0.000	0.000	0.000	0.000	(0.558)

2.8 Drivers

2.8.1 Detailed Analysis Table

Detail Analysis	Over/Under Expenditure?	Amount (M's)
Key variation 1 –	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	\$0.453M
Key variation 2 –	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	\$0.105M



Re-sanction Request

2.8.2 Explanation of Key Variations

1. Project go-live was delayed from Q4 of FY18 into Q1 of FY19. This delay was due to a mandate from the Finance organization to freeze all changes leading up to the fiscal year end close and resulted in increased labor and SAP environment hosting costs. In addition, the final project deliverable was delayed by several months due to commercial delays with SAP. We were unable to execute a contract due to updates that were required to satisfy General Data Protection Regulation (GDPR) requirements.
 The cost of additional labor and hosting cost is \$.453M.
2. Verizon has overcharged by \$.105M for iPad cellular service when the iPads were requested in a deactivated state. The team is currently in negotiation with Verizon to recover the cost. The refund will be applied to project costs as a credit.

2.9 Key Milestones

Milestone	Target Date: (Month Year)
Start Up	June 2017
Partial Sanction	September 2017
Begin Requirements and Design	September 2017
Project Sanction	January 2018
Begin Development and Implementation	December 2017
Project Re-sanction	January 2019
Move to Production / Last Go Live	April 2018
Project Closure	March 2019

2.10 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
March 2019	Project Closure Sanction



Re-sanction Request

3 Statements of Support

3.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Thomas LaVeck	Business Representative
Program Delivery Management (PDM)	Narayan Devireddy	Head of PDM
Business Partner (BP)	Joel Semel	Relationship Manager
Program Delivery Management (PDM)	Samir Parikh	Program Delivery Director
IT Finance	Michelle Harris	Manager
IT Regulatory	Dan Demauro	Director
Digital Risk and Security (DR&S)	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Director

3.2 Reviewers

The reviewers have provided feedback on the content/language of the paper

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



Re-sanction Request

4 Decisions

I:

- (a) APPROVE this paper and the investment of \$4.963M and a tolerance of +/-10% for the purposes of Implementation
- (b) NOTE that Samir Parikh is the Project Manager and has the approved financial delegation.

Signature.....Date.....
David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



Re-sanction Request

5 Appendices



US Sanction Paper

Title:	NY Tax Remittance and Reporting Corrections	Sanction Paper #:	USSC-18-222 v2
Project #:	INVP 4821 Capex: S007872	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	12/18/2018
Author:	Susan Stallard Teders / Mike Pawlowski	Sponsor:	Jody Allison, VP Billing and Collections Strategy
Utility Service:	IT	Project Manager:	Mike Pawlowski / Saurabh Verrma

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of INVP 4821 in the amount of \$2.049M with a tolerance of +/- 10% for the purposes of Full Implementation.

This sanction amount is \$2.049M broken down into:

- \$1.818M Capex*
- \$0.231M Opex*
- \$0.000M Removal*

1.2 Project Summary

This project is to address the proper presentation of the municipal Gross Receipts Tax (GRT) tax and the Sales tax on selected non-service business-product transactions. In addition, multi-year retroactive adjustments are required for current and historical tax reporting. Specifically, National Grid’s billing system requires updates and modifications to the existing tax structure calculations and reporting mechanisms.

1.3 Summary of Projects

Project Number	Project Title	Estimate Amount (\$M)
INVP 4821 CAPEX: S007872	NY Tax Remittance and Reporting Corrections	2.049
Total		2.049

1.4 Associated Projects

N/A



US Sanction Paper

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Potential Investment Tolerance
5/28/18	USSC	\$0.632M	\$2.083M	Partial Sanction	+/- 25%

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
February 2020	Project Closure Sanction

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input checked="" type="radio"/> Mandatory <input type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	Compliance with New York State Taxation Laws

1.8 Asset Management Risk Score

Asset Management Risk Score: 49

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability
 Environment
 Health & Safety
 Not Policy Driven



US Sanction Paper

1.9 Complexity Level

High Complexity Medium Complexity Low Complexity N/A

Complexity Score: 25

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

Yes No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan
IT Investment Plan FY19 - 23	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	\$0.165M

1.12 If cost > approved Business Plan how will this be funded?

Re-allocation of budget within the IT business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
CapEx	0.000	0.708	1.110	0.000	0.000	0.000	0.000	1.818
OpEx	0.000	0.206	0.025	0.000	0.000	0.000	0.000	0.231
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.914	1.135	0.000	0.000	0.000	0.000	2.049



US Sanction Paper

1.14 Key Milestones

Milestone	Target Date: (Month Year)
Start Up	April 2018
Partial Sanction	May 2018
Begin Requirements and Design	May 2018
Project Sanction	January 2019
Begin Development and Implementation	January 2019
Begin User Acceptance Testing	September 2019
Move to Production / Last Go Live	November 2019
Project Closure	February 2020

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green

1.16 Key Issues (include mitigation of Red or Amber Resources)

N/A



US Sanction Paper

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative

1.18 List References

N/A



US Sanction Paper

2 Decisions

I:
(a) APPROVE this paper and the investment of \$2.049M and a tolerance of +/-10% for the purposes of Development and Implementation.
(b) NOTE that Mike Pawlowski is the Project Manager and has the approved financial delegation.
Signature.....Date.....
David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



US Sanction Paper

3 Sanction Paper Detail

Title:	NY Tax Reporting and Remittance Corrections	Sanction Paper #:	USSC-18-222 v2
Project #:	INVP 4821 Capex: S007872	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	12/18/2018
Author:	Susan Stallard Teders / Mike Pawlowski	Sponsor:	Jody Allison, VP Billing and Collections Strategy
Utility Service:	IT	Project Manager:	Mike Pawlowski / Saurabh Verrma

3.1 Background

During the course of a KEDLI customer bill inquiry in November 2016 it was determined the late payment charge (LPC) did not have Municipal Gross Receipts Tax, (MUNI GRT) applied. The National Grid Tax Department confirmed that MUNI GRT needs to be applied. This led to an assessment of how CSS was handling taxes with respect to Non-Service Revenue. The discussions and research, that followed led to the identification of the following required adjustments related to:

- Tax for selected business-product combinations
- Tax for non-service business-product combinations
- Reporting non-service taxes
- Capture/identification of all taxes collected by tax district
- Presentation of non-service taxes on the customer bill

Tax reporting on service sales had a well-defined set of reporting. These changes will improve consistency in reporting of non-service sales.

3.2 Drivers

The primary driver for this project is compliance with various New York State tax laws.

3.3 Project Description

Modifications to National Grid’s Billing System’s static table/code are necessary to implement the calculation of sales tax and/or MUNI GRT on those business-product combinations identified by Tax Department.

Specifically, for Niagara Mohawk, there are 9 business-product combinations that need corrective action for sales tax. There are 43 business-product combinations that need corrective action for MUNI GRT.



US Sanction Paper

For KEDLI, there are 3 business-product combinations that need corrective sales tax action and 17 business-product combinations that need corrective MUNI GRT action.

Modifications from service only revenue reports will be made to create improved for non-Service Revenue.

3.4 Benefits Summary

Compliance with New York State Tax laws and reporting obligations and the avoidance of any penalties and interest for the underreporting of tax liabilities.

3.5 Business and Customer Issues

There are no additional business or customer issues beyond what has been described elsewhere in this paper.

3.6 Alternatives

Alternative 1: Do Nothing: Defer Project

This alternative was not selected as National Grid is required to be in compliance with New York State tax laws.

Alternative 2: Manual Calculation

Tax Liability will be manually calculated and reported until such time as this project can be delivered to perform these tasks in a more cost effective manner. This option is not viable for an ongoing solution as manual processing introduces human error factors and can require additional time to correct.

3.7 Safety, Environmental and Project Planning Issues

There are no significant safety, environmental or project planning issues beyond what has been described elsewhere in this paper.



US Sanction Paper

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	Competition for CSS resources due to multiple projects may cause a delay in development	3	1	1	3	3	Avoid	Use normal forecasting tools to reserve resources	High Priority and unforeseen resource demands could still potentially arise	Work with IT Solution Delivery management to prioritize project work and defer work as necessary
2	Code availability for change may be impacted by parallel projects	2	1	1	2	2	Mitigate	Meet with all relevant project managers to compare schedules and technical plans to identify potential overlaps	Unforeseen conflicts occur due to new project work or missed impacts	Work with IT Solution Delivery management to prioritize project work and defer work as necessary
3	Testing may be impacted by corporate financial schedules and business teams availability	3	2	2	6	6	Avoid	Develop project development and testing schedule after discussion with business about potential impacts	Unforeseen conflicts occur due to new work or changing business priorities	Work with IT Solution Delivery management and business management to prioritize project work and defer work as necessary

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A



US Sanction Paper

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total	
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +		
					2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
INVP 4821 CAPEX: S007872	NY Tax Remittance and Reporting Corrections	+/- 10%	CapEx	0.000	0.708	1.110	0.000	0.000	0.000	0.000	0.000	1.818
			OpEx	0.000	0.206	0.025	0.000	0.000	0.000	0.000	0.000	0.231
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	0.914	1.135	0.000	0.000	0.000	0.000	0.000	0.000
Total Project Sanction			CapEx	0.000	0.708	1.110	0.000	0.000	0.000	0.000	0.000	1.818
			OpEx	0.000	0.206	0.025	0.000	0.000	0.000	0.000	0.000	0.231
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	0.914	1.135	0.000	0.000	0.000	0.000	0.000	0.000

3.11.2 Project Budget Summary Table

Project Costs per Business Plan

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	0.000	0.708	0.930	0.000	0.000	0.000	0.000	1.638
OpEx	0.000	0.206	0.040	0.000	0.000	0.000	0.000	0.246
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.914	0.970	0.000	0.000	0.000	0.000	1.884

Variance (Business Plan-Project Estimate)

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	0.000	(0.000)	(0.180)	0.000	0.000	0.000	0.000	(0.180)
OpEx	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.015
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	(0.000)	(0.165)	0.000	0.000	0.000	0.000	(0.165)

3.11.3 Cost Assumptions

The accuracy level of estimate for each project is identified in table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

N/A



US Sanction Paper

3.11.4.2 NPV Assumptions and Calculations

N/A

3.11.5 Additional Impacts

N/A

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Jody Allison	Business Representative
IT Global Solutions Development	Michelle McNaught	IT Global Solutions
IT Business Partner (BP)	Joel Semel	Relationship Manager
IT Global Solutions Development	Mike Pawlowski	Program Delivery Director
IT Finance	Michelle Harris	Manager
IT Regulatory	Dan DeMauro	Director
Digital Risk and Security (DR&S)	Peter Shattuck	Manager
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Director

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Maria Harvey
Jurisdictional Delegate - Electric NY	Mark Harbaugh
Jurisdictional Delegate - FERC	Terron Hill
Jurisdictional Delegate - Gas NY	Don Wolf
Procurement	Diego Chevere



US Sanction Paper

4 Appendices

4.1 Sanction Request Breakdown by Project

N/A

4.2 Other Appendices

4.2.1 Project Cost Breakdown

Project Cost Breakdown \$ (millions)					
Cost Category	sub-category	Value of Work to Date (VOWD)	Forecast to Complete (FTC)	Forecast At Completion (FAC=VOWD+FTC)	Name of Firm(s) providing resources
Personnel	NG Resources		0.260	0.260	
	SDC Time & Materials		1.129	1.129	IBM
			0.025	0.025	WiPro
			-	-	DXC
			-	-	Verizon
	SDC Fixed-Price		-	-	IBM
			-	-	WiPro
			-	-	DXC
			-	-	Verizon
		All other personnel	0.437	-	0.437
	TOTAL Personnel Costs	0.437	1.413	1.850	
Hardware	Purchase		-	-	
	Lease		-	-	
Software			-	-	
Risk Margin			0.077	0.077	
AFUDC			0.087	0.087	
Other			0.035	0.035	
	TOTAL Costs	0.437	1.612	2.049	

4.2.2 Benefiting Operating Companies

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp - Electric	Electric Distribution	NY
Niagara Mohawk Power Corp – Gas	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY



US Sanction Paper

4.2.3 IS Ongoing Operational Costs (RTB):

This project will change the IT ongoing operations support costs as per the following table. These are also known as Run the Business (RTB) costs.

all figures in \$ thousands						
INV ID:	4821				Date RTB Last Forecasted	12/07/2018
Investment Name:						
Project Manager:				PDM:		
All figures in \$ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB						-
Last Sanction Business Net Impact to RTB						-
Last Sanction Total Net Impact to RTB	-	-	-	-	-	-
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB						-
Business Budgeted Net Impact to RTB						-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Business Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	-	-	-	-	-	-
Business Budgeted Net Impact to RTB Variance	-	-	-	-	-	-

4.3 NPV Summary

N/A

4.4 Customer Outreach Plan

N/A



US Sanction Paper

Title:	EMS Lifecycle Hardware and Software Upgrade	Sanction Paper #:	USSC-17-374 v2
Project #:	INVP 4914 Capex: S007766	Sanction Type:	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	5/29/2018
Author:	Lynn McLaren	Sponsor:	John Spink, VP Control Center Operations
Utility Service:	IS	Project Manager:	Lynn McLaren

1 Executive Summary

1.1 Sanctioning Summary

This paper requests partial sanction of INVP 4914 in the amount \$19.165M with a tolerance of +/- 10% for the purposes of the Development phase through completion of Factory Acceptance Testing at the vendor site.

This sanction amount is \$19.165M broken down into:
\$16.784M Capex
\$ 2.381M Opex
\$ 0.000M Removal

NOTE the potential investment of \$30.530M with a tolerance of +/- 25%, contingent upon submittal and approval of a Project Sanction paper following completion of Factory Acceptance Testing.

1.2 Project Summary

The hardware and software supporting the Energy Management System (EMS) and related networks is approaching end-of-life and is therefore creating risk to National Grid. During the execution of this investment, nearly 70% of the Critical National Infrastructure (CNI) networking assets will be at “End of Support/ End of Life”, with no ability to obtain vendor assistance to resolve problems, and limited or no ability to procure required replacement parts. Upgrade of the current EMS requires replacement of the application and networking hardware, as these legacy assets are incompatible with current software releases. Without vendor supported assets, National Grid is at risk of not being able to recover from a system failure, resulting in the inability of operations to monitor and control the transmission and distribution electric systems, and the potential for customer service interruptions.



US Sanction Paper

This investment will deploy hardware and software purchased under investments “INVP 4568-EMS Lifecycle Hardware and Software Upgrade” and “INVP 4570-Tech Services-Network Equipment Lifecycle Replacements” to the electric control rooms in New York and New England thereby mitigating the risk associated with these assets. An upgrade of the EMS application to the current supported version will benefit the business through increased capacity to support new initiatives, such as the Massachusetts Grid Modernization, the New York Reforming the Energy Vision and the ability to interconnect more with the growing distributed generation programs and monitor system impacts.

1.3 Summary of Projects

Project Number	Project Title	Estimate Amount (\$M)
4914	EMS Lifecycle Hardware and Software Upgrade	30.530
Total		30.530

1.4 Associated Projects

Project Number	Project Title	Estimate Amount (\$M)
4568	EMS Lifecycle Hardware and Software Upgrade	3.189
4570	Tech Services-Network Equipment Lifecycle Replacements	9.169
Total		12.358

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Paper Title	Sanction Type	Tolerance
Dec 2017	USSC	\$4.734M	\$16.000M	EMS Lifecycle Hardware and Software Upgrade	Partial	+/- 25%

Significant cost increases due to additional hardware/software requirements and labor required for testing of updated software version and additional project expertise.



US Sanction Paper

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
Mar 2019	Project Sanction

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	Maintain CNI computing assets at vendor supported version levels in alignment with National Grid's US CNI end state strategy to meet all business SLAs and NERC CIP Compliance.

1.8 Asset Management Risk Score

Asset Management Risk Score: 44

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability
 Environment
 Health & Safety
 Not Policy Driven

1.9 Complexity Level

- High Complexity
 Medium Complexity
 Low Complexity
 N/A

Complexity Score: 21



US Sanction Paper

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

Yes No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY19-23	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	\$12.937M

1.12 If cost > approved Business Plan how will this be funded?

Re-allocation of funds within the IS budget has been managed and approved to meet jurisdictional budgetary, statutory and regulatory requirements.

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
CapEx	0.847	15.937	6.960	0.919	0.000	0.000	0.000	24.663
OpEx	1.192	1.189	2.122	1.364	0.000	0.000	0.000	5.867
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	2.039	17.126	9.082	2.283	0.000	0.000	0.000	30.530



US Sanction Paper

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	September 2017
Partial Sanction	December 2017
Begin Requirements and Design	January 2018
Begin Development and Implementation	March 2018
Partial Sanction	May 2018
Project Sanction	March 2019
Move to Production/Last Go Live	May 2020
Project Complete	June 2020
Project Closure Sanction	August 2020

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green

1.16 Key Issues (include mitigation of Red or Amber Resources)

N/A



US Sanction Paper

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative

1.18 List References

N/A



US Sanction Paper

2 Decisions

The Senior Executive Sanctioning Committee (SESC) at a meeting held on May 29, 2018:

- (a) APPROVED the investment of \$19.165M and a tolerance of +/- 10% for the purposes of Development and following the completion of Factory Acceptance Testing.
- (b) NOTED the potential run-the-business (RTB) impact of \$.006M for FY 2020 and \$0.805M (per average annum) for the remaining 4 years.
- (c) NOTED the potential investment of \$30.530M and a tolerance of +/-25% contingent upon submittal and approval of a Project Sanction paper following completion of Development and Factory Acceptance Testing.
- (d) NOTED that Michelle McNaught has the approved financial delegation to undertake the activities stated in (a).

Signature.....Date.....

Margaret Smyth
US Chief Financial Officer
Chair, Senior Executive Sanctioning Committee



US Sanction Paper

3 Sanction Paper Detail

Title:	EMS Lifecycle Hardware and Software Upgrade	Sanction Paper #:	USSC-17-374 v2
Project #:	INVP 4914 Capex: S007766	Sanction Type:	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	5/29/2018
Author:	Lynn McLaren	Sponsor:	John Spink, VP Control Center Operations
Utility Service:	IS	Project Manager:	Lynn McLaren

3.1 Background

The existing computing hardware and software supporting the New York and New England CNI Energy Management System (EMS) is near end-of-life and at risk of running unsupported versions of operating systems and software. A capacity limitation of the current configuration is limiting the system’s ability to respond to growing demands, including in the distributed generation area. Running the EMS systems on this hardware and software leaves National Grid at risk of losing visibility of the grid and potentially control of remotely operated devices and equipment which impacts the reliability of customer service. A failure could cause both reputational and financial impacts to National Grid from both our regulators and governmental agencies.

National Grid has a significant number of network and security related devices within the Critical National Infrastructure (CNI) environment that are also at End of Support (EoS), or will be in 2018. Running the network on this hardware and software leaves National Grid at risk of potential irrecoverable hardware failures or cyber threats due to outdated versions of software. Failure of the CNI networks could cause System Operators to lose control of electric transmission and distribution assets.

These mission critical computing assets require a refresh of infrastructure hardware and software to continue operating at the highest level of availability. The IS delivery team has determined, due to the interdependence of the EMS systems and CNI networks, that deployment of refreshed assets must be performed concurrently. Hardware and software purchased under investments “INVP 4568-EMS Lifecycle Hardware and Software Upgrade” and “INVP 4570-Tech Services-Network Equipment Lifecycle Replacements” will be deployed under this investment.



US Sanction Paper

3.2 Drivers

Key Business Drivers:

- Maintain EMS reliability in support of Control Center Operations
- Preserving reputation of National Grid by maintaining system availability
- Aid in quicker restoration to customers in the event of outages
- Maintain EMS on the latest supported hardware and software, which preserves manufacturers support through maintenance agreements
- Safeguard the reliability of networks and therefore the Company's ability to effectively operate EMS, provide timely and accurate regulatory reporting, and provide customer facing outage information during storms
- Without an upgrade to supported levels of networking hardware and software, National Grid will not be able to deploy security patches, leaving National Grid vulnerable to cyber threats and at risk of NERC CIP non-compliance
- Accommodate increasing requirement for electric system data driven by Distributed Generation program growth

3.3 Project Description

This investment will deliver the following:

- Deploy hardware to refresh the EMS application infrastructure purchased under "INVP 4568-EMS Lifecycle Hardware and Software Upgrade" for Quality Assurance (QA) and production environments
- Deploy hardware to refresh the CNI Networking assets purchased under "INVP 4570-Tech Services-Network Equipment Lifecycle Replacements" for test and production environments in the CNI Data Centers, Communications rooms, Operations Centers, and Support areas across the National Grid service territory in New York and New England
- Upgrade the current EMS application from version 5.5 to the current and supported release v9.2
- Purchase and deploy additional hardware required to perform the EMS application upgrade

Factors that contributed to the increase in costs for this project include:

- Additional system requirements for hardware, software, and maintenance, and the associated cost of licenses are more expensive than originally anticipated
- Additional project resources and expertise are required to upgrade the system (i.e. CNI resources for Requirements, Design and Testing phase)
- Greater timeframe to evaluate the latest version of the current EMS application
- Additional equipment required to meet Regulatory/Compliance needs



US Sanction Paper

This project will be delivered using National Grid US CNI, Information Services, and Verizon resources.

3.4 Benefits Summary

Benefits of this investment include:

- Ready the CNI data centers and associated Wide Area Network infrastructure to support the refreshed system
- Provide increased capacity of the EMS databases to accommodate future growth in National Grid territories receiving Supervisory Control and Data Acquisition (SCADA) data. This helps National Grid stay compliant with regulatory requirements to share transmission SCADA data with regional ISOs and interconnecting utilities
- Increase the reliability and integrity of the EMS application and CNI networks in New York and New England
- Deliver increased capacity in the EMS application to capture information from new devices, particularly distributed generation
- Provides quicker restoration to customers in the event of outages
- Prevent network outages which would impact regulatory availability requirements
- Provide a more robust network security environment, which allows National Grid to continue meeting the North American Electric Reliability Corporation Critical Infrastructure Protection (NERC CIP) requirements
- Mitigate risks associated with unsupported hardware and software affecting National Grids ability to effectively monitor, operate and control the electric bulk power supply systems

3.5 Business and Customer Issues

There are no significant business issues beyond what has been described elsewhere.

3.6 Alternatives

Alternative 1: Delay the Project

This alternative is not a viable option, because it puts the existing system at risk of system failure without the ability to procure replacement parts for equipment. The next planned opportunity to upgrade of software is 2020-2021, which would render all hardware out of support and not replaceable in the marketplace.



US Sanction Paper

Alternative 2: Move forward with a Software only project, without new Hardware
 This alternative is not a viable option, as the vendor will not support a software upgrade without hardware that can be supported.

Alternative 3: Move forward with a new Hardware only project, without new Software
 This is not a viable option because it doesn't allow for the required vendor supported operation systems nor does it provide the system growth required to support the grid modernization initiatives.

3.7 Safety, Environmental and Project Planning Issues

There are no significant issues beyond what has been described elsewhere.

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	There is a risk that defects discovered during the software testing may not be resolved in time for the planned cutovers for NY and/or NE.	3	3	2	9	6	Mitigate	Risk money budgeted to cover an additional month of resource costs if needed fixes are delayed.	N/A	The risk money budgeted will be used to cover the needed resource costs.
2	There is a risk that additional penetration testing may be required if any defects discovered are not properly addressed before the second planned test.	3	1	3	3	9	Mitigate	The project has planned a risk budget that could be used to cover this expense if the need materializes.	N/A	General risk money will be used to address this risk if it becomes an actual problem
3	There is a risk that CNI and business resource availability for project work may be hampered by production support work.	3	1	3	3	9	Mitigate	The project schedule and budget have some contingency cost and timing built into the plan.	N/A	The budgeted costs and time will be used to cover the needed resource costs.

3.9 Permitting

N/A



US Sanction Paper

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company benefiting from the investment and receiving allocations of these costs.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	0.847	15.937	6.960	0.919	0.000	0.000	0.000	24.663
OpEx	1.192	1.189	2.122	1.364	0.000	0.000	0.000	5.867
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	2.039	17.126	9.082	2.283	0.000	0.000	0.000	30.530



US Sanction Paper

3.11.2 Project Budget Summary Table

Project Costs per Business Plan

\$M	Prior Yrs (Actual)	Current Planning Horizon							Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +		
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
CapEx	0.847	9.129	5.300	0.000	0.000	0.000	0.000	15.276	
OpEx	1.192	0.118	1.007	0.000	0.000	0.000	0.000	2.317	
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Total Cost in Bus. Plan	2.039	9.247	6.307	0.000	0.000	0.000	0.000	17.593	

Variance (Business Plan-Project Estimate)

\$M	Prior Yrs (Actual)	Current Planning Horizon							Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +		
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
CapEx	0.000	(6.808)	(1.660)	(0.919)	0.000	0.000	0.000	(9.387)	
OpEx	0.000	(1.071)	(1.115)	(1.364)	0.000	0.000	0.000	(3.550)	
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Total Cost in Bus. Plan	0.000	(7.879)	(2.775)	(2.283)	0.000	0.000	0.000	(12.937)	

3.11.3 Cost Assumptions

This estimate was developed in 2018 using the standard IS estimating methodology which includes an assessment of project resource needs. Examples of these resource needs include hardware, software, internal and contract labor required to deliver the project. The accuracy level of estimate for each project is identified in table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

This is not an NPV project.

3.11.4.1 NPV Summary Table

N/A

3.11.4.2 NPV Assumptions and Calculations

N/A



US Sanction Paper

3.11.5 Additional Impacts

None.

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Role	Individual
Business Representative	John Spink
Head of PDM	Deb Rollins
Relationship Manager	Aman Aneja
Program Delivery Director	Michelle McNaught
IS Finance Management	Michelle Harris
IS Regulatory	Dan DeMauro
DR&S	Elaine Wilson
Service Delivery	Mark Mirizio
Enterprise Architecture	Svetlana Lyba

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory-IS	Maria Harvey
Jurisdictional Delegate-Electric-NE	Sonny Anand
Jurisdictional Delegate-Electric-NY	Mark Harbaugh
Jurisdictional Delegate-Electric-FERC	Terron Hill
Procurement	Diego Chevere



US Sanction Paper

4 Appendices

4.1 Sanction Request Breakdown by Project

\$M	4914	Total
CapEx	16.784	16.784
OpEx	2.381	2.381
Removal		0.000
Total	19.165	19.165

4.2 Other Appendices

4.2.1 Project Cost Breakdown

		Project Cost Breakdown \$ (millions)			
Cost Category	sub-category	VOWD	FTC	FAC=VOWD+FTC	Name of Firm(s) providing
Personnel	NG Resources	0.038	5.379	5.418	
	SDC Time & Materials	0.112	1.579	1.691	
		0.000	-	-	
		0.000	-	-	
		0.000	2.017	2.017	
	SDC Fixed-Price	0.000	-	-	
		0.000	-	-	
		0.000	-	-	
		0.000	-	-	
	All other personnel	0.040	4.412	4.452	
TOTAL Personnel Costs	0.190	13.388	13.578		
Hardware	Purchase	0.219	3.998	4.217	
	Lease	0.000	-	-	
Software		0.069	2.371	2.441	
Risk Margin			2.255	2.255	
AFUDC		0.004	2.806	2.810	
Other		1.558	3.672	5.230	
	TOTAL Costs	2.040	28.490	30.530	



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4.2.2 Benefiting Operating Companies

The following companies will benefit from this program.

Benefiting Operating Companies Table:

SAP Alloc. Code	SAP Co./Seg	Company Description	Capex	T&D O&M	Total T&D Expenditures	%
T-186	5210E	Niagara Mohawk Power Corp. - Electric Distr.	273,134,564	308,019,307	581,153,871	19.94%
T-186	5210T	Niagara Mohawk Power Corp. - Transmission	195,961,593	220,989,805	416,951,398	14.30%
T-186	5310E	Massachusetts Electric Company	275,452,392	1,030,957,438	1,306,409,831	44.81%
T-186	5310T	Massachusetts Electric Company (Transmission)	4,140,939	15,498,618	19,639,556	0.67%
T-186	5320E	Nantucket Electric Company	3,051,677	9,130,958	12,182,635	0.42%
T-186	5360E	Narragansett Electric Company	134,811,055	79,716,574	214,527,629	7.36%
T-186	5360T	Narragansett Electric Company (Transmission)	37,539,219	22,197,719	59,736,939	2.05%
T-186	5410T	New England Power (Transmission)	202,780,012	101,846,813	304,626,825	10.45%
Totals					2,915,228,684	100.00%

4.2.3 IS Ongoing Operational Costs (RTB):

This project will impact Service Delivery CNI Budget ongoing operations support costs as per the following table. These are also known as Run the Business (RTB) costs (in thousands).

Due to the phased Go Live dates for New England (NE) in FY 2020 and New York (NY) in FY 2021, FY 20 contains a portion of RTB for the implementation of NE.

INV ID:	4914				Forecast Date:	03/22/18
Investment Name:	EMS Lifecycle Hardware and Software Upgrade				Go-Live Date:	5/15/2020
Project Manager:	Lynn McLaren			PDM:	Michelle McNaught	
All figures in \$ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB	157.4	232.4	232.4	238.2	244.2	1,104.6
Last Sanction Business Net Impact to RTB						-
Last Sanction Total Net Impact to RTB	157.4	232.4	232.4	238.2	244.2	1,104.6
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB	157.4	232.4	232.4	238.2	244.2	1,104.6
Business Budgeted Net Impact to RTB						-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	6.1	386.2	861.1	932.8	1,038.1	3,224.4
Business Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	151.3	(153.8)	(628.7)	(694.6)	(793.9)	(2,119.8)
Business Budgeted Net Impact to RTB Variance	-	-	-	-	-	-



US Sanction Paper

4.3 *NPV Summary*

N/A

4.4 *Customer Outreach Plan*

N/A



Closure Paper

Title:	Process Automation Implementation	Sanction Paper #:	USSC-18-149C
Project #:	INVP 4941 (S007828)	Sanction Type:	Closure
Operating Company:	National Grid USA Svc. Co.	Date of Request:	3/26/2019
Author:	Baseer Ahmad / Suresh Muthiravilayil	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IT	Project Manager:	Jeffrey Dailey

1 Executive Summary

This paper is presented to close INVP 4941. The total spend was \$1.146M. The original sanctioned amount for this project was \$1.090M at +/- 10%.

2 Project Summary

This project delivered National Grid’s Process Automation platform. Process Automation automates tasks & functions and improves process execution accuracy. Using the output of the related Feasibility & Analysis study, the current project delivers the environment and configures the pre-defined use cases for the following business areas: Procure to Pay, Account Maintenance and Operations, Billing, Credit & Collections and Payment Processing.

3 Variance Analysis

Cost Summary Table

Project Sanction Summary (\$M)				
Title	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
Process Automation Implementation	Capex	1.062	1.017	(0.045)
	Opex	0.084	0.073	(0.011)
	Removal	0.000	0.000	0.000
	Total	1.146	1.090	(0.056)

Cost Variance Analysis

- Project cost variance is within tolerance.
- Contributors to variance:
 - Additional System Integrator scope
 - Challenges/Delays in building out new Virtual Desktop (VDI) infrastructure, including Verizon Firewall changes in support of same

3.1 Schedule Variance Table



Closure Paper

Schedule Variance	
Project Grade - Ready for Use Date	6/30/2018
Actual Ready for Use Date	9/25/2018
Schedule Variance	0 years, 2 months, 26 days

3.2 Schedule Variance Explanation

- Delay in building out National Grid's strategic cloud node (secondary location) to host a disaster recovery solution for virtual desktops used by Process Automation.
- Delay in implementation of required network changes by ecosystem partner.

4 Final Cost by Project

Actual Spending (\$M) vs. Sanction (\$M)				
Project	Breakdown	Total Actual Spend	Original Project Sanction Approval	Variance (Over) / Under
INVP 4941 Capex: S007828	Capex	1.062	1.017	(0.045)
	Opex	0.084	0.073	(0.011)
	Removal	0.000	0.000	0.000
	Total	1.146	1.090	(0.056)

5 Improvements / Lessons Learned/Root Cause

- 2018-LL-611 Project must have clear insight into National Grid's cloud strategy / road map to take the appropriate course of action.

6 Closeout Activities

The following closeout activities have been completed..

Activity	Completed
All work has been completed in accordance with all National Grid policies	<input checked="" type="radio"/> Yes <input type="radio"/> No
Gate E checklist completed (appl. only to CCD)	<input type="radio"/> Yes <input checked="" type="radio"/> N/A
All relevant costs have been charged to project	<input checked="" type="radio"/> Yes <input type="radio"/> No
All work orders and funding projects have been closed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All unused materials have been returned	<input checked="" type="radio"/> Yes <input type="radio"/> No



Closure Paper

All IT Service Transition activities have been completed	<input checked="" type="radio"/> Yes <input type="radio"/> No
All lessons learned have been entered appropriately into the IT Knowledge Management Tool (KMT) lesson learned database	<input checked="" type="radio"/> Yes <input type="radio"/> No

7 Statements of Support

7.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Mike Zinsmeyer	Business Representative
Business Partner (BP)	Joel Semel	Relationship Manager
Program Delivery Management (PDM)	Jeff Dailey	Program Delivery Director
IT Finance	Michelle Harris	Manager
IT Regulatory	Dan DeMauro	Director
Digital Risk and Security (DR&S)	Peter Shattuck	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Director

7.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



Closure Paper

8 Decisions

I approve this paper.

Signature.....Date.....

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



US Sanction Paper

Title:	Annual HR & Payroll Mandatory Service Pack Upgrade (HRSP) - FY19	Sanction Paper #:	USSC-18-292v2
Project #:	INVP 4965 Capex: S007958	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	11/13/2018
Author / NG Representative:	Diane Beard / Ella Weisbord	Sponsor:	Christopher McConnachie, VP Finance Services
Utility Service:	IT	Project Manager:	Samir Parikh

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of project INVP4965 in the amount of \$1.377M with a tolerance of +/- 10% for the purposes of Full Implementation.

This sanction amount is \$1.377M broken down into:

- \$1.126M Capex*
- \$0.251M Opex*
- \$0.000M Removal*

1.2 Project Summary

This project provides a funding base and governance structure that allows the Information Technology (IT) organization to effectively deliver needed updates to the US SAP application portfolio in order to comply with federal, state, and local government requirements.

1.3 Summary of Projects

Project Number	Project Title	Estimate Amount (\$M)
INVP 4965	US SAP: Annual HR Payroll Mandatory Service Pack Upgrade FY19	1.377
Total		1.377

1.4 Associated Projects

N/A



US Sanction Paper

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Potential Investment Tolerance
9/4/18	USSC	\$0.402M	\$1.377M	Sanction	10%

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
June 2019	Project Closure Sanction

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input checked="" type="radio"/> Mandatory <input type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	This project funds a budget for the 2018/19 fiscal year that will be managed by the Project Delivery Team and Business Process Support (BPS) to ensure timely delivery of upgrade components for the HR modules which include the required tax, payroll, legal, and regulatory reporting changes throughout the year.

1.8 Asset Management Risk Score

Asset Management Risk Score: 49

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability
 Environment
 Health & Safety
 Not Policy Driven



US Sanction Paper

1.9 Complexity Level

High Complexity Medium Complexity Low Complexity N/A

Complexity Score: 19

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

Yes No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY18 - 19	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input type="radio"/> Under <input checked="" type="radio"/> NA	\$0.000

1.12 If cost > approved Business Plan how will this be funded?

N/A

1.13 Current Planning Horizon

	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2019/20	Yr. 2 2020/21	Yr. 3 2021/22	Yr. 4 2022/23	Yr. 5 2023/24	Yr. 6 + 2024/25	
\$M								
CapEx	0.000	1.126	0.000	0.000	0.000	0.000	0.000	1.126
OpEx	0.000	0.251	0.000	0.000	0.000	0.000	0.000	0.251
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	1.377	0.000	0.000	0.000	0.000	0.000	1.377



US Sanction Paper

1.14 Key Milestones

Milestone	Target Date: (Month Year)
Start Up	August 2018
Partial Sanction	September 2018
Begin Requirements and Design	September 2018
Project Sanction	November 2018
Begin Development and Implementation	November 2018
Move to Production / Last Go Live	March 2019
Project Closure	June 2019

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green

1.16 Key Issues (include mitigation of Red or Amber Resources)

N/A



US Sanction Paper

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative

1.18 List References

N/A



US Sanction Paper

2 Decisions

I:

- (a) APPROVE this paper and the investment of \$1.377M and a tolerance of +/-10% for the purposes of Development and Implementation.

- (c) NOTE that Samir Parikh is the Project Manager and has the approved financial delegation.

Signature.....Date.....

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



US Sanction Paper

3 Sanction Paper Detail

Title:	Annual HR & Payroll Mandatory Service Pack Upgrade (HRSP) - FY19	Sanction Paper #:	USSC-18-292v2
Project #:	INVP 4965 Capex: S007575	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	11/13/2018
Author / NG Representative:	Diane Beard / Ella Weisbord	Sponsor:	Christopher McConnachie, VP Finance Services
Utility Service:	IT	Project Manager:	Samir Parikh

3.1 *Background*

SAP releases an annual support pack update for components of its HR modules.

Required updates include the following:

- Tax changes
- Payroll modifications
- Legal and regulatory reporting changes
- Considerations required to produce year end employee wage statements (W-2s)
- Tax table changes for correctly processing payroll and required earnings withholdings
- Revised tax withholding tables
- New annual maximum withholding requirements
- All associated legal and regulatory compliance or reporting considerations for employee and company labor governmental reporting

The annual HR support packs contain updates for the close out Quarterly Employer Tax Reporting and current calendar year reporting cycle and for staging the requisite changes for the subsequent calendar year reporting cycle.

These are mandatory annual changes requested by federal and state agencies, such as the Internal Revenue Services (IRS) and various state Departments of Finance, as well as different municipalities which must be applied to the SAP core solution in order to properly reflect employee wages, employee and company withholdings, legal requirements and to comply with federal and state regulatory reporting.

National Grid applies the service pack updates on an annual basis. The requirement analysis will assure the alignment with other IT projects and business programs, such



US Sanction Paper

as data center migration, and define the approach to prepare system updates that will occur in December.

3.2 *Drivers*

The primary driver is to comply with mandatory federal and state changes to laws and regulations in order to properly reflect employee wages, employee and company tax withholdings, legal requirements and to comply with regulatory reporting.

3.3 *Project Description*

The annual HR SAP Support packs increase system reliability by applying upgrade service packs provided by SAP on a regular basis following the vendor recommended schedule. The project will ensure the upgrades are applied to the National Grid US SAP environment by following the IT delivery process and best practices, and overseeing necessary testing (modular and integration) as well as providing overall governance for the upgrades.

3.4 *Benefits Summary*

The project is intended to implement and comply with mandatory federal and state regulatory and legal changes. For example, new tax tables and any new changes to employer tax reporting are achieved through applying these HR support packs. The anticipated benefits of upgrading from current patch level to the new patch level or applying the HR support pack are listed below.

- Produce weekly, monthly and special payroll runs
- Ensure correct federal and state withholdings and legal reporting requirements
- Provide a more stable and reliable core SAP solution
- Reduce need for incident resolution and associated patches
- Provide an opportunity to eliminate and reduce custom code for changes
- Allow for faster SAP vendor resolution times for production incidents/issues.

3.5 *Business and Customer Issues*

There are no significant business and customer issues beyond what has been described elsewhere in this paper



US Sanction Paper

3.6 Alternatives

Alternative 1: Defer project / Do Nothing

This option is not viable as the upgrades are mandatory to comply with changes to federal and state laws and regulations.

3.7 Safety, Environmental and Project Planning Issues

There are no significant issues beyond what has been described in this paper.

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	Delivery of DEV environment from FIT to support mock 1 cutover is currently planned for September 24th, leaves only 4 days to load transports, copy over data from T-Systems DEV, and perform validation testing.	3	5	5	15	15	Mitigate	Working with BASIS team to identify a back-up plan for environments.		
2	We do not have a contingency plan for QA1 or QA 2 environments, any delay in the delivery of these environments from FIT will impact the go-live date.	3	4	4	12	12	Mitigate	Working with BASIS team to identify a back-up plan for environments.		
3	The data for QA1 environments will be from a July snapshot, there is a potential that QA2 environments will have the same data which would not include GBE and YouConnect.	3	3	3	9	9	Avoid	Working to have refresh completed in time so that new data will be available for regression testing.		
4	December releases of SAP_HR patches D3-D5 and EA_HR patches 84-85 need to be analyzed to determine if they are needed for December production cutover.	3	3	3	9	9	Accept			

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A



US Sanction Paper

3.10.3 CIAC / Reimbursement

N/A

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total	
					2019/20	2020/21	2021/22	2022/23	2023/24	2024/25		
INVP 4965	US SAP: Annual HR Payroll Mandatory Service Pack Upgrade FY19	+/- 10%	CapEx	0.000	1.126	0.000	0.000	0.000	0.000	0.000	0.000	1.126
			OpEx	0.000	0.251	0.000	0.000	0.000	0.000	0.000	0.000	0.251
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	1.377	0.000	0.000	0.000	0.000	0.000	0.000	1.377
Total Project Sanction			CapEx	0.000	1.126	0.000	0.000	0.000	0.000	0.000	0.000	1.126
			OpEx	0.000	0.251	0.000	0.000	0.000	0.000	0.000	0.000	0.251
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	1.377	0.000	0.000	0.000	0.000	0.000	0.000	1.377

3.11.1 Project Budget Summary Table

3.11.2

Project Costs per Business Plan

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
\$M		1.126	2020/21	2021/22	2022/23	2023/24	2024/25	
CapEx	0.000	1.126	0.000	0.000	0.000	0.000	0.000	1.126
OpEx	0.000	0.251	0.000	0.000	0.000	0.000	0.000	0.251
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	1.377	0.000	0.000	0.000	0.000	0.000	1.377

Variance (Business Plan-Project Estimate)

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
\$M		2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	
CapEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OpEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000



US Sanction Paper

3.11.3 Cost Assumptions

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

N/A

3.11.4.2 NPV Assumptions and Calculations

3.11.5 Additional Impacts

None

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Tom LaVeck	Business Representative
Program Delivery Management (PDM)	Deborah Rollins	Head of PDM
Business Partner (BP)	Joel Semel	Relationship Manager
Program Delivery Management (PDM)	Samir Parikh	Program Delivery Director
IT Finance	Michelle Harris	Manager
IT Regulatory	Dan DeMauro	Director
Digital Risk and Security (DR&S)	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Director



US Sanction Paper

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego

4 Appendices

4.1 Sanction Request Breakdown by Project

N/A



US Sanction Paper

4.2 Other Appendices

4.2.1 Project Cost Breakdown

Project Cost Breakdown \$ (millions)						
Cost Category	sub-category	Value of Work to Date (VOWD)	Forecast to Complete (FTC)	Forecast At Completion (FAC=VOWD+FTC)	Name of Firm(s) providing resources	
Personnel	NG Resources	0.035	0.216	0.251		
	SDC Time & Materials	0.006	0.007	0.013	IBM	
			-	-	-	WiPro
			-	-	-	DXC
			-	-	-	Verizon
	SDC Fixed-Price		-	-	-	IBM
			0.659	0.659	0.659	WiPro
			-	-	-	DXC
		-	-	-	Verizon	
All other personnel	0.081	0.032	0.113			
TOTAL Personnel Costs	0.122	0.914	1.035			
Hardware	Purchase		-	-		
	Lease		-	-		
Software			-	-		
Risk Margin			0.116	0.116		
AFUDC		0.000	0.023	0.023		
Other			0.202	0.202		
TOTAL Costs		0.122	1.255	1.377		



US Sanction Paper

4.2.2 Benefiting Operating Companies

Company Description
Niagara Mohawk Power Corp.- Electric Distr.
Niagara Mohawk Power Corp. - Gas
Niagara Mohawk Power Corp. - Transmission
KeySpan Energy Delivery New York
KeySpan Energy Delivery Long Island
Massachusetts Electric Company
Nantucket Electric Company
Boston Gas Company
Colonial Gas Company
Narragansett Electric Company
Narragansett Gas Company
KeySpan LNG LP Regulated Entity
KeySpan Generation LLC (PSA)
Transgas Inc

4.2.3 IS Ongoing Operational Costs (RTB):

There are no RTB cost impacts as a result of this project.

4.3 NPV Summary (if applicable)

N/A

4.4 Customer Outreach Plan

N/A



US Sanction Paper

Title:	US SAP: Infrastructure Landscape- FY19	Sanction Paper #:	USSC-18-213v2
Project #:	INVP 4970 Capex: S007865	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	1/29/2019
Author / NG Representative:	Anil Garg / Ella Weisbord	Sponsor:	Narayan Devireddy, VP Solution & Del
Utility Service:	IT	Project Manager:	Samir Parikh

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of INVP 4970 in the amount of \$4.700M with a tolerance of +/- 10% for the purposes of Full Implementation.

This sanction amount is \$4.700M broken down into:

- \$3.600M Capex*
- \$1.100M Opex*
- \$0.000M Removal*

1.2 Project Summary

This project will create / refresh non-production environments used for project development in support of initiatives pertaining to the Systems, Applications and Products (SAP) portfolio.

1.3 Summary of Projects

Project Number	Project Title	Estimate Amount (\$M)
INVP 4970 / Capex: S007865	US SAP: Infrastructure Landscape FY19	4.700
Total		4.700



US Sanction Paper

1.4 Associated Projects

Project Number	Project Title
INVP 4144	YouConnect / HRIS Simplification Program
INVP 4572	Gas Business Enablement
INVP 4662 Capex: S007732	Concur Expenses
INVP 4779 Capex: S007730	Time Entry and Approval Mobility Enhancements
INVP 4952	Drumbeat BPC Planning
INVP 4563 Capex: S007900	US SAP: FERC on HANA (FOH) Upgrade
INVP 4965 Capex: S007958	Annual HR & Payroll Mandatory Service Pack Upgrade (HRSP) - FY19
INVP 5360 CapEx: S008007	Powerplan Lease upgrade

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Potential Investment Tolerance
5/29/18	USSC	\$1.476M	\$4.115M	Partial	+/-25%

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
September 2019	Project Closure Sanction

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input checked="" type="radio"/> Mandatory <input type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	This project will set the background for all projects (mandatory and policy driven) within portfolio.



US Sanction Paper

1.8 Asset Management Risk Score

Asset Management Risk Score: 44

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability
 Environment
 Health & Safety
 Not Policy Driven

1.9 Complexity Level

- High Complexity
 Medium Complexity
 Low Complexity
 N/A

Complexity Score: N/A

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

- Yes
 No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY19 - 23	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input checked="" type="radio"/> Under <input type="radio"/> NA	0.215M

1.12 If cost > approved Business Plan how will this be funded?

N/A



US Sanction Paper

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
CapEx	0.000	3.600	0.000	0.000	0.000	0.000	0.000	3.600
OpEx	0.000	1.100	0.000	0.000	0.000	0.000	0.000	1.100
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	4.700	0.000	0.000	0.000	0.000	0.000	4.700

1.14 Key Milestones

Milestone	Target Date: (Month Year)
Start Up	March 2018
Partial Sanction	May 2018
Begin Requirements and Design	May 2018
Project Sanction	January 2019
Begin Development and Implementation	January 2019
Move to Production / Last Go Live	March 2019
Project Closure	September 2019

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input type="checkbox"/> Contractor	
Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green



US Sanction Paper

1.16 Key Issues (include mitigation of Red or Amber Resources)

N/A

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative

1.18 List References

N/A



US Sanction Paper

2 Decisions

I:

- (a) APPROVE this paper and the investment of \$4.700M and a tolerance of +/-10% for the purposes of Full Implementation.
- (b) NOTE that Samir Parikh is the Project Manager and has the approved financial delegation.

Signature.....Date.....

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



US Sanction Paper

3 Sanction Paper Detail

Title:	US SAP: Infrastructure Landscape – FY19	Sanction Paper #:	USSC-18-213v2
Project #:	INVP 4970 Capex: S007865	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	1/29/2019
Author / NG Representative:	Anil Garg / Ella Weisbord	Sponsor:	Narayan Devireddy, VP Solution & Del
Utility Service:	IT	Project Manager:	Samir Parikh

3.1 *Background*

Obtaining, setting and configuring project environments is a critical path task for SAP related projects and initiatives. These activities can be time consuming and add to costs. To improve IT project implementation schedules, National Grid Information Services introduced a new process in Fiscal Year (FY) 18 to provide annual funding in the beginning of each fiscal year to set and configure a set of project environments to support all initiatives within the SAP portfolio for that fiscal year.

3.2 *Drivers*

The primary driver is to improve IT project implementation schedules by creating a landscape to support all projects and initiatives within the SAP Portfolio.

3.3 *Project Description*

As part of this project, the following activities will be implemented:

- Complete design assessment to determine a permanent set of critical SAP project environments that will require further extension

3.4 *Benefits Summary*

This project is intended to support mandated projects by:

- Reducing the lead time to start projects and initiatives within the portfolio
- Increasing accuracy of cost estimates
- Alleviating project startup bottlenecks
- Increasing reliability for SAP related project delivery
- Reducing one-time capex startup costs associated with standing up new environments for each project



US Sanction Paper

3.5 *Business and Customer Issues*

There are no significant business issues beyond what has been described in this paper.

3.6 *Alternatives*

Alternative 1: *Defer project / Do Nothing*

This option will not address the business need for project environments to efficiently support initiatives in the SAP portfolio.

Alternative 2: *Address every SAP portfolio project needs individually*

This “unbundled” option, which was used in the past, will negatively impact each project within portfolio by increasing the lead time to start each initiative, add cost and complexity for portfolio management and overall delivery cycle.

3.7 *Safety, Environmental and Project Planning Issues*

There are no significant issues beyond what has been described in this paper.

3.8 *Execution Risk Appraisal*

N/A

3.9 *Permitting*

N/A

3.10 *Investment Recovery*

3.10.1 *Investment Recovery and Regulatory Implications*

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 *Customer Impact*

N/A

3.10.3 *CIAC / Reimbursement*

N/A



US Sanction Paper

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total	
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +		
					2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
INVP 4970 / Capex: S007865	US SAP: Infrastructure Landscape FY19	+/- 10%	CapEx	0.000	3.600	0.000	0.000	0.000	0.000	0.000	0.000	3.600
			OpEx	0.000	1.100	0.000	0.000	0.000	0.000	0.000	0.000	1.100
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	4.700	0.000	0.000	0.000	0.000	0.000	0.000	4.700
Total Project Sanction			CapEx	0.000	3.600	0.000	0.000	0.000	0.000	0.000	0.000	3.600
			OpEx	0.000	1.100	0.000	0.000	0.000	0.000	0.000	0.000	1.100
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	4.700	0.000	0.000	0.000	0.000	0.000	0.000	4.700

3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
\$M		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	0.000	3.682	0.000	0.000	0.000	0.000	0.000	3.682
OpEx	0.000	1.233	0.000	0.000	0.000	0.000	0.000	1.233
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	4.915	0.000	0.000	0.000	0.000	0.000	4.915

Variance (Business Plan-Project Estimate)

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
\$M		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	0.000	0.082	0.000	0.000	0.000	0.000	0.000	0.082
OpEx	0.000	0.133	0.000	0.000	0.000	0.000	0.000	0.133
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.215	0.000	0.000	0.000	0.000	0.000	0.215

3.11.3 Cost Assumptions

This estimate was developed using standard IT estimating methodology and was determined based upon historical monthly hosting rates for a pre-defined set of core projects. The accuracy level of the estimate for each project is identified in table 3.11.1.



US Sanction Paper

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

This is not an NPV project.

3.11.4.2 NPV Assumptions and Calculations

This is not an NPV project.

3.11.5 Additional Impacts

None

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Jason Gramas	Business Representative
Business Partner (BP)	Joel Semel	Relationship Manager
Program Delivery Management (PDM)	Samir Parikh	Program Delivery Director
IT Finance	Michelle Harris	Manager
IT Regulatory	Daniel DeMauro	Director
Digital Risk and Security (DR&S)	Peter Shattuck	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Director

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



US Sanction Paper

4 Appendices

4.1 Sanction Request Breakdown by Project

N/A

4.1 Other Appendices

4.1.1 Project Cost Breakdown

Project Cost Breakdown \$ (millions)					
Cost Category	sub-category	Value of Work to Date (VOWD)	Forecast to Complete (FTC)	Forecast At Completion (FAC=VOWD+FTC)	Name of Firm(s) providing resources
Personnel	NG Resources		-	-	
	SDC Time & Materials		-	-	IBM
			-	-	WiPro
			-	-	DXC
			-	-	Verizon
	SDC Fixed-Price		-	-	IBM
			-	-	WiPro
			-	-	DXC
			-	-	Verizon
All other personnel		-	-		
TOTAL Personnel Costs	-	-	-		
Hardware	Purchase		-	-	
	Lease		-	-	
Software			-	-	
Risk Margin			0.116	0.116	
AFUDC			0.056	0.056	
Other		2.974	1.553	4.527	T-Systems, HEC
TOTAL Costs		2.974	1.726	4.700	



US Sanction Paper

4.1.2 Benefiting Operating Companies

Benefiting Operating Companies	Business Area	State
Niagara Mohawk Power Corp.- Electric Distr.	Electric Distribution	NY
Massachusetts Electric Company	Electric Distribution	MA
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
Boston Gas Company	Gas Distribution	MA
Narragansett Electric Company	Electric Distribution	RI
Niagara Mohawk Power Corp. - Transmission	Transmission	NY
Niagara Mohawk Power Corp. - Gas	Gas Distribution	NY
New England Power Company – Transmission	Transmission	MA, NH, RI, VT
KeySpan Generation LLC (PSA)	Generation	NY
Narragansett Gas Company	Gas Distribution	RI
Colonial Gas Company	Gas Distribution	MA
Narragansett Electric Company – Transmission	Transmission	RI
National Grid USA Parent	Parent Company	
Nantucket Electric Company	Electric Distribution	MA
NE Hydro - Trans Electric Co.	Inter Connector	MA,NH
KeySpan Energy Development Corporation	Non-Regulated	NY
KeySpan Port Jefferson Energy Center	Generation	NY
New England Hydro - Trans Corp.	Inter Connector	MA, NH
KeySpan Services Inc. Service Company	Service Company	
KeySpan Glenwood Energy Center	Generation	NY
Massachusetts Electric Company – Transmission	Transmission	MA
NG LNG LP Regulated Entity	Gas Distribution	MA, NY, RI
Transgas Inc	Non-Regulated	NY
Keyspan Energy Trading Services	Other	NY
KeySpan Energy Corp. Service Company	Service Company	
New England Electric Trans Corp	Inter Connector	MA
New England Electric Trans Corp	InterConnector	MA



US Sanction Paper

Title:	Mandated IS Projects FY19	Sanction Paper #:	USSC-18-195
Project #:	INVP 5156 Capex: S007852	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	5/9/2018
Author:	Tejal Patel	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	Joel Semel

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of INVP 5156 in the amount \$6.500M with a tolerance of +/- 10% for the purposes of *Full implementation*.

This sanction amount is \$6.500M broken down into:

- \$5.200M Capex*
- \$1.300M Opex*
- \$0.000M Removal*

1.2 Project Summary

This project provides a funding base and governance structure needed to respond to regulatory mandates, regulatory audits, or compliance reporting occurring in Fiscal Year 2019 across the National Grid US service territory.

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
5156		Mandated IS Projects FY19	6.500
Total			6.500

1.4 Associated Projects

N/A



US Sanction Paper

1.5 Prior Sanctioning History

N/A

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
June 2019	Project Closure Sanction

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input checked="" type="radio"/> Mandatory <input type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	This investment will support US regulatory mandates.

1.8 Asset Management Risk Score

Asset Management Risk Score: 49

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability
 Environment
 Health & Safety
 Not Policy Driven

1.9 Complexity Level

- High Complexity
 Medium Complexity
 Low Complexity
 N/A

Complexity Score: N/A



US Sanction Paper

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

Yes No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY19 - 23	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input type="radio"/> Under <input checked="" type="radio"/> NA	\$0.000M

1.12 If cost > approved Business Plan how will this be funded?

N/A

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
CapEx	0.000	5.200	0.000	0.000	0.000	0.000	0.000	5.200
OpEx	0.000	1.300	0.000	0.000	0.000	0.000	0.000	1.300
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	6.500	0.000	0.000	0.000	0.000	0.000	6.500



US Sanction Paper

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	April 2018
Begin Requirements and Design	May 2018
Project Sanction	May 2018
Begin Development and Implementation	June 2018
Multiple Moves to Production / Last Go Live	March 2019
Project Complete	March 2019

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green

1.16 Key Issues (include mitigation of Red or Amber Resources)

1	Will be evaluated individually for each item funded by this project.
---	--



US Sanction Paper

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative

1.18 List References

N/A

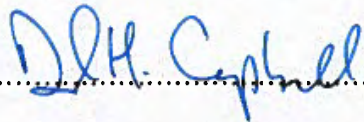


US Sanction Paper

2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on 5/9/2018:

- (a) APPROVE this paper and the investment of \$6.500M and a tolerance of +/-10%.
- (b) NOTE that Joel Semel is the Project Manager and has the approved financial delegation.
- (c) NOTE: In the event that any Blanket projects are not approved prior to the start of the FY2020 fiscal year, the FY2019 approval limits will remain in effect until such time as the FY2020 blanket projects are approved by USSC and/or other appropriate authority for approval.

Signature..........Date...5/23/18.....

David H. Campbell, Vice President, ServCo Business Partnering, USSC Chair



US Sanction Paper

3 Sanction Paper Detail

Title:	Mandated IS Projects FY19	Sanction Paper #:	USSC-18-195
Project #:	INVP 5156 Capex: S007852	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	5/9/2018
Author:	Tejal Patel	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	Joel Semel

3.1 *Background*

Over the course of the year, Massachusetts (MA), Rhode Island (RI), New York (NY) and Federal regulators issue a number of orders that must be addressed by National Grid in a timely manner. Complying with regulatory mandates requires changing National Grid business processes which may require key systems enhancements and re-design.

This project provides a funding base and governance structure that allows the organization to respond effectively to demands and change requests arising from regulatory mandates and orders from the following regulators:

- DPU – Massachusetts Department of Public Utilities
- PUC – Rhode Island Public Utilities Commission
- PSC – New York Public Service Commission
- FERC – Federal Energy Regulatory Commission

3.2 *Drivers*

This project will fund FY2019 investments in information systems to assure National Grid is in compliance with Regulatory Mandates.

3.3 *Project Description*

The requests approved under this project represent mandatory initiatives.

An approval committee, will oversee project prioritization based on assessments of priority/urgency ,available funding and other regulatory attributes.

The committee will approve or delay requests based on their assessment.



US Sanction Paper

Requests exceeding \$30K or resulting in any incremental Run the Business (RTB) cost will be required to follow the IS project governance path (i.e., they will require their own investment proposal and associated approvals).

3.4 Benefits Summary

The requests worked under this project are expected to contribute to National Grid's compliance with regulatory mandates.

3.5 Business and Customer Issues

In order to develop/deliver the most effective solutions possible, there will be instances in which IS will draw upon business area Subject Matter Experts (SME's).

3.6 Alternatives

Alternative 1: : Do Nothing or Defer the Project

This is not a viable option because this course of action would mean that legally required mandated projects would require additional time for startup. The Business would lose the ability to implement important requests efficiently, which would result in increased risk of missing regulatory deadlines.

3.7 Safety, Environmental and Project Planning Issues

There are no significant issues beyond what has been described elsewhere.

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	Resources with the appropriate skills may not be available in a timely fashion.	2	2	2			Mitigate	The Project Manager will determine a means of handling such occurrences.	Will be determined after discussions with the business.	Will be determined after discussions with the business.



US Sanction Paper

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

NA

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total	
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +		
Proj Num	Proj Name	Est Lvl (e.g. +/- 10%)	CapEx	0.000	5.200	0.000	0.000	0.000	0.000	0.000	0.000	5.200
			OpEx	0.000	1.300	0.000	0.000	0.000	0.000	0.000	0.000	1.300
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	6.500	0.000	0.000	0.000	0.000	0.000	0.000	6.500
Total Project Sanction			CapEx	0.000	5.200	0.000	0.000	0.000	0.000	0.000	0.000	5.200
			OpEx	0.000	1.300	0.000	0.000	0.000	0.000	0.000	0.000	1.300
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	6.500	0.000	0.000	0.000	0.000	0.000	0.000	6.500



US Sanction Paper

3.11.2 Project Budget Summary Table

Project Costs per Business Plan

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
\$M								
CapEx	0.000	5.200	0.000	0.000	0.000	0.000	0.000	5.200
OpEx	0.000	1.300	0.000	0.000	0.000	0.000	0.000	1.300
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	6.500	0.000	0.000	0.000	0.000	0.000	6.500

Variance (Business Plan-Project Estimate)

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
\$M								
CapEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OpEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

3.11.3 Cost Assumptions

This estimate was developed in 2017 consistent with historical annual spend for similar system changes in response to regulatory mandates.

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

N/A

3.11.4.2 NPV Assumptions and Calculations

N/A

3.11.5 Additional Impacts

N/A



US Sanction Paper

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Role	Individual
Business Representative	Joel Semel
Head of PDM	Deborah Rollins
Relationship Manager	Joel Semel
Program Delivery Director	Joel Semel
IS Finance Management	Michele Harris
IS Regulatory	Dan DeMauro
DR&S	Alaine Wilson
Service Delivery	Mark Mirizio
Enterprise Architecture	Joe Clinchot

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual	Area
Regulatory	Harvey, Maria	IS
Jurisdictional Delegate(s)	Anand, Sonny	Electric - NE
	Harbaugh, Mark	Electric - NY
	Hill, Terron	FERC
	Currie, John	Gas - NE
	Wolf, Don	Gas - NY
Procurement	Chevere, Diego	All

4 Appendices

4.1 Sanction Request Breakdown by Project

N/A



US Sanction Paper

4.2 Other Appendices

4.2.1 Benefiting Operating Companies

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp - Electric	Electric Distribution	NY
Niagara Mohawk Power Corp – Gas	Gas Distribution	NY
Niagara Mohawk Power Corp. - Transmission	Transmission	NY
Massachusetts Electric Company	Electric Distribution	MA
Nantucket Electric Company	Electric Distribution	MA
New England Power Company – Transmission	Transmission	MA, NH, RI, VT
Narragansett Gas Company	Gas Distribution	RI
Narragansett Electric Company	Electric Distribution	RI
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
KeySpan Generation LLC (PSA)	Generation	NY
KeySpan Glenwood Energy Center	Generation	NY
KeySpan Port Jefferson Energy Center	Generation	NY
Boston Gas Company	Gas Distribution	MA
Colonial Gas Company	Gas Distribution	MA

NOTE: This list of companies represents G-098 allocation for All Retail, incl GSE and Energy North, plus NMPC-T, NEP-T, KS Generation, GW, Port Jefferson.

4.2.2 IS Ongoing Operational Costs (RTB)

RTB needs will be defined by each individual initiative funded by this blanket project. The source of RTB funding will be determined and approved as a part of each initiative sanction process.

4.3 NPV Summary

N/A

4.4 Customer Outreach Plan

N/A



US Sanction Paper

Title:	AIX Upgrade	Sanction Paper #:	USSC-18-108_V2
Project #:	INVP 5199 Capex: S007804	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	10/16/2018
Author:	Aravind Lochan / Andrew Yee	Sponsor:	Barry Sheils, Vice President of Infrastructure and Operations
Utility Service:	IT	Project Manager:	Ken Little

1 Executive Summary

1.1 Sanctioning Summary

This paper requests full sanction of INVP 5199 in the amount of \$2.208M with a tolerance of +/- 10% for the purposes of Full Implementation for the AIX (Advanced Interactive executive) Upgrade project.

This sanction amount is \$2.208M broken down into:

- \$2.079M Capex*
- \$0.129M Opex*
- \$0.000M Removal*

1.2 Project Summary

The scope of this project is to purchase, configure and implement new AIX infrastructure to replace legacy AIX infrastructure that hosts business applications in the Newark DXC datacenter. This project will also analyze the current application estate hosted on the legacy AIX environment in the Newark DXC datacenter and migrate to the new AIX platform located in the Newark DXC datacenter. The current legacy AIX infrastructure does not have the capability to support high availability (systems which are durable and minimize hardware failures) and redundancy of server hardware components. Without high availability capabilities, AIX hosted applications may fail in the event of an infrastructure failure increasing the risk of application outages. A new AIX infrastructure is required to support improved resiliency and failover capabilities.

This paper requests sanction for the purchase and installation of AIX servers, network switches, cabling, power and the migration of AIX hosted production applications to the new AIX infrastructure located in the Newark DXC data center. The new AIX servers will provide a level of resiliency that will allow for high availability of production hosted virtual servers and applications. This project will also perform the analysis of existing AIX hosted applications and migrate the applications to the new AIX servers and infrastructure.



US Sanction Paper

The project scope includes:

- Purchase and installation of AIX server hardware in the Newark DXC datacenter
- Purchase and installation of network equipment related to the new AIX infrastructure
- Purchase of network cabling and power installation services for the AIX infrastructure
- Analysis of applications hosted on the current AIX infrastructure
- Migration of applications to the new AIX infrastructure

1.3 Summary of Projects

Project Number	Project Title	Estimate Amount (\$M)
5199	AIX Upgrade Project	\$2.208M

1.4 Associated Projects

N/A

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Potential Investment Tolerance
2/13/18	USSC	\$1.638M	\$2.569M	Partial	+/-10%

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
June 2019	Project Closure Sanction



US Sanction Paper

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory	This project will upgrade and improve National Grid's AIX infrastructure platform. This investment will improve resiliency and availability of hosted business applications that reside on the AIX infrastructure.
<input type="radio"/> Policy- Driven	
<input type="radio"/> Justified NPV	
<input checked="" type="radio"/> Other	

1.8 Asset Management Risk Score

Asset Management Risk Score: 44

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability
 Environment
 Health & Safety
 Not Policy Driven

1.9 Complexity Level

- High Complexity
 Medium Complexity
 Low Complexity
 N/A

Complexity Score: 20

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

- Yes
 No



US Sanction Paper

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IT Investment Plan FY19-23	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input checked="" type="radio"/> Under <input type="radio"/> NA	\$0.090M

1.12 If cost > approved Business Plan how will this be funded?

N/A

1.13 Current Planning Horizon

\$M	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	1.356	0.679	0.044	0.000	0.000	0.000	0.000	2.079
OpEx	0.011	0.111	0.007	0.000	0.000	0.000	0.000	0.129
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	1.367	0.790	0.051	0.000	0.000	0.000	0.000	2.208

1.14 Key Milestones

Milestone	Target Date: (Month Year)
Start Up	January 2018
Partial Sanction	February 2018
Begin Requirements and Design	April 2018
Project Sanction (Full Sanction)	October 2018
Begin Development and Implementation	October 2018
Move to Production / Last Go Live	April 2019
Project Closure	June 2019



US Sanction Paper

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green

1.16 Key Issues (include mitigation of Red or Amber Resources)

N/A

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative

1.18 List References

N/A



US Sanction Paper

2 Decisions

I:

(a) APPROVE this paper and the investment of \$2.208M and a tolerance of +/-10% for the purposes of Development and Implementation.

(b) NOTE that Ken Little is the Project Manager and has the approved financial delegation.

Signature.....Date.....
David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



US Sanction Paper

3 Sanction Paper Detail

Title:	AIX Upgrade	Sanction Paper #:	USSC-18-108_V2
Project #:	INVP 5199 Capex: S007804	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	10/16/2018
Author:	Aravind Lochan / Andrew Yee	Sponsor:	Barry Sheils Vice President of Infrastructure and Operations
Utility Service:	IT	Project Manager:	Ken Little

3.1 *Background*

The current legacy AIX infrastructure that hosts virtual servers and business applications located in the Newark DXC datacenter does not readily provide resiliency for hosted virtual servers and applications. The new AIX infrastructure will provide resiliency, increased performance and availability for hosted virtual servers and applications.

The new AIX servers will reduce the potential of a hardware failure causing virtual server and application outages reducing risk to our business. Existing applications will be analyzed and migrated to the new AIX platform.

3.2 *Drivers*

- The current legacy server hardware does not have the capability to support high availability (systems which are durable and minimize hardware failures) failover in the event of a hardware failure for hosted virtual servers or applications
- Improve hardware resiliency and application availability with new AIX infrastructure
- Provide improved performance and supportability for AIX hosted virtual servers and applications with new server hardware
- Supports the modernization of National Grid's AIX infrastructure



US Sanction Paper

3.3 *Project Description*

This paper requests sanction for the purchase and installation of AIX servers, network switches, cabling and power in the DXC Newark data center. The new AIX servers will provide a level of resiliency that will allow for high availability of production hosted virtual servers and applications.

This project will also perform the analysis of existing AIX hosted applications and migrate the applications to the new AIX servers and infrastructure.

3.4 *Benefits Summary*

Qualitative Benefits

- Business applications hosted on supported and modern AIX infrastructure
 - Upgrading the AIX infrastructure in the DXC Newark datacenter supports high availability and reduces the risk of potential hardware failure
- Improved resiliency, reliability and performance
 - Upgraded AIX infrastructure provides a robust environment for reducing outages and increased performance for hosted applications

3.5 *Business and Customer Issues*

There are no significant issues beyond what has been described elsewhere in this paper.

3.6 *Alternatives*

Alternative 1: Do Nothing - Not selected. This option does not address the need to reduce application outages for the business.

Alternative 2: Defer investment – Not selected. Does not mitigate the risk from running applications on legacy AIX infrastructure. Deferring the investment does not support the modernization of National Grid's AIX infrastructure.

3.7 *Safety, Environmental and Project Planning Issues*

There are no significant issues beyond what has been described elsewhere.



US Sanction Paper

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	The schedule of application migrations are subject to coordination with business application owners and their approval for migration dates	3	2	3	6	9	Mitigate	Manage business expectations	Project schedule may be at risk	Work closely with the respective business application owners to plan and schedule application migrations.
2	Work stoppage may limit the days that Gas Business related application can be migrated.	4	2	3	8	12	Mitigate	Manage business expectations	Project schedule may be at risk	Monitor the work stoppage status throughout the project. Work closely with the respective business application owners to plan and schedule application migrations.
3	Project timeline will be negatively impacted if there are delays completing the sanctioning process	2	2	2	4	4	Mitigate	Engage early with sanction stakeholders and follow up.	Project schedule may be at risk	Monitor the progress of the sanction workflows and approvals.

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A



US Sanction Paper

3.10.3 CIAC / Reimbursement

N/A

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total	
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +		
					2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
5199	AIX Upgrade	+/- 10%	CapEx	1.356	0.679	0.044	0.000	0.000	0.000	0.000	0.000	2.079
			OpEx	0.011	0.111	0.007	0.000	0.000	0.000	0.000	0.000	0.129
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	1.367	0.790	0.051	0.000	0.000	0.000	0.000	0.000	2.208

3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	1.356	0.866	0.000	0.000	0.000	0.000	0.000	2.222
OpEx	0.011	0.065	0.000	0.000	0.000	0.000	0.000	0.076
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	1.367	0.931	0.000	0.000	0.000	0.000	0.000	2.298

Variance (Business Plan-Project Estimate)

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	0.000	0.187	(0.044)	0.000	0.000	0.000	0.000	0.143
OpEx	0.000	(0.046)	(0.007)	0.000	0.000	0.000	0.000	(0.053)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.141	(0.051)	0.000	0.000	0.000	0.000	0.090

3.11.3 Cost Assumptions

This estimate was developed in 2018 using the Standard IT Estimating Methodology. The accuracy level of estimate for each project is identified in Table 3.11.1.



US Sanction Paper

3.11.4 Net Present Value / Cost Benefit Analysis

N/A

3.11.4.1 NPV Summary Table

N/A

3.11.4.2 NPV Assumptions and Calculations

N/A

3.11.5 Additional Impacts

N/A

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Barry Sheils	Business Representative
PDM	Helen Smith	Head of PDM
BRM	Brian Detota	Relationship Manager
PDM	Chris Granata	Program Delivery Director
IT Finance	Michelle Harris	Director
IT Regulatory	Dan DeMauro	Director
DR&S	Elaine Wison	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Svetlana Lyba	Director

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John



US Sanction Paper

Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego

4 Appendices

4.1 Sanction Request Breakdown by Project

N/A

4.2 Other Appendices

4.2.1 Project Cost Breakdown

Project Cost Breakdown \$ (millions)					
Cost Category	sub-category	Value of Work to Date (VOWD)	Forecast to Complete (FTC)	Forecast At Completion (FAC=VOWD+FTC)	Name of Firm(s) providing resources
Personnel	NG Resources	0.101	0.122	0.223	
	SDC Time & Materials	0.000	0.091	0.091	IBM
		0.011	0.003	0.014	WiPro
		0.092	0.078	0.170	DXC
		0.000	-	-	Verizon
	SDC Fixed-Price	0.000	-	-	IBM
		0.000	0.123	0.123	WiPro
		0.000	-	-	DXC
		0.000	-	-	Verizon
		All other personnel	0.000	-	-
	TOTAL Personnel Costs	0.203	0.417	0.620	
Hardware	Purchase	1.426	-	1.426	
	Lease	0.000	-	-	
Software		0.000	-	-	
Risk Margin			-	-	
AFUDC		0.050	0.105	0.155	
Other		0.001	0.006	0.007	
	TOTAL Costs	1.680	0.528	2.208	



US Sanction Paper

4.2.2 Benefiting Operating Companies

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp.- Electric Distr.	Electric Distribution	NY
Massachusetts Electric Company	Electric Distribution	MA
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
Boston Gas Company	Gas Distribution	MA
Narragansett Electric Company	Electric Distribution	RI
Niagara Mohawk Power Corp. - Transmission	Transmission	NY
Niagara Mohawk Power Corp. - Gas	Gas Distribution	NY
New England Power Company – Transmission	Transmission	MA, NH, RI, VT
KeySpan Generation LLC (PSA)	Generation	NY
Narragansett Gas Company	Gas Distribution	RI
Colonial Gas Company	Gas Distribution	MA
Narragansett Electric Company – Transmission	Transmission	RI
National Grid USA Parent	Parent	
Nantucket Electric Company	Electric Distribution	MA
NE Hydro - Trans Electric Co.	Inter Connector	MA, NH
New England Hydro Finance Company Inc.	Inter Connector	MA, NH
KeySpan Energy Development Corporation	Non-Regulated	NY
KeySpan Port Jefferson Energy Center	Generation	NY
New England Hydro - Trans Corp.	Inter Connector	MA, NH
KeySpan Services Inc.	Service Company	
KeySpan Glenwood Energy Center	Generation	NY
Massachusetts Electric Company – Transmission	Transmission	MA
NG LNG LP Regulated Entity	Gas Distribution	MA, NY, RI
Transgas Inc	Non-Regulated	NY
Keyspan Energy Trading Services	Other	NY
KeySpan Energy Corp.	Service Company	
New England Electric Trans Corp	Inter Connector	MA



US Sanction Paper

4.2.3 IT Ongoing Operational Costs (RTB):

There is no impact to RTB as a result of this project.

4.3 *NPV Summary (if applicable)*

N/A

4.4 *Customer Outreach Plan*

N/A



US Sanction Paper

Title:	AVLS - Old 3G Modem Replacement	Sanction Paper #:	USSC-18-230
Project #:	INVP 5226 Capex: S007904	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	6/26/2018
Author:	Rashmi Kadam	Sponsor:	Dan Bunzell, VP NE Electric
Utility Service:	IS	Project Manager:	Craig Costanzo

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of INVP 5226 in the amount of \$4.076M with a tolerance of +/- 10% for the purposes of full implementation.

This sanction amount is \$4.076M broken down into:

- \$3.965M Capex*
- \$0.111M Opex*
- \$0.000M Removal*

1.2 Project Summary

National Grid is currently using modems and toughbooks using Verizon 3G technology. Verizon has announced the 3G shutdown date as 12/30/2019. This project will purchase and replace around 2,000 3G modems in trucks. The project will also install 475 previously purchased toughbooks to replace old toughbooks using Verizon 3G technology. The project will replace approximately 200 Sim cards in CF-53 toughbooks used in the field.

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
5226	Project Type	AVLS - Old 3G Modem Replacement	4.076

1.4 Associated Projects

N/A

1.5 Prior Sanctioning History

N/A



US Sanction Paper

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
October 2019	Project Closure Sanction

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	A significant number of trucks currently using modems and antennas that run on the Verizon 3G platform. Verizon plans to sunset 3G completely by Dec 30, 2019. This will cause 3G modems to cease working, which would disable existing 3G-based functions that provide code blue functionality, automatic vehicle location service, and would impact operations. # NG-EOP G027

1.8 Asset Management Risk Score

Asset Management Risk Score: 41

Primary Risk Score Driver: (Policy Driven Projects Only)

Reliability
 Environment
 Health & Safety
 Not Policy Driven

1.9 Complexity Level

High Complexity
 Medium Complexity
 Low Complexity
 N/A

Complexity Score: 18

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

Yes
 No



US Sanction Paper

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY19-23	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	\$4.076M

1.12 If cost > approved Business Plan how will this be funded?

Re-allocation of budget within the IS business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
CapEx	0.000	2.677	1.288	0.000	0.000	0.000	0.000	3.965
OpEx	0.000	0.083	0.028	0.000	0.000	0.000	0.000	0.111
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	2.760	1.316	0.000	0.000	0.000	0.000	4.076

1.14 Key Milestones

Milestone	Target Date
Start Up	June 2018
Project Sanction	June 2018
Begin Requirements and Design	July 2018
Begin Development and Implementation	September 2018
Move to Production / Last Go Live	August 2019
Project Closure	October 2019

1.15 Resources, Operations and Procurement



US Sanction Paper

Resource Sourcing			
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green

1.16 Key Issues (include mitigation of Red or Amber Resources)

N/A

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative

1.18 List References

N/A



US Sanction Paper

2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on 06/26/2018

- (a) APPROVED this paper and the investment of \$4.076M and a tolerance of +/- 10%
- (b) APPROVE the run-the-business (RTB) of \$0.020M (per annum) for 5 years.
- (c) NOTED that Craig Costanzo is the Project Manager and has the approved financial delegation.

Signature.....Date.....
David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



US Sanction Paper

3 Sanction Paper Detail

Title:	AVLS - Old 3G Modem Replacement	Sanction Paper #:	USSC-18-230
Project #:	INVP 5226 Capex: S007904	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	6/26/2018
Author:	Rashmi Kadam	Sponsor:	Dan Bunzell, VP Electric NE
Utility Service:	IS	Project Manager:	Craig Costanzo

3.1 *Background*

National Grid is using approximately 2,000 modems that run on Verizon 3G networks. These modems are not compatible to run on 4G or LTE networks. Verizon has announced final sunset date for 3G network as December 30, 2019. National Grid uses these modems in significant number of trucks to activate code blue in the event of emergency.

In addition, National Grid Fleet uses Automatic Vehicle Location System (AVLS) to track vehicles real time using GPS. AVLS relies on existing modems in the trucks to connect to network. Once 3G network is cut off, these modems will stop working, posing a significant risk to field worker safety as AVLS tracking and code blue functionality will not work.

National Grid also has about 475 truck-mounted mobile devices that are more than 5 years old and run on 3G networks. These devices support work management tools to the field workers and unavailability can result into productivity loss. The challenges that mobile crews face while using these old devices include:

*** Replacement Parts and Spare Devices Not Available**

The devices fail frequently due to age and the normal wear and tear of operating in a harsh environment. Additionally, the hardware vendor General Dynamics (previously called Itronix) has stopped manufacturing most widely used mobile device at National Grid. Therefore, parts are not available to fix failed devices, leading to device being fully replaced when broken.



US Sanction Paper

*** Underpowered Devices**

Newer versions of some of the applications (such as ArcFM Viewer) need more processing power and disk space than what is available on the existing devices. Therefore, these types of applications do not work well on the old devices.

*** Slow Network Hardware**

Wireless networks have doubled in speed approximately every two years over the last 7-10 years. The devices currently in the field are unable to take advantage of these improved speeds since they only use the old Verizon air/Wi-Fi cards that were installed 7 years ago.

*** Obsolete Operating System**

Some of these ruggedized devices still run on the discontinued Windows XP operating system, which is no longer supported by Microsoft. Therefore, Microsoft is no longer issuing security patches, bug fixes, etc. for the operating system used on these devices. This situation places National Grid and these devices at risk of exposure to viruses and security intrusions.

*** Applications Not Upgradable**

The next versions of the applications that need to be run on these mobile devices are not available for Windows XP. It is imperative that more updated devices are deployed to the field.

In summary, older mobile devices and modems need to be replaced in time before Verizon shuts off 3G network. Key issues are:

- Working Code Blue functionality
- AVLS – Real time vehicle tracking functionality and GPS
- No spare parts to perform minor repairs
- Slow devices with poor network connectivity, due to older hardware
- End-user frustration with the slow and barely functional devices
- Inefficient work environment when vehicles do not have a device

To address this need, 475 new mobile devices will be deployed as part of this project. The devices are previously secured under a separate investment (INVP 4395). The project will secure and deploy 2000 modems in the trucks carrying old 3G modems. Additionally, 200 sim cards will be secured and swapped in toughbooks using 3G sim cards.



US Sanction Paper

3.2 Drivers

The key drivers for this investment are:

- Verizon is sunsetting 3G network by December 30, 2019. Code blue functionality used to track worker location in the event of emergency will not work after 3G sunsetting posing major safety risk
- Older toughbooks using 3G networks will not work after sunsetting resulting into loss of productivity.

3.3 Project Description

This investment is to secure 2000 modems and 200 sim cards and deploy those in the field. The project will also install 475 toughbooks previously secured

- Analysis, by site, of the current inventory as well as unit specific details and an estimated number of new field devices needed at that location.
- Prioritization across all sites to aid the development of a recommended implementation plan relative to the project budget.
- Procurement, and pilot compatible modems
- Install new modems in the trucks
- Install new devices in the trucks

3.4 Benefits Summary

Safety

Real time vehicle tracking and code blue functionality is crucial for safety of National Grid crew in the field. The project will upgrade modems thus mitigating the risk due to sunsetting of Verizon 3G services.

Efficiency / Productivity

Increased reliability and/or efficiencies gained by the availability of newer, faster, and more reliable devices.

Speed / Connectivity

Faster devices with better connectivity through the use of faster air cellular connectivity cards.

Ensure Security

By upgrading to a version of Windows that Microsoft supports, National Grid can be assured that these systems will have access to the latest OS fixes as well a security patches that are lacking in the current systems to help mitigate any potential threat from virus or malware from these systems.



US Sanction Paper

By utilizing the latest wireless technology and the security enhancements that are now built in to the protocol (ie. the use of AES-based encryption with the 802.11i protocol), as well as the incorporation of VPN which will create a secure and encrypted tunnel within this robust protocol, the data being sent wirelessly by these devices will be protected from eavesdropping or man-in-the-middle attacks.

3.5 Business and Customer Issues

N/A

3.6 Alternatives

Alternative 1: Do Nothing

Rejected - This is not a viable option, since Verizon 3G sunset date is fixed and National Grid needs to replace old modems and toughbooks prior to sunsetting.

Alternative 2: Defer

Rejected - This option is not recommended due to time required to replace approximately 2000 modems and 475 toughbooks prior to Verizon sunset date.

Alternative 3: Seeking Other solution

Rejected – Over 50% of infrastructure runs on 4G and introducing a brand new solution will require incremental investments and introducing new application.

3.7 Safety, Environmental and Project Planning Issues

N/A

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	It's possible that additional vehicles with 3G modems are discovered	1	3	2	3	2	Mitigate	Surveys will be performed to confirm the vehicles that exist in the AVLS database extract.	Pre-deployment site visits.	If discovered early enough and additional modems are on hand. rework the schedule and adjust the plan to complete upgrades prior to 4/1/2019.
2	It's possible that the new CF54 Win7 build is not accepted by the Business	2	3	1	6	2	Mitigate	Conduct controlled pilot to test out the new device and image on site at one or two upstate facilities.	Be onsite for all upgrade deployments.	Discovered source of any issues and quickly correct.
3	It's possible that the installers cannot meet our schedule	1	1	3	1	3	Mitigate	We have contacted the installer companies prior to the project sanctioning to ensure their availability for our project requirements	Require daily updates status sheets from the installers. Maintain a weekly call with installer management.	If a potential delay in installation schedule is detected, first attempt to re-arrange current resources to make up for the delay. If none available seek additional



US Sanction Paper

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total	
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +		
5226	AVLS - Old 3G Modem Replacement	Est Lvl (e.g. +/- 10%)	CapEx	0.000	2.677	1.288	0.000	0.000	0.000	0.000	0.000	3.965
			OpEx	0.000	0.083	0.028	0.000	0.000	0.000	0.000	0.000	0.111
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	2.760	1.316	0.000	0.000	0.000	0.000	0.000	4.076



US Sanction Paper

**3.11.2 Project Budget Summary Table
 Project Costs Per Business Plan**

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
\$M								
CapEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OpEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Variance (Business Plan-Project Estimate)

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
\$M								
CapEx	0.000	(2.677)	(1.288)	0.000	0.000	0.000	0.000	(3.965)
OpEx	0.000	(0.083)	(0.028)	0.000	0.000	0.000	0.000	(0.111)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	(2.760)	(1.316)	0.000	0.000	0.000	0.000	(4.076)

3.11.3 Cost Assumptions

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

N/A

3.11.4.2 NPV Assumptions and Calculations

N/A

3.11.5 Additional Impacts

N/A



US Sanction Paper

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Dan Bunzell	Business Representative
PDM	Deb Rollins	Head of PDM
BRM	Rick Sheer	Relationship Manager
PDM	Sally Seltzer	Program Delivery Director
IS Finance	Michelle Harris	Director
IS Regulatory	Dan DeMauro	Director
DR&S	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Director
Enterprise Architecture	Svetlana Lyba	Director

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Anand, Sonny
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



US Sanction Paper

4 Appendices

4.1 Other Appendices

4.1.1 Project Cost Breakdown

Project Cost Breakdown \$ (millions)					
Cost Category	sub-category	VOWD	FTC	FAC=VOWD+FTC	Name of Firm(s) providing
Personnel	NG Resources	0.000	0.286	0.286	
	SDC Time & Materials	0.000	0.124	0.124	IBM
		0.000	-	-	WiPro
		0.000	0.045	0.045	DXC
		0.000	-	-	Verizon
		0.000	-	-	IBM
	SDC Fixed-Price	0.000	-	-	WiPro
		0.000	-	-	DXC
		0.000	-	-	Verizon
		0.000	1.509	1.509	
All other personnel	0.000	1.509	1.509		
TOTAL Personnel Costs	-	1.963	1.963		
Hardware	Purchase	0.000	1.377	1.377	
	Lease	0.000	-	-	
Software		0.000	-	-	
Risk Margin			0.346	0.346	
AFUDC		0.000	0.178	0.178	
Other		0.000	0.210	0.210	
TOTAL Costs		-	4.076	4.076	Should match Financial Summary Total

4.1.2 Benefiting Operating Companies

This investment will benefit NE and NY electric and CMS.

Benefiting Operating Companies Table:

Operating Company Name	Business Area	State
Keyspan Energy Delivery - NY	Gas Distribution	NY
Niagara Mohawk Power Corp – Gas	Gas Distribution	NY
Niagara Mohawk Power	Electric Distribution	NY
Narragansett Gas Company	Gas Distribution	RI
Nantucket Electric Company	Electric Distribution	MA
Massachusetts Electric Company	Electric Distribution	MA
Narragansett Electric Company	Electric Distribution	RI

4.1.3 IS Ongoing Operational Costs (RTB):



US Sanction Paper

This project will increase/decrease IS ongoing operations support costs as per the following table. These are also known as Run the Business (RTB) costs.

all figures in \$ thousands						
INV ID:	5226				Forecast Date:	05/31/18
Investment Name:	AVLS - UNY Hardware Upgrade				Go-Live Date:	6/30/2019
Project Manager:	Alex Koshurin			PDM:	Sally Seltzer	
All figures in \$ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 18/19	FY 19/20	FY 20/21	FY 21/22	FY 22/23	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB						-
Last Sanction Business Net Impact to RTB						-
Last Sanction Total Net Impact to RTB	-	-	-	-	-	-
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB						-
Business Budgeted Net Impact to RTB						-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	-	15.0	20.0	20.0	20.0	75.0
Business Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	-	(15.0)	(20.0)	(20.0)	(20.0)	(75.0)
Business Budgeted Net Impact to RTB Variance	-	-	-	-	-	-

4.2 NPV Summary

N/A

4.3 Customer Outreach Plan

N/A



US Sanction Paper

Title:	Network Modernization	Sanction Paper #:	USSC-18-313 v2
Project #:	INVP 5309 Capex: S007971	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	3/13/2019
Author:	Morgan Matthews / Andrew Yee	Sponsor:	Barry Sheils VP IT Infrastructure & Operations
Utility Service:	IT	Project Manager:	Andrew Costello

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of INVP 5309 in the amount of \$7.911M with a tolerance of +/- 10 for the purposes of Development and Implementation.

This sanction amount is \$7.911M broken down into:

- \$ 5.655M Capex
- \$ 2.256M Opex
- \$ 0.000M Removal

1.2 Project Summary

The Network Modernization Program has identified a series of projects that will modernize the National Grid network (replacing outdated, aged and unsupported network equipment and streamlining processes). The paper request funds for the following initiatives listed under the Program INVP 5309 - Network Modernization:

- 5310: Governance
 - Video Conferencing (EOS Maintenance Model / Webex Video Bridging and Tandberg Replacement)
 - WAAS (Wide Area Application Service) Decommissioning
 - SRST (Survivable Remote Site Telephony) Decommissioning
- 5311: InfoBlox / IP Platform Management
- 5312: Ethernet/SD-WAN (Software Defined-Wide Area Network) Upgrade
- 5313: Zscaler Cloud Security Gateway
- 5314: eBond/ Non-Standard Service Request (NSSR)/Service Catalog



US Sanction Paper

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
INVP 5309 Capex: S007971		Network Modernization	7.911

1.4 Associated Projects

N/A

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Potential Investment Tolerance
10/16/18	USSC	\$2.991M	\$4.844	Partial	25%

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
December 2019	Project Closure Sanction

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input checked="" type="radio"/> Other	This Program is to modernize the National Grid Network.



US Sanction Paper

1.8 Asset Management Risk Score

Asset Management Risk Score: 41

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability
 Environment
 Health & Safety
 Not Policy Driven

1.9 Complexity Level

- High Complexity
 Medium Complexity
 Low Complexity
 N/A

Complexity Score: 22

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

- Yes
 No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IT Investment Plan FY20 - 24	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	0.412M

1.12 If cost > approved Business Plan how will this be funded?

Re-allocation of budget within the IT business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.



US Sanction Paper

1.13 Current Planning Horizon

	Prior Yrs	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
\$M		2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	
CapEx	4.635	1.021	0.000	0.000	0.000	0.000	0.000	5.655
OpEx	1.856	0.400	0.000	0.000	0.000	0.000	0.000	2.256
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	6.491	1.420	0.000	0.000	0.000	0.000	0.000	7.911

1.14 Key Milestones

Milestone	Target Date: (Month Year)
Start Up	September 2018
Project Sanction	March 2019
Begin Development and Implementation	January 2019
Move to Production / Last Go Live	September 2019
Project Closure	December 2019

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input type="checkbox"/> Contractor	
Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green



US Sanction Paper

1.16 Key Issues (include mitigation of Red or Amber Resources)

N/A

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative

1.18 List References

N/A



US Sanction Paper

2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on 03/13/2019:

- (a) APPROVED this paper and the investment of \$7.911M and a tolerance of +/- 10% for the purposes of Development and Implementation.
- (b) APPROVED the run-the-business (RTB) of \$0.032M for the first year, \$1.989 for the second year, and \$2.472 (per annum) for 3 years.
- (c) NOTED that Andrew Costello is the Project Manager and has the approved financial delegation.

Signature.....Date.....
David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



US Sanction Paper

3 Sanction Paper Detail

Title:	Network Modernization	Sanction Paper #:	USSC-18-313 v2
Project #:	INVP 5309 Capex: S007971	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	3/13/2019
Author:	Morgan Matthews / Andrew Yee	Sponsor:	Barry Sheils VP IT Infrastructure & Operations
Utility Service:	IT	Project Manager:	Andrew Costello

3.1 Background

The Network Modernization Program has identified a series of projects that will modernize the National Grid network (replacing outdated, aged and unsupported network equipment and streamlining processes). The paper request funds for the following initiatives listed under the Program INVP 5309 - Network Modernization:

- 5310: Governance
 - Video Conferencing (EOS Maintenance Model / Webex Video Bridging and Tandberg Replacement)
 - WAAS (Wide Area Application Service) Decommissioning
 - SRST (Survivable Remote Site Telephony) Decommissioning
- 5311: InfoBlox / IP Platform Management
- 5312: Ethernet/SD-WAN Upgrade
- 5313: Zscaler Cloud Security Gateway
- 5314: eBond/NSSR/Service Catalog

INVP 5310 – Network Modernization Governance

A). Video Conferencing: EOS Maintenance Model, Webex Video Bridging, and Tandberg Replacement

This solution was developed in partnership with Verizon and EOS to deliver an enhanced video support service and on premise video bridging functionality that enhances the Webex video bridging in use today. This solution provides for video bridges (Webex Video Mesh (WVM) bridges) to be deployed in the US Verizon Strategic Internet Gateways (VSTIGs) and dedicated for National Grid’s use.

Verizon’s third party vendor, EOS, will take over management and maintenance of the video platform from Verizon’s current third party vendor (YorkTel). In addition, four new video units will replace Tandberg units that are at end of life. The new video units will be installed in the following US locations: (2) Syracuse, NY(1) Metrotech, NY(1) Albany, NY.



US Sanction Paper

B). WAAS (Wide Area Application Service) Decommissioning

As part of the Verizon contract renewal extension, Verizon identified that National Grid would be more efficient if the WAAS was decommissioned and physically removed in thirty-one (31) locations. Traffic studies indicate that this technology is at end of life, end of support, and no longer provides an effective solution for enhancing WAN performance.

C). SRST (Survivable Remote Site Telephony) Decommissioning

As part of a Verizon contract renewal extension, National Grid determined it could take advantage of efficiency if SRST were decommissioned as it is largely obsolete due to the proliferation of cell phones. National Grid has requested Verizon to remove the SRST from (116) US National Grid non-operational critical sites.

INVP 5311 – Network Modernization InfoBlox / IP Platform Management

The Internet Protocol Management Platform provides Domain Name System (DNS), Dynamic Host Configuration Protocol (DHCP) and manages IP addresses, which every device on the National Grid network requires to function. The DNS service translates to user-friendly IP addresses which can be recognized by users and programs to reference devices on the network.

The existing IP management platform reached end-of-life in 2018 and needs to be replaced with an alternative service. It has a complex integration process and minimal automation functionality resulting in significant integrating delays and no self-service capability. At end of life, the software and hardware will no longer be serviced via software upgrades, patches or hardware replacements and left vulnerable to security attack and operational risk. Should there be a failure, this would be resolved on a reasonable endeavors basis only.

Upgrading to InfoBlox allows an interface with Service Now via an API (Application Program Interface) to enable a self-service infrastructure through automation which leads to efficiency for National Grid.

INVP 5312 – Network Modernization Ethernet/SD-WAN Upgrade

The current Network architecture is experiencing performance and capacity issues that impacts our ability to successfully manage the growing network demand for National Grid's cloud-based digital initiatives, infrastructure and operational upgrades.

- **WAN Ethernet Network Upgrade**

The majority of National Grid's WAN circuits are based on the outdated Time Division Multiplexing (TDM) technology. Migrating to Ethernet technology will be more efficient and allow for bandwidth upgrades in a more efficient manner.



US Sanction Paper

This project is being coordinated with the SD-WAN project. Any sites in scope of the SD-WAN project which do not already have an Ethernet connection will be migrated before they can be implemented. We are currently looking at seven (7) sites that require procurement, installation, testing and replacement of local access circuits.

- **SD-WAN (Software Defined – Wide Area Network) Upgrade**

The current network architecture is experiencing performance and capacity issues that impact our ability to successfully manage the growing network demand for National Grid's cloud -based digital initiatives, infrastructure and operational upgrades.

The existing WAN (Wide Area Network) architecture is not able to deliver the application performance as desired for National Grid business, *i.e.*, the global application deployment process is cumbersome and error prone due to complexity on tools, scripts and procedures. Implementing SD-WAN (Software Defined Wide Area network) architecture can efficiently manage National Grid's network traffic, application deployment and implement routing based on business application requirements.

The SD-WAN architecture upgrade will increase agility by simplifying network policy configuration, management, and provide higher performance by leveraging multiple paths and broadband connections.

There are twenty-five (25) sites targeted for the SD WAN architecture upgrade.

INVP 5313 – Network Modernization Zscaler Cloud Security Gateway

Part of the Network Modernization program is to implement a cloud-based internet security solution, Zscaler Internet Access (ZIA), to support the increased security requirements of software-defined networking and support the increased proxy port demand of Office 365. This will allow National Grid to use online collaborative tools.

This project will also enable a cloud platform service to direct all National Grid users through secured gateway, *i.e.*, National Grid corporate users onsite and remote will access National Grid's applications based on National Grid's security policy in a seamless manner.

National Grid plans to use software defined networking (SD WAN) to route internet traffic from the sites enabled for SD WAN directly to the Internet (local internet breakout) and thereby bypass the National Grid WAN and VSTIG infrastructure (that is, the current Internet Security). To make the SD-WAN local Internet breakout solution secure, a cloud-based proxy service was selected as the most appropriate solution. Zscaler will provide the Internet controls for access to external sites and feed the results and required logs into Digital Risk & Security (DR&S) security tools to provide security and event alerting.



US Sanction Paper

The implementation of Zscaler will reduce the usage of existing National Grid's Multi-Protocol Label Switching (MPLS) private network from 30% to 40%.

A workshop will be conducted to better understand Zscaler Private Access(ZPA). To see if ZPA is viable to replace current Juniper Virtual Private Network (VPN) solution and associated Network Connect client with a Zscaler security platform services in coordination with the Zscaler Private Access (ZPA) solution

INVP 5314 – Network Modernization eBond/NSSR (Non-Standard Service Request)/Service Catalog

As part of the Verizon contract renewal extension, this project will remove manual processes, and refine / automate existing processes to create a more efficient end user experience by delivering three initiatives:

- **E-Bond for Service Requests (E-Bonding is the act of automating the data exchange between business enterprises to reduce or remove manual intervention)**
 - Mapping of all tasks currently undertaken by the manual process (swivel chair) for Service Request Management. (Moves, Adds, Changes, Deletions (MACD))
 - Creation of automated process for exchanging, acknowledging receipt and fulfilment of requests between ETMS (Enterprise Ticket Management System) and ServiceNow
 - Synchronizing the systems so that notifications can be triggered
 - Enabling more uniform processing and tracking of requests for more accurate reporting

- **Service Catalog Integration**
 - Establish a catalog of items frequently procured from Verizon in ServiceNow
 - Establish an interim version of the catalog for use while ServiceNow Catalog is being created
 - Create a governance process around the use of the Service Catalog

- **NSSR Automation**
 - Establish an automated instance of the NSSR process with Verizon in ServiceNow
 - Create a governance process around the use of the NSSR process in ServiceNow



US Sanction Paper

- Include suitable functionality to enable other vendors to be onboarded

3.2 Drivers

The main driver of this program is a modernized network for Infrastructure.

3.3 Project Description

INVP #	Project Title	Project Description
Network Modernization: Governance		
5310 CAPEX \$0.599M OPEX \$0.177M	Video Conferencing Turn Down of the WAAS US Decommission of the SRST	<p>This project is to deliver enhance video support and on premise video bridging functionality that enhances the Webex video bridging in use today. Verizon’s third party vendor EOS will take over management and maintenance of the video platform from Verizon’s current third party vendor. In addition, four new video units will be installed in conference rooms that had end of life Tandberg units.</p> <p>Verizon’s engineering traffic studies have identified Wide Area Application Service (WAAS) does not provide an effective solution for enhancing WAN performance at most of the sites where it was deployed. This project is to disable and physically remove the WAAS for thirty-one (31) locations.</p> <p>With the increase of cell phones, there is no longer a need for the survivable remote site telephony (SRST) in non-operational office sites to make outbound calls in the event of a WAN failure. National Grid has requested Verizon to remove the aging SRST technology from 116 sites that do not have a control center functional requirement for continued outbound calling.</p>
Network Modernization: InfoBlox		
5311 CAPEX \$2.872M	InfoBlox	This project will replace the current IP management platform, (BP Diamond) which reached end of life in 2018, by InfoBlox to provide better IP Management platform with secure DHS, DHCP.



US Sanction Paper

OPEX \$0.264M		
Network Modernization: Ethernet/SD-WAN Upgrade		
5312 CAPEX \$1.468M OPEX \$0.171M	WAN Ethernet Network Upgrade SD-WAN Upgrade	<p>This project is a pre-requisite for the SD-WAN project, which will migrate WAN Circuits on the existing sites to an Ethernet interface to achieve cost benefits by implementing the SD-WAN project.</p> <p>This project will be implementing SD-WAN (Software Defined Wide Area network) architecture to improve network performances and capacity issues, and to successfully manage the growing network demand for cloud-based digital IT solutions by replacing the existing WAN (Wide Area Network) architecture that is not able to deliver the desired network performance and capabilities.</p>
5313 CAPEX \$0.463M OPEX \$1.142M	Zscaler Cloud Security Gateway	<p>With the increase of cloud based services, such as Office 365, being used across National Grid, this project will implement Zscaler Cloud Security Gateway to provide internet security controls for access to external sites and provide logs for DR&S security tools which will provide security and event alerting identifying and preventing cyber-attack.</p>
Network Modernization: eBond/NSSR/SVC Catalogue		
5314 CAPEX \$0.252M OPEX \$0.093M	Ebond NSSR	<p>This project will provide better IT service management by integrating the National Grid Service Now tool and Verizon Service Request Management (SRM) tool (case exchange), to efficiently manage IT service requests.</p> <p>This project will streamline the Non-Standard Service Request (NSSR) process between National Grid and Verizon to make the process more user friendly.</p>



US Sanction Paper

	Service Catalog	This project will enable end users (employees, suppliers and vendors) to raise any service request through the Service Now tool (<i>i.e.</i> , via Service Catalog) and have the service fulfilled. The Service Catalog includes information about deliverables, prices, contact points, ordering and request Processes. Based on the approval process the requested service will be fulfilled.
--	-----------------	--

3.4 Benefits Summary

- The current end of life BT IP management platform will be retired and services will have moved across to a new, supported platform
- An IP address self-service request portal will be deployed
- Thirty-three (33) sites connected via SD-WAN resulting in improved operational support
- Local internet breakout will improve responsiveness of internet applications and reduce bandwidth requirement of VSTIG Internet connections
- Central Policy Management will reduce time of wide scale network changes
- Implementation of the Zscaler, which is an enabler for the SD-WAN project and will immediately support the traffic volumes estimated for O365
- More standardized and user friendly interface with Service Catalog
- Streamline the NSSR process

3.5 Business and Customer Issues

N/A

3.6 Alternatives

Alternative 1: Defer project/ Do Nothing –

Rejected: This option is not viable as it will not address network modernization and the benefits listed in Section 3.4.

Indicative Costs: N/A

3.7 Safety, Environmental and Project Planning Issues

There are no significant issues beyond what has been described elsewhere.



US Sanction Paper

3.8 Execution Risk Appraisal

Risk Breakdown Structure Category	Qualitative Assessment / Risk Response Strategy					Risk Score
	Risk ID + Title	IF Statement	THEN Statement	Risk Response Strategy		
1. Weather	R1 - Weather	IF there are adverse weather conditions	THEN key change activities could be impacted thereby impacting project timescales	Accept	Effective and proactive planning will be critical as a workaround	9
2. Additional Scope	R2 - Additional Scope	IF the scope changes currently under review are required	THEN there can an impact to cost and the overall schedule.	Mitigate	Utilize the risk margin to absorb the additional cost to avoid re-sanction. Change process will be utilized for any areas that can not be covered within the risk margin.	9
3. Security	R3 - DR&S	IF DR&S is implementing the same security policies, procedures, that are in place today and identify additional security or penn testing is required	THEN DR&S will open up risks in the Archer database for Acceptance, Mitigation, Transfer, or Avoidance.	Accept	Senior leadership has agreed to implementing a "like for like" environments and will accept the risks. Change process will be utilized for any areas that need to be included and added in as new scope.	9

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total	
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +		
					2019/20	2020/21	2021/22	2022/23	2023/24	2024/25		
INVP 5309 Capex: S007971	Network Modernization	Est Lvl (e.g. +/- 10%)	CapEx	4.635	1.021	0.000	0.000	0.000	0.000	0.000	0.000	5.655
			OpEx	1.856	0.400	0.000	0.000	0.000	0.000	0.000	2.256	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	6.491	1.420	0.000	0.000	0.000	0.000	0.000	7.911	



US Sanction Paper

3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1 2019/20	Yr. 2 2020/21	Yr. 3 2021/22	Yr. 4 2022/23	Yr. 5 2023/24	Yr. 6 + 2024/25	
\$M								
CapEx	4.635	0.685	0.000	0.000	0.000	0.000	0.000	5.320
OpEx	1.856	0.323	0.000	0.000	0.000	0.000	0.000	2.179
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	6.491	1.008	0.000	0.000	0.000	0.000	0.000	7.499

Variance (Business Plan-Project Estimate)

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1 2019/20	Yr. 2 2020/21	Yr. 3 2021/22	Yr. 4 2022/23	Yr. 5 2023/24	Yr. 6 + 2024/25	
\$M								
CapEx	0.000	(0.336)	0.000	0.000	0.000	0.000	0.000	(0.336)
OpEx	0.000	(0.077)	0.000	0.000	0.000	0.000	0.000	(0.077)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	(0.412)	0.000	0.000	0.000	0.000	0.000	(0.412)

3.11.3 Cost Assumptions

The cost estimates come from proposals from multiple vendors (Verizon, DXC) coupled with National Grid labor to manage and implement these solutions. All proposals were reviewed and validated through R&D and payment milestone schedules were agreed to in the calendar year.

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

N/A

3.11.4.2 NPV Assumptions and Calculations

N/A

3.11.5 Additional Impacts

N/A

3.12 Statements of Support



US Sanction Paper

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Adriano Antiquera	Business Representative
Business Partner (BP)	Caitlin Davidson	Relationship Manager
Program Delivery Management (PDM)	Doug Campbell	Program Delivery Director
IT Finance	Michelle Harris	Manager
IT Regulatory	Dan DeMauro	Director
Digital Risk and Security (DR&S)	Peter Shattuck	Manager
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Svetlana Lyba	Manager

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego

4 Appendices

4.1 Sanction Request Breakdown by Project

N/A



US Sanction Paper

4.2 Project Cost Breakdown

Project Cost Breakdown \$ (millions)					
Cost Category	sub-category	Value of Work to Date (VOWD)	Forecast to Complete (FTC)	Forecast At Completion (FAC=VOWD+FTC)	Name of Firm(s) providing resources
Personnel	NG Resources		-	-	
	SDC Time & Materials		-	-	IBM
			-	-	WiPro
			-	-	DXC
			-	-	Verizon
	SDC Fixed-Price		-	-	IBM
			-	-	WiPro
			-	-	DXC
	All other personnel		-	-	Verizon
	TOTAL Personnel Costs	-	-	-	
Hardware	Purchase		-	-	
	Lease		-	-	
Software			-	-	
Risk Margin			-	-	
AFUDC			-	-	
Other		4.208	3.703	7.911	
TOTAL Costs		4.208	3.703	7.911	



US Sanction Paper

4.3 Benefiting Operating Companies

Operating Company Name	Business Area	State
National Grid USA Parent	Parent	
KeySpan Energy Development Corporation	Non-Regulated	NY
KeySpan Services Inc.	Service Company	
KeySpan Energy Corp.	Service Company	
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
KeySpan Generation LLC (PSA)	Generation	NY
KeySpan Glenwood Energy Center	Generation	NY
KeySpan Port Jefferson Energy Center	Generation	NY
Keyspan Energy Trading Services	Other	NY
Niagara Mohawk Power Corp.- Electric Distr.	Electric Distribution	NY
Niagara Mohawk Power Corp. - Gas	Gas Distribution	NY
Niagara Mohawk Power Corp. - Transmission	Transmission	NY
Massachusetts Electric Company	Electric Distribution	MA
Massachusetts Electric Company – Transmission	Transmission	MA
Nantucket Electric Company	Electric Distribution	MA
Boston Gas Company	Gas Distribution	MA
Colonial Gas Company	Gas Distribution	MA
Narragansett Gas Company	Gas Distribution	RI
Narragansett Electric Company	Electric Distribution	RI
Narragansett Electric Company – Transmission	Transmission	RI
New England Power Company – Transmission	Transmission	MA,NH,RI,VT
New England Hydro - Trans Corp.	Inter Connector	MA, NH
New England Electric Trans Corp	Inter Connector	MA
NG LNG LP Regulated Entity	Gas Distribution	MA,NY,RI
Trans Gas Inc.	Non-Regulated	NY



US Sanction Paper

4.4 IT Ongoing Operational Costs (RTB):

This project will increase/decrease IT ongoing operations support costs as per the following table. These are also known as Run the Business (RTB) costs.

All figures in \$ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 18/19	FY 19/20	FY 20/21	FY 21/22	FY 22/23	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB						-
Last Sanction Business Net Impact to RTB						-
Last Sanction Total Net Impact to RTB	-	-	-	-	-	-
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB						-
Business Budgeted Net Impact to RTB						-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	32.2	1,989.8	2,472.7	2,472.7	2,472.7	9,440.1
Business Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	(32.2)	(1,989.8)	(2,472.7)	(2,472.7)	(2,472.7)	(9,440.1)
Business Budgeted Net Impact to RTB Variance	-	-	-	-	-	-

4.5 NPV Summary (if applicable)

N/A

4.6 Customer Outreach Plan

N/A



US Sanction Paper

4.7 Glossary

Terminology/Jargon/Abbreviation	Meaning
AD	Active Directory
BRD	Business Requirements Document
CNI	Critical National Grid Infrastructure
DAAS	Desktop-as-a-service
DNS	Domain Name System
DHCP	Dynamic Host Control Protocol
DR&S	Digital Risk & Security
EOS	Verizon's third party vendor
InfoBlox	Company that focuses on managing and identifying devices connect to networks – specifically for the DNS, DHCP and IP address management
IPAM	Internet Protocol Address Management System
L2 / L3	Layer 2 / Layer 3
NG	National Grid
O365	Office 365
PAC	Proxy Auto Configuration
RTO	Recovery Time Objective
RPO	Recovery Point Objective
SD-WAN	Software Defined - Wide Area Network
SLA	Service Level Agreement
SRM	Service Request Management
SRST	Survivable Remote Site Telephony
SSL	Secured Socket Layer
SSMA	Single Scan Multi-Action
Tandberg	Company offering video conferencing solutions
TDM	Time-division multiplexing (TDM) is a method of transmitting and receiving independent signals over a common signal path by means of synchronized switches at each end of the transmission line so that each signal appears on the line only a fraction of time in an alternating pattern
UAT	User Acceptance Testing
VPN	Virtual Private Network
vSTIGS	A scalable plugin-based PowerCLI application intended for setting and auditing of security policies for VMware vSphere 5.X environments
WAAS	Wide Area Application Service
WAN	Wide Area Network
WVM	Webex Video Mesh
ZAB	Zscaler Authentication Bridge
ZIA	Zscaler Internet Access
ZPA	Zscaler private access
Zscaler	Global cloud-based information security company



US Sanction Paper

Title:	US T430 Refresh	Sanction Paper #:	USSC-18-301
Project #:	INVP 5316 Capex: S007956	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	2/5/2019
Author:	Neha Verma / Donna McGuirk	Sponsor:	Barry Sheils, VP Infrastructure and Operations
Utility Service:	IT	Project Manager:	Donna McGuirk

1 Executive Summary

1.1 Sanctioning Summary

This paper requests full sanction of INVP5316 in the amount of \$2.433M with a tolerance of +/- 10% for the purposes of full implementation.

This sanction amount is \$2.433M broken down into:

- \$2.280M Capex*
- \$0.153M Opex*
- \$0.000M Removal*

1.2 Project Summary

This policy-driven project will refresh approx. 1,500 laptops devices in the US to the T470 model. This project will replace all devices over 4 years old as of December 31, 2018, with models T430, T440, T450, X220 and X230s. The bulk of the devices being replaced by this project are T430. This is to ensure that the end user device estate continues to be reliable, remains secure and can meet new business demands. It is important that the hardware can support the new application and security tool deployments to the standard operating environments (SOE's).

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
INVP 5316 Capex: S007956		T 430 Device Replacement	2.433
Total			2.433



US Sanction Paper

1.4 Associated Projects

Not Applicable

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Potential Investment Tolerance
9/25/2018	USSC	\$1.548M	\$2.062	Partial	+/-25%

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
March 2019	Project Closure Sanction

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	This policy driven project will refresh approx. 1500 laptop devices in the US older than 4 years old to the T470 model. Policy Reference: - As per the planned IT Infrastructure RIIO T2 Strategy, device refresh and modernization capabilities are required to support end user devices including a refresh on a four-year cycle - 25% a year

1.8 Asset Management Risk Score

Asset Management Risk Score: 37

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability
 Environment
 Health & Safety
 Not Policy Driven



US Sanction Paper

1.9 Complexity Level

High Complexity Medium Complexity Low Complexity N/A

Complexity Score: 19

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

Yes No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IT Investment Plan FY19 - FY 23	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	\$2.433M

1.12 If cost > approved Business Plan how will this be funded?

Re-allocation of budget within the IT business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.



US Sanction Paper

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	0.000	2.280	0.000	0.000	0.000	0.000	0.000	2.280
OpEx	0.000	0.153	0.000	0.000	0.000	0.000	0.000	0.153
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	2.433	0.000	0.000	0.000	0.000	0.000	2.433

1.14 Key Milestones

Milestone	Target Date: (Month Year)
Partial Sanction	September 2018
Begin Requirements and Design	September 2018
Project Sanction	February 2019
Begin Development and Implementation	February 2019
Move to Production / Last Go Live	February 2019
Project Closure	March 2019

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input type="checkbox"/> Contractor	
Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			



US Sanction Paper

Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
--	---------------------------	-----------------------------	--

1.16 Key Issues (include mitigation of Red or Amber Resources)

Not Applicable

1.17 Climate Change

Contribution to National Grid’s 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative

1.18 List References

Not Applicable



US Sanction Paper

2 Decisions

I:

(a) APPROVE this paper and the investment of \$2.433M and a tolerance of +/-10% for the purposes of Full Implementation

(b) NOTE that Donna McGuirk is the Project Manager and has the approved financial delegation.

Signature.....Date.....
David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



US Sanction Paper

3 Sanction Paper Detail

Title:	US T430 Refresh	Sanction Paper #:	USSC-18-301
Project #:	INVP 5316 Capex: S007956	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	2/5/2019
Author:	Neha Verma / Donna McGuirk	Sponsor:	Barry Sheils, VP Infrastructure and Operations
Utility Service:	IT	Project Manager:	Donna McGuirk

3.1 *Background*

Laptop performance issues have been introduced to the environment because of new application and security tool deployments to the standard operating environments (SOE's) on legacy T430 laptops.

3.2 *Drivers*

The main drivers of the project are to ensure that the end user device estate continues to be reliable, remains secure and can meet new business demands.

There is a necessity to realize value of the project as early as possible, as well as having a highly efficient project team, closer alignment with the business and improved project visibility. This project will therefore be incorporating some agile techniques to try and help achieve these goals. It is not expected that a full agile / scrum approach will be adhered to but the main agile principles will be followed wherever possible:

- collaborative working
- iterative delivery
- business engagement
- flexibility to change and adapt
- frequent feedback loops

There is a need to refresh the devices as quickly as possible as the performance issues are impacting productivity, user experience and morale.

3.3 *Project Description*

During the implementation of the project, the following will be accomplished:

- Roll out remaining devices.



US Sanction Paper

3.4 *Benefits Summary*

- Improved performance of the laptops will enable users to work more efficiently
- Improved employee morale. User's frustration will be reduced by the higher performance of the new laptops.

3.5 *Business and Customer Issues*

There are no significant business issues beyond what has been described elsewhere.

3.6 *Alternatives*

Alternative 1: Defer project/ Do Nothing – This option is not viable as it will not address the business driver or achieve the business benefits. Laptop performance will continue to be an issue.

Note :- No other engagement options are available due to contractual obligations under the IT End User Services Contract.

3.7 *Safety, Environmental and Project Planning Issues*

There are no significant issues beyond what has been described elsewhere.



US Sanction Paper

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	SOE is not available in production (Windows 7 and Office 2016)	4	2	4	8	16	Mitigate	Operations is working with DXC to test the SOE (windows 7 and Office 2016) to ensure we have an SOE for production	Can't get the SOE to work with Office 2016 on devices	Have DXC manually remove Office 2010 and install Office 2016
2	Delays in ordering/delivering T470s	5	2	5	10	25	Mitigate	DXC has a number of laptops in inventory and will pull those to begin imaging. DXC will order devices prior to a PO being created at NG	Time estimates for delivery may be to aggressive and delivery may take longer than anticipated	Acceptance
3	Installing SOE image on T470 - 5,500	5	4	5	20	25	Mitigate	Change Request is being created to increase DXC resources. Team is asking that the new laptops be pre-loaded with Windows 7 so that it will save time on imaging the devices.	Not enough time/resources to install the image on 5,500 devices	Acceptance
4	End User experience will be poor - data transfer, possibility of missing applications	4	3	5	12	20	Mitigate	Change Request is being created to increase DXC resources. Team is being asked for creative, quick, smooth, easy ways of transferring user data from old machine to new.	may miss applications that an end user has on existing laptop due to missing information in asset inventories. End users may not transfer data in time or at all. End User may not be able to get to location for drop-off/pickup of new device.	Acceptance

3.9 Permitting

Not applicable

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

Not applicable

3.10.3 CIAC / Reimbursement

Not applicable



US Sanction Paper

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total	
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +		
					2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
INVP 5316 Capex: S007956	T 430 Device Replacement	Est Lvl (e.g. +/- 10%)	CapEx	0.000	2.280	0.000	0.000	0.000	0.000	0.000	0.000	2.280
			OpEx	0.000	0.153	0.000	0.000	0.000	0.000	0.000	0.000	0.153
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	2.433	0.000	0.000	0.000	0.000	0.000	0.000	2.433

3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OpEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Variance (Business Plan-Project Estimate)

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	0.000	(2.280)	0.000	0.000	0.000	0.000	0.000	(2.280)
OpEx	0.000	(0.153)	0.000	0.000	0.000	0.000	0.000	(0.153)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	(2.433)	0.000	0.000	0.000	0.000	0.000	(2.433)

3.11.3 Cost Assumptions

Not applicable

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

Not Applicable



US Sanction Paper

3.11.4.2 NPV Assumptions and Calculations

Not Applicable

3.11.5 Additional Impacts

Not applicable

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	John Gilbert	Business Representative
Business Partner (BP)	Caitlin Davidson	Relationship Manager
Program Delivery Management (PDM)	Ken Wermann	Program Delivery Director
IT Finance	Michelle Harris	Director
IT Regulatory	Dan DeMauro	Director
Digital Risk and Security (DR&S)	Peter Shattuck	Director
Service Delivery	Mark Mirizio	Director
Enterprise Architecture	Joseph Clinchot	Director

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



US Sanction Paper

4 Appendices

4.1 Sanction Request Breakdown by Project

Not Applicable

4.2 Project Cost Breakdown

Project Cost Breakdown \$ (millions)						
Cost Category	sub-category	Value of Work to Date (VOWD)	Forecast to Complete (FTC)	Forecast At Completion (FAC=VOWD+FTC)	Name of Firm(s) providing resources	
Personnel	NG Resources	0.053	0.032	0.085		
	SDC Time & Materials			-	-	IBM
				-	-	WiPro
			0.240	0.240	0.240	DXC
				-	-	Verizon
	SDC Fixed-Price			-	-	IBM
				-	-	WiPro
			0.074	-	0.074	DXC
				-	-	Verizon
	All other personnel	0.300	-	0.300		
TOTAL Personnel Costs	0.427	0.272	0.699			
Hardware	Purchase	1.388	-	1.388		
	Lease		-	-		
Software			-	-		
Risk Margin			-	-		
AFUDC			0.040	0.040		
Other			0.306	0.306		
TOTAL Costs		1.815	0.618	2.433		



US Sanction Paper

4.3 Benefiting Operating Companies

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp.- Electric Distr.	Electric Distribution	NY
Niagara Mohawk Power Corp. - Gas	Gas Distribution	NY
Niagara Mohawk Power Corp. - Transmission	Transmission	NY
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
Massachusetts Electric Company	Electric Distribution	MA
Nantucket Electric Company	Electric Distribution	MA
Boston Gas Company	Gas Distribution	MA
Narragansett Electric Company	Electric Distribution	RI
Narragansett Gas Company	Gas Distribution	RI
KeySpan LNG LP Regulated Entity	Generation	NY
KeySpan Generation LLC (PSA)	Generation	NY
Transgas Inc	Non-Regulated	NY

4.4 IT Ongoing Operational Costs (RTB):

No impacts to IT ongoing operational costs (RTB) as a result of this project



US Sanction Paper

Title:	Lease Accounting Updates and Contract Management	Sanction Paper #:	USSC-19-027
Project #:	INVP 5360 CapEx: S008007	Sanction Type:	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	2/12/2019
Author / NG Representative:	Anil Garg / Ella Weisbord	Sponsor:	Kate Sturgess, VP US Financial Controller
Utility Service:	IT	Project Manager:	Samir Parikh

1 Executive Summary

1.1 Sanctioning Summary

This paper requests partial sanction of INVP 5360 in the amount of \$2.100M with a tolerance of +/- 10% for the purposes of Requirements and Design.

This sanction amount is \$2.100M broken down into:

- \$1.400M Capex*
- \$0.700M Opex*
- \$0.000M Removal*

NOTE the potential investment of \$5.621M with a tolerance of +/- 25% contingent upon submittal and approval of a Project Sanction paper following completion of Requirements and Design.

1.2 Project Summary

This initiative will support the need to modify existing processes to adhere to the new leasing accounting standard. This project will ensure full compliance with International Financial Reporting Standards 16 (IFRS 16) and Accounting Standards Codification topic 842 (ASC 842) for US Generally Accepted Accounting Principles (GAAP) & International Financial Reporting Standards (IFRS) accounting standards for all lease categories identified by National Grid.

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
INVP 5360 CapEx: S008007		Lease Accounting Updates and Contract Management	5.621
Total			5.621



US Sanction Paper

1.4 Associated Projects

N/A

1.5 Prior Sanctioning History

N/A

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
February 2019	Project Sanction

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input checked="" type="radio"/> Mandatory <input type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	This project will ensure compliance to accounting standards IFRS16 and ASC842 by US GAAP and IFRS.

1.8 Asset Management Risk Score

Asset Management Risk Score: 42

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability
 Environment
 Health & Safety
 Not Policy Driven

1.9 Complexity Level

- High Complexity
 Medium Complexity
 Low Complexity
 N/A

Complexity Score: 24



US Sanction Paper

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

Yes No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IT Investment Plan FY19 - 23	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	\$0.221M

1.12 If cost > approved Business Plan how will this be funded?

Re-allocation of budget from US Finance to the IT business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
CapEx	0.000	3.877	1.136	0.000	0.000	0.000	0.000	5.013
OpEx	0.000	0.494	0.114	0.000	0.000	0.000	0.000	0.608
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	4.371	1.250	0.000	0.000	0.000	0.000	5.621



US Sanction Paper

1.14 Key Milestones

Milestone	Target Date: (Month Year)
Start Up	September 2018
Partial Sanction	February 2019
Begin Requirements and Design	February 2019
Project Sanction	March 2019
Begin Development and Implementation	March 2019
Begin User Acceptance Testing	March 2019
Move to Production / Last Go Live	May 2019
Project Closure	September 2019

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green

1.16 Key Issues (include mitigation of Red or Amber Resources)

N/A



US Sanction Paper

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative

1.18 List References

N/A



US Sanction Paper

2 Decisions

I:

- (a) APPROVE this paper and the investment of \$ 2.100M and a tolerance of +/-10% for the purposes of Requirements and Design
- (b) NOTE the potential run-the-business (RTB) impact of \$ 0.940M total for 5 years.
- (c) NOTE the potential investment \$ 5.621M and a tolerance of +/- 25%, contingent upon submittal and approval of a Project Sanction paper following completion of requirements and design.
- (d) NOTE that Samir Parikh is the Project Manager and has the approved financial delegation to undertake the activities stated in (a).

Signature.....Date.....

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



US Sanction Paper

3 Sanction Paper Detail

Title:	Lease Accounting Updates and Contract Management	Sanction Paper #:	USSC-19-027
Project #:	INVP 5360 CapEx: S008007	Sanction Type:	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	2/12/2019
Author / NG Representative:	Anil Garg / Ella Weisbord	Sponsor:	Kate Sturgess, VP US Financial Controller
Utility Service:	IT	Project Manager:	Samir Parikh

3.1 Background

National Grid is following the Generally Accepted Accounting Principles (GAAP or U.S. GAAP) adopted by the US Securities and Exchange Commission (SEC) as well as International Financial Reporting Standards (IFRS).

IFRS 16 – Leases, was issued in January 2016 and applies to annual reporting periods beginning on or after January 1, 2019. Similarly, ASC 842, Leases (GAAP), is going in effect at the same time and all reporting have to be done according to the new standards starting from the first quarter of calendar year 2019.

This project will:

- Ensure full compliance with ASC 842 and IFRS 16 accounting standards for all lease categories identified by National Grid
- Improve reporting capabilities
- Update templates as required
- Convert existing leases and master data into new lease module (Accounting master data i.e. major locations, asset locations, asset identification (IDs), General Ledger (G/L) accounts etc.)
- Deliver One Consolidated Lease module that houses all National Grid leases (including existing Fleet leases)
- Provide training on new lease module

In addition, the project will implement Cognitive Contract Management solution which leverages KPMG’s modular cognitive capabilities to ingest, analyze and automate decision making during the Contract Management Lifecycle. Solution allows

- Read Contracts: The ability to read/ ingest documents, such as contracts, invoices, amendments, price lists, catalogs, financials, etc.



US Sanction Paper

- Understand Information: Neuro Linguistic Programming (NLP) enables Cognitive Contract Management to understand the meaning of the text based on trained subject matter expertise.
- Interrupt Contract: Solution utilizes custom built assessment criteria using pre-existing policy, rules, regulations, business objectives. to extract information, and transform the information into structured, enabled format.
- Automate Decisions: Cognitive Contract Management can make decisions and provide answers to questions, produce insights, identify patterns and anomalies

3.2 Drivers

This project is driven by National Grid's need to stay compliant with accounting standards.

3.3 Project Description

This project will:

- Identify the impact that IFRS 16 and ASC 842 has on current business and model future state
- Ensure Stakeholder engagement, including Operations and Regulatory
- Develop and Implement project deliverables to establish future state process ahead of 2019 financial reporting
- Implement PowerPlan Lease Module
- Implement Cognitive Contract Management (CCM) for leases including Fleet Interface for PowerPlan Lease Module.

During the Requirements and Design (R&D) phase of the project, the following should be accomplished:

- Document Business and Technical requirements
- Develop Solution design
- Document Key Capabilities required
- Design the testing strategy
- Define the training strategy
- Review and validate RTB (Running The Business) cost

3.4 Benefits Summary

The main benefits of this project are:

- Compliance with mandatory accounting standards (IFRS16 and ASC842).
- Ensuring that leases are correctly reflected on the Company's financial statements.



US Sanction Paper

- Ensuring an effective control environment around the gathering and tracking of lease agreements and accounts.
- Capturing and maintaining of complete and accurate lease contract information.
- Establishing an automated solution to review new agreements which should increase efficiencies and accuracy in data gathering.

3.5 *Business and Customer Issues*

There are no significant business issues beyond what has been described elsewhere.

3.6 *Alternatives*

Alternative 1: Manual Work Around

Rejected: This is not recommended as manual alternative is not feasible based upon the volume of actual leases the National Grid has and which must be read and analyzed to determine the proper accounting treatment. National Grid does not have the staffing or bandwidth to employ the manual approach

Indicative cost: N/A

Alternative 2: Do Nothing

Rejected: This is not recommended due to the timeline dictated by US GAAP and IFRC.

Indicative cost: N/A

3.7 *Safety, Environmental and Project Planning Issues*

There are no significant issues beyond what has been described elsewhere.



US Sanction Paper

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	FIT Migration might need additional testing, resources	4	1	2	4	8	Mitigate	Aligning with business to plan additional testing to mitigate the risk with out compromising the delivery date and year end closing date		
2	Not enough NG resource availability to support the overlap testing required between multiple releases	3	1	2	3	6	Mitigate	Determine if NG resources available are sufficient or a staff augmentation is required		
3	Project timeline will allow only one dress rehearsal/mock cutover per release prior to Go Live	5	1	1	5	5	Accept	Additional testing & coordination will be brought to this single dress rehearsal		

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A



US Sanction Paper

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
INVP 5360 CapEx: S008007	Lease Accounting Updates and Contract Management	Est Lvl (+/- 25%)	CapEx	0.000	3.877	1.136	0.000	0.000	0.000	0.000	5.013
			OpEx	0.000	0.494	0.114	0.000	0.000	0.000	0.000	0.608
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	4.371	1.250	0.000	0.000	0.000	0.000	5.621

3.11.2 Project Budget Summary Table

Project Costs per Business Plan

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
CapEx	0.000	3.929	0.448	0.000	0.000	0.000	0.000	4.377
OpEx	0.000	0.979	0.044	0.000	0.000	0.000	0.000	1.023
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	4.908	0.492	0.000	0.000	0.000	0.000	5.400

Variance (Business Plan-Project Estimate)

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
CapEx	0.000	0.052	(0.688)	0.000	0.000	0.000	0.000	(0.636)
OpEx	0.000	0.485	(0.070)	0.000	0.000	0.000	0.000	0.415
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.537	(0.758)	0.000	0.000	0.000	0.000	(0.221)

3.11.3 Cost Assumptions

This estimate was developed in 2018 using standard IT estimating methodology which includes an assessment of project resource needs. Examples of these resource needs include hardware, software, internal and contract labor required to deliver the project. The accuracy level of the estimate for each project is identified in Table 3.11.

3.11.4 Net Present Value / Cost Benefit Analysis

This is not an NPV project.

3.11.4.1 NPV Summary Table

N/A



US Sanction Paper

3.11.4.2 NPV Assumptions and Calculations

N/A

3.11.5 Additional Impacts

None

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Finance Technology Enablement	William Donoghue	Business Representative
Business Partner (BP)	Joel Semel	Relationship Manager
Program Delivery Management (PDM)	Samir Parikh	Program Delivery Director
IT Finance	Michelle Harris	Manager
IT Regulatory	Dan DeMauro	Director
Digital Risk and Security (DR&S)	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Director

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



US Sanction Paper

4 Appendices

4.1 Sanction Request Breakdown by Project

N/A

4.2 Project Cost Breakdown

Project Cost Breakdown \$ (millions)					
Cost Category	sub-category	Value of Work to Date (VOWD)	Forecast to Complete (FTC)	Forecast At Completion (FAC=VOWD+FTC)	Name of Firm(s) providing resources
Personnel	NG Resources		0.342	0.342	
	SDC Time & Materials		-	-	IBM
			0.049	0.049	WiPro
			-	-	DXC
			-	-	Verizon
	SDC Fixed-Price		0.027	0.027	IBM
			-	-	WiPro
			-	-	DXC
			-	-	Verizon
	All other personnel		4.613	4.613	KPMG, PowerPlan, Arc Two
TOTAL Personnel Costs	-	5.031	5.031		
Hardware	Purchase		-	-	
	Lease		-	-	
Software			0.029	0.029	
Risk Margin			-	-	
AFUDC			0.206	0.206	
Other			0.355	0.355	
TOTAL Costs		-	5.621	5.621	



US Sanction Paper

4.3 Benefiting Operating Companies

Benefiting Operating Companies	Business Area	State
Niagara Mohawk Power Corp.- Electric Distr.	Electric Distribution	NY
Massachusetts Electric Company	Electric Distribution	MA
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
Boston Gas Company	Gas Distribution	MA
Narragansett Electric Company	Electric Distribution	RI
Niagara Mohawk Power Corp. - Transmission	Transmission	NY
Niagara Mohawk Power Corp. - Gas	Gas Distribution	NY
New England Power Company – Transmission	Transmission	MA, NH, RI, VT
KeySpan Generation LLC (PSA)	Generation	NY
Narragansett Gas Company	Gas Distribution	RI
Colonial Gas Company	Gas Distribution	MA
Narragansett Electric Company – Transmission	Transmission	RI
National Grid USA Parent	Parent Company	
Nantucket Electric Company	Electric Distribution	MA
NE Hydro - Trans Electric Co.	Inter Connector	MA,NH
KeySpan Energy Development Corporation	Non-Regulated	NY
KeySpan Port Jefferson Energy Center	Generation	NY
KeySpan Services Inc. Service Company	Service Company	
KeySpan Glenwood Energy Center	Generation	NY
Massachusetts Electric Company – Transmission	Transmission	MA
NG LNG LP Regulated Entity	Gas Distribution	MA, NY, RI
KeySpan Energy Corp. Service Company	Service Company	



US Sanction Paper

4.4 IT Ongoing Operational Costs (RTB):

This project will potentially increase IT ongoing operations support costs as per the following table. These are also known as Run the Business (RTB) costs. The values showing below are preliminary and will be reviewed further during Requirements and Design phase.

The increase of RTB is caused by the need to run two instances (old and new) of lease modules in parallel. Phase 2 of this initiative, planned for FY20, will turn off existing lease module.

All figures in \$ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB						-
Last Sanction Business Net Impact to RTB						-
Last Sanction Total Net Impact to RTB	-	-	-	-	-	-
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB						-
Business Budgeted Net Impact to RTB						-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	358.8	478.4	34.4	34.4	34.4	940.4
Business Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	(358.8)	(478.4)	(34.4)	(34.4)	(34.4)	(940.4)
Business Budgeted Net Impact to RTB Variance	-	-	-	-	-	-

4.5 NPV Summary (if applicable)

N/A

4.6 Customer Outreach Plan

N/A



US Sanction Paper

Title:	Storage Capacity Purchase and Configure For Use	Sanction Paper #:	USSC-19-095
Project #:	INVP 5636 Capex: S008013	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	3/13/2019
Author:	Andrew Yee	Sponsor:	Barry Sheils VP IT Infrastructure & Operations
Utility Service:	IT	Project Manager:	Ken Little

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of INVP 5636 in the amount of \$6.853M with a tolerance of +/- 10% for the purpose of Full Implementation.

This sanction amount is \$ 6.853M broken down into:

- \$ 6.811M Capex
- \$ 0.042M Opex
- \$ 0.000M Removal

1.2 Project Summary

The scope of the project is to purchase, install and configure for use a new SAN (Storage Area Network) infrastructure that will be hosted in the Newark DXC datacenter and the Norwich DXC datacenter. The new SAN infrastructure will be used to accommodate net new capacity requests, accommodate growth and to replace the legacy SAN infrastructure that hosts business applications and shared drives. The majority of the current legacy SAN infrastructure is at end of life (EOL) or at end of service life (EOSL) that limits the support that can be provided by the SAN hardware vendor.

The new SAN infrastructure will include 323TBe (effective capacity in Terabytes) storage that is approximately 25% of the current SAN storage footprint. The new SAN storage infrastructure is expandable allowing additional capacity to be added to meet demand. The legacy SAN infrastructure will be decommissioned as part of a separate project.

This paper requests full sanction for the purchase, installation and the configuration for use of a new SAN infrastructure.



US Sanction Paper

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
INVP 5636 Capex: S008013		Storage Capacity Purchase and Configure For Use	6.853

1.4 Associated Projects

N/A

1.5 Prior Sanctioning History

N/A

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
January 2020	Project Closure Sanction

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input checked="" type="radio"/> Other	This project will upgrade and improve National Grid’s SAN infrastructure platform. The investment will provide capacity for growth, replacement of end of life SAN infrastructure and provide increased availability of business applications that utilize the SAN infrastructure.

1.8 Asset Management Risk Score

Asset Management Risk Score: 48

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability
 Environment
 Health & Safety
 Not Policy Driven



US Sanction Paper

1.9 Complexity Level

High Complexity Medium Complexity Low Complexity N/A

Complexity Score: 23

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

Yes No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IT Investment Plan FY20 - 24	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	\$6.853M

1.12 If cost > approved Business Plan how will this be funded?

Re-allocation of budget within the IT business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2019/20	Yr. 2 2020/21	Yr. 3 2021/22	Yr. 4 2022/23	Yr. 5 2023/24	Yr. 6 + 2024/25	
CapEx	0.000	6.811	0.000	0.000	0.000	0.000	0.000	6.811
OpEx	0.000	0.042	0.000	0.000	0.000	0.000	0.000	0.042
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	6.853	0.000	0.000	0.000	0.000	0.000	6.853



US Sanction Paper

1.14 Key Milestones

Milestone	Target Date: (Month Year)
Start Up	March 2019
Project Sanction	March 2019
Begin Requirements and Design	April 2019
Begin Development and Implementation	June 2019
Move to Production / Last Go Live	October 2019
Project Closure	January 2020

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input type="checkbox"/> Contractor	
Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input checked="" type="radio"/> Amber	<input type="radio"/> Green

1.16 Key Issues (include mitigation of Red or Amber Resources)

N/A

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative



US Sanction Paper

1.18 *List References*

N/A



US Sanction Paper

2 Decisions

This paper was approved using the fast track approval process and will be noted at the next USSC meeting to be held on 3/13/2019.

Signature.....Date.....

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



US Sanction Paper

3 Sanction Paper Detail

Title:	Storage Capacity Purchase and Configure For Use	Sanction Paper #:	USSC-19-095
Project #:	INVP 5636 Capex: S008013	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	3/13/2019
Author:	Andrew Yee	Sponsor:	Barry Sheils VP IT Infrastructure & Operations
Utility Service:	IT	Project Manager:	Ken Little

3.1 Background

The current legacy SAN infrastructure that hosts business applications and shared drives has reached end of life (EOL) and/or end of service life (EOSL) and does not allow for growth to accommodate future requests for business applications and data. The majority of the current legacy SAN infrastructure is at end of life and/or at end of service life that limits the support that can be provided by the SAN hardware vendor. The new SAN (Storage Area Network) infrastructure will provide capacity for growth, improved resiliency and availability for hosted business applications and data.

3.2 Drivers

- The current legacy SAN storage infrastructure has no capability to be expanded to account for future growth as the current infrastructure is near end of life or at the end of service life
- Improve the availability and resiliency of data that is stored on the SAN infrastructure
- Supports the modernization of National Grid’s SAN infrastructure

3.3 Project Description

This paper request sanction to purchase, install and configure for use a new SAN (Storage Area Network) infrastructure that will be hosted in the Newark DXC datacenter and the Norwich DXC datacenter. The new SAN infrastructure will provide capacity for growth and high availability of hosted business applications and data.

- Document Business and Technical Requirements
- Document Key Business Issues, Pain Points and Challenges



US Sanction Paper

- Create Business Requirements Document
- Document Key Capabilities Required
- Develop Solution Design
- Develop Solution Implementation Roadmap
- Develop Financial Workbook and a Detailed Implementation Plan

3.4 Benefits Summary

- Business applications and data hosted on supported and modern SAN infrastructure
 - Upgrading the SAN infrastructure supports high availability and reduces the risk for hardware failure
 - Allows for requests for SAN storage capacity of existing hosted business applications and data
 - Allows for requests for SAN storage capacity for new business applications and data
- Improved resiliency, reliability and performance
 - Upgraded SAN infrastructure provides a robust environment for reducing outages and increasing resiliency for hosted business applications and data

3.5 Business and Customer Issues

N/A

3.6 Alternatives

Alternative 1: Defer Project/ Do Nothing

Rejected: Failure to provide the investment could result in significant impact to the business as applications fail due to insufficient storage capacity or legacy SAN components being unobtainable. This would create a state where there will be a need to delete data or applications to provide immediate capacity should the investment be delayed.

Indicative Costs: N/A

Alternative 2: Competitive Bids From Multiple Vendors

Rejected: The new SAN storage equipment will be purchased through an existing competitively bid contract with an existing IT framework partner.

Indicative Costs: N/A



US Sanction Paper

3.7 Safety, Environmental and Project Planning Issues

There are no significant issues beyond what has been described elsewhere.

3.8 Execution Risk Appraisal

Risk Breakdown Structure Category	Qualitative Assessment / Risk Response Strategy				Risk Score
	Risk ID + Title	IF Statement	THEN Statement	Risk Response Strategy	
18. IT Vendor	R1 - Sanction	The sanction process is delayed or not completed	The project schedule will be negatively impacted	Reduce Monitor the progress of the sanction workflows and approvals. Request updates as required.	12
18. IT Vendor	R2 - Vendor	There are delays by the vendor with delivery of the equipment or the configuration of the solution	The project schedule will be negatively impacted	Reduce Monitor the progress of vendor performance and adherence to milestones. Determine what actions can be taken to minimize delays.	9
17. Project Resources	R3 - Resources	There is limited availability of National Grid resources to work on the project	The completion of project activates may be delayed	Reduce Monitor the availability of assigned resources throughout the lifecycle of the project. Engage resource managers as needed to ensure resources are assigned as needed.	4



US Sanction Paper

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total	
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +		
INVP 5636 Capex: S00	Storage Capacity Purchase and Configure For Use	Est Lvl (e.g. +/- 10%)	CapEx	0.000	6.811	0.000	0.000	0.000	0.000	0.000	0.000	6.811
			OpEx	0.000	0.042	0.000	0.000	0.000	0.000	0.000	0.000	0.042
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	6.853	0.000	0.000	0.000	0.000	0.000	0.000	6.853

3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
CapEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
OpEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000



US Sanction Paper

Variance (Business Plan-Project Estimate)

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1 2019/20	Yr. 2 2020/21	Yr. 3 2021/22	Yr. 4 2022/23	Yr. 5 2023/24	Yr. 6 + 2024/25	
\$M								
CapEx	0.000	(6.811)	0.000	0.000	0.000	0.000	0.000	(6.811)
OpEx	0.000	(0.042)	0.000	0.000	0.000	0.000	0.000	(0.042)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	(6.853)	0.000	0.000	0.000	0.000	0.000	(6.853)

3.11.3 Cost Assumptions

N/A

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

N/A

3.11.4.2 NPV Assumptions and Calculations

N/A

3.11.5 Additional Impacts

N/A

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Steve Maxwell	Business Representative
Business Partner (BP)	Caitlin Davidson	Relationship Manager
Program Delivery Management (PDM)	Chris Granata	Program Delivery Director
IT Finance	Michelle Harris	Manager
IT Regulatory	Dan DeMauro	Director
Digital Risk and Security (DR&S)	Peter Shattuck	Manager
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Svetlana Lyba	Manager



US Sanction Paper

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego

4 Appendices

4.1 Sanction Request Breakdown by Project

N/A

4.2 Project Cost Breakdown

Project Cost Breakdown \$ (millions)					
Cost Category	sub-category	Value of Work to Date (VOWD)	Forecast to Complete (FTC)	Forecast At Completion (FAC=VOWD+FTC)	Name of Firm(s) providing resources
Personnel	NG Resources		0.104	0.104	
	SDC Time & Materials		-	-	IBM
			-	-	WiPro
			-	-	DXC
			-	-	Verizon
	SDC Fixed-Price		-	-	IBM
			-	-	WiPro
		0.503	0.503	DXC	
All other personnel		-	-	Verizon	
TOTAL Personnel Costs		-	0.607	0.607	
Hardware	Purchase		5.641	5.641	
	Lease		-	-	
Software			-	-	
Risk Margin			0.121	0.121	
AFUDC			0.220	0.220	
Other			0.264	0.264	
TOTAL Costs		-	6.853	6.853	



US Sanction Paper

4.3 Benefiting Operating Companies

Operating Company Name	Business Area	State
National Grid USA Parent	Parent	
KeySpan Energy Development Corporation	Non-Regulated	NY
KeySpan Services Inc.	Service Company	
KeySpan Energy Corp.	Service Company	
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
KeySpan Generation LLC (PSA)	Generation	NY
KeySpan Glenwood Energy Center	Generation	NY
KeySpan Port Jefferson Energy Center	Generation	NY
Keyspan Energy Trading Services	Other	NY
Niagara Mohawk Power Corp. - Electric Distr.	Electric Distribution	NY
Niagara Mohawk Power Corp. - Gas	Gas Distribution	NY
Niagara Mohawk Power Corp. - Transmission	Transmission	NY
Massachusetts Electric Company	Electric Distribution	MA
Massachusetts Electric Company – Transmission	Transmission	MA
Nantucket Electric Company	Electric Distribution	MA
Boston Gas Company	Gas Distribution	MA
Colonial Gas Company	Gas Distribution	MA
Narragansett Gas Company	Gas Distribution	RI
Narragansett Electric Company	Electric Distribution	RI
Narragansett Electric Company – Transmission	Transmission	RI
New England Power Company – Transmission	Transmission	MA,NH,RI,VT
New England Hydro - Trans Corp.	Inter Connector	MA, NH
New England Electric Trans Corp	Inter Connector	MA
NG LNG LP Regulated Entity	Gas Distribution	MA,NY,RI
Trans Gas Inc.	Non-Regulated	NY



US Sanction Paper

4.4 IT Ongoing Operational Costs (RTB):

This project will increase IT ongoing operations support costs as per the following table. These are also known as Run the Business (RTB) costs.

All figures in \$ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB						-
Last Sanction Business Net Impact to RTB						-
Last Sanction Total Net Impact to RTB	-	-	-	-	-	-
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB						-
Business Budgeted Net Impact to RTB						-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	366.6	366.6	366.6	366.6	366.6	1,832.9
Business Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	(366.6)	(366.6)	(366.6)	(366.6)	(366.6)	(1,832.9)
Business Budgeted Net Impact to RTB Variance	-	-	-	-	-	-

4.5 NPV Summary (if applicable)

N/A

4.6 Customer Outreach Plan

N/A

4.7 Glossary

Terminology/Jargon/Abbreviation	Meaning
EOL	End Of Life
EOSL	End Of Service Life
SAN	Storage Area Network
TBe	Effective Capacity in Terabytes



US Sanction Paper

Title:	Complex Capital Delivery Phase 2	Sanction Paper #:	USSC-18-037 v2
Project #:	INVP 4771 Capex: S007768	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	8/8/2018
Author:	Dorothy Gosline	Sponsor:	Trisha Brabbs, VP Proj Controls & Estimating
Utility Service:	IS	Project Manager:	Sally Seltzer

1 Executive Summary

1.1 Sanctioning Summary

This paper requests full sanction of INVP 4771 in the amount of \$9.398M with a tolerance of +/- 10% for the purposes of Development and Implementation.

This sanction amount is \$9.398M broken down into:

- \$6.889M Capex*
- \$2.494M Opex*
- \$0.015M Removal*

1.2 Project Summary

This investment will support the Capital Delivery Initiative (CDI) by delivering the following solutions for complex projects for Gas and Electric Lines of Business (LoB):

- Oracle Unifier tool (paired with the existing National Grid SAP Ariba tool capabilities) for 300 identified end-users for Contract Management CDI Work Stream.
- Selection and Implementation of a new Strategic Estimation Tool for the Estimating CDI Work Stream.
- Earned Value, Finance Forecast, and Schedule (Milestones) Tableau dashboards for the Reporting & Analytics CDI Work Stream.
 - A Feasibility and Analysis study to align SAP and Primavera P6 based on a common Work Breakdown Structure (WBS) for Gas and Electric complex capital projects added to the INVP 4771 project scope as a project change request.
- @Risk software for Risk Management CDI Work Stream.



US Sanction Paper

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M) total
4771		Complex Capital Delivery Phase 2, Contract Management Work stream	\$3.739M
		Complex Capital Delivery Phase 2, Estimating Work stream	\$3.009M
		Complex Capital Delivery Phase 2, Reporting & Analytics Work stream	\$2.566M
		Complex Capital Delivery Phase 2, Risk Management Work stream	\$0.084M
Total			\$9.398M

1.4 Associated Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
INVP 4972		Complex Capital Delivery Phase 1	0.954
Total			0.954

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Potential Investment Tolerance
2/14/18	USSC 18-037	\$5.357M	\$8.874M	Partial Sanction	+/-25%

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
July 2019	Project Closure Sanction



US Sanction Paper

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	The Capital Delivery business initiative will leverage IS automation and system enhancements to optimize business process efficiencies.

1.8 Asset Management Risk Score

Asset Management Risk Score: 48

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability
 Environment
 Health & Safety
 Not Policy Driven

1.9 Complexity Level

- High Complexity
 Medium Complexity
 Low Complexity
 N/A
- Complexity Score: 20

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

- Yes
 No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved



US Sanction Paper

			Business Plan (\$)
IS Investment Plan FY 19-23	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	\$0.788M

1.12 If cost > approved Business Plan how will this be funded?

Re-allocation of budget within the IS business has been managed to meet jurisdictional budgetary, statutory, and regulatory requirements. Future fiscal year forecasts will be addressed in future year business plans.

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
CapEx	0.902	5.941	0.046	0.000	0.000	0.000	0.000	6.890
OpEx	0.672	1.702	0.119	0.000	0.000	0.000	0.000	2.493
Removal	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.015
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	1.575	7.643	0.180	0.000	0.000	0.000	0.000	9.398

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	December 2017
Partial Sanction	February 2018
Begin Requirements and Design	February 2018
Project Sanction	August 2018
Begin Development and Implementation	September 2018
Move to Production / Last Go Live	March 2019
Project Complete	July 2019



US Sanction Paper

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input type="checkbox"/> Contractor	
Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green

1.16 Key Issues (include mitigation of Red or Amber Resources)

There are no significant business issues beyond what has been described elsewhere.

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative

1.18 List References

Not applicable

US Sanction Paper



2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on 08/08/2018:

- (a) APPROVED this paper and the investment of \$9.398M and a tolerance of +/-10% for the purposes of Development and Implementation.
- (b) APPROVED the run-the-business (RTB) of \$3.574M total for 5 years.
- (c) NOTED that Sally Seltzer is the Project Manager and has the approved financial delegation.

Signature..... David H. Campbell Date... 8/17/18
David H. Campbell, Vice President, ServCo Business Partnering, USSC Chair



US Sanction Paper

3 Sanction Paper Detail

Title:	Complex Capital Delivery Phase 2	Sanction Paper #:	USSC-18-037 v2
Project #:	INVP 4771 Capex: S007768	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	8/8/2018
Author:	Dorothy Gosline	Sponsor:	Trisha Brabbs, VP Proj Controls & Estimating
Utility Service:	IS	Project Manager:	Sally Seltzer

3.1 Background

Improving National Grid's ability to deliver major capital US Gas and Electric projects on time, within budget, and at a lower cost is a key element of the company's Shaping Our Future strategy. In order to increase the capability and performance of the capital delivery functions, a Capital Delivery Initiative (CDI) has been formed and is part of the US Critical Program Portfolio. National Grid has reviewed its' capital project delivery processes and found a number of improvement opportunities that it believes will drive a step change in core performance.

The CDI will leverage IS automation and system enhancements to address business process capability challenges associated with:

- Contract Management Work Stream:
 - Electric Line of Business (LoB) is using an internally developed tool; Gas LoB doesn't have a tool and is managing all contracts using a manual paper based process.
 - Invoice Management / Approval process is handled in various systems.
 - Change Order Management is done in a paper based format that is not efficient and not sustainable.
- Estimating Work Stream:
 - Multiple tools were being utilized: Success Enterprise tool for Electric LoB and an internally developed tool for Gas LoB. As of April 1, 2018 SE is being used by both LoBs.
 - Success Enterprise tool is at risk with outdated Infrastructure
 - Success Enterprise tool end-users are experiencing significant application performance issues.
- Reporting & Analytics Work Stream:



US Sanction Paper

- Reporting - limited ability to report on current status of each complex capital project deliverable.
- Key Performance Indicators (KPIs) – the current manual effort to collect, analyze, and format KPIs is not efficient and not sustainable.
- Risk Management Work Stream:
 - Standardized risk identification, risk documentation, cost analysis, and management of risk through complex capital project lifecycle are not done or done inconsistently today.

The INVP 4771 scope is based on the findings and accomplishments of INVP 4972 (Complex Capital Delivery Phase 1), a four month effort initiated in September 2017. The following has been completed:

- Contract Management Work Stream:
 - The evaluation of National Grid currently owned tools highlighted that SAP Ariba tool paired with Oracle Unifier tool provides US CDI with the best capability coverage for complex and non-complex projects for the Gas and Electric LoB.
- Estimating Work Stream:
 - Completed infrastructure remediation analysis for Success Enterprise tool.
 - Completed a benchmarking exercise for a new strategic Estimating Tool based on the sampling of market solutions.
- Reporting & Analytics Work Stream:
 - Executed proof of concept for implementation of the Tableau capabilities; identified required dashboards for US CDI.
- Risk Management Work Stream:
 - Piloted @Risk software.

In May 2018, a project change request was approved to the Reporting & Analytics work stream to add a Feasibility & Analysis study (F&A) to investigate aligning SAP with Primavera P6 on a common Work Breakdown Structure (WBS). The current WBS in the US SAP instance is the engine for the Financial End-to-End processes (Service Company Allocations & Settlements, FERC Reporting, etc.).

Currently the business faces the following challenges associated with alignment:

- US SAP tracks project costs based on Operating Company codes, not on WBS; Primavera P6 tracks costs based on WBS for Gas and Electric projects.
- Lack of alignment prevents accurate calculation of Earned Value at the activity level for complex capital Gas and Electric projects.
- Cost leakage can also occur due to the lack of accurate Earned Value reporting.



US Sanction Paper

The F&A study will evaluate solution options to map actuals (cost and schedule) in SAP and Primavera P6 with forecast information based on a common WBS for Gas and Electric complex capital projects. The recommended solution will be part of future years' investment.

3.2 Drivers

The main driver is:

- Improve complex capital project management capabilities for gas and electric LoBs by delivering complex capital projects fit for purpose at a lower unit cost, on time and within budget.

3.3 Project Description

During the Requirements and Design phase of the project, all work planned for that phase was completed as follows:

- Contract Management and Estimating Work Streams:
 - All Requirements & Design phase activities completed as planned.
- Reporting & Analytics Work Stream:
 - All Requirements & Design phase activities completed following a re-prioritization of dashboard rollout sequence, resulting in a change of the order of development but no change to overall scope.
- Risk Management Work Stream:
 - The entire body of work for Risk Management was completed, including:
 - Procure the @Risk software: Contract, Licenses, Services.
 - Perform detailed technical analysis, requirements, and design.
 - Finalize the detailed implementation plan.
 - Implement @Risk software.
 - Provide post implementation support.

During the Development and Implementation (D&I) phase of the project, the following will be accomplished:

- Contract Management Work Stream:
 - Configure the full set of capabilities and system integrations for the new solution.
 - Perform solution testing.
 - Implement the solution.
 - Plan and conduct user and system administration training.
 - Define and finalize the support model.
 - Deliver post implementation support.



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- **Estimating Work Stream:**
 - Finalize the solution set up and configuration.
 - Perform Sage Estimating application testing.
 - Define and finalize the support model.
 - Conduct user and system administration training.
 - Roll out of Sage Estimating solution.
 - Decommission legacy Success Enterprise application.
- **Reporting & Analytics Work Stream:**
 - Rollout of the last of three releases for Financial Forecast Dashboard.
 - Rollout of second and third of three releases for the Schedule (Milestones) dashboard.
 - Rollout of second and third of three releases of Earned Value dashboard.
 - Rollout of Executive 360 and Project 360 dashboards, combining elements of the Finance, Schedule and Earned Value dashboards.
- **Feasibility & Analysis study to align SAP and Primavera P6 on common WBS:**
 - Requirements Discovery.
 - Current As-is Technical and Functional Analysis (including current WBS structures in SAP and Primavera P6, MAXIMO, STORMS, Powerplan, etc.)
 - Solution Options Analysis.
 - Recommendation for most optimal solution.

Out of Scope:

- **All Work Streams:**
 - Delivering solutions for non-complex capital Gas and Electric projects.
- **Aligning SAP with Primavera P6 based on common WBS:**
 - Detailed solution design.
 - Actual implementation of the selected solution.



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3.4 Benefits Summary

This investment will facilitate US Gas and Electric LoB's ability to:

- Manage contracts and communications with vendors in a standard, controlled, reportable, and auditable way.
- Increase stability of produced estimates in a consistent manner within the Work Breakdown Structure.
- Report on current status of each complex capital project deliverable to increase visibility.
- Monitor KPIs to drive performance.
- Increase visibility of complex capital project risks and associated costs so they can be managed more effectively and enable better decision making.
- Identify the best possible solution to align SAP and Primavera P6 on a set of common WBS.

And therefore:

- Accurately measure project cost performance.
- Reduce negative impacts to customers.
- Avoid penalties for under performance.
- Increase credibility with regulators.
- Improve regulatory filing outcomes based on an improved on time, on budget delivery of complex capital delivery projects.
- Improve tracking of CDI project costs and increase efficiencies.

3.5 Business and Customer Issues

There are no significant business issues beyond what has been described elsewhere.

3.6 Alternatives

Contract Management Solution:

Alternative 1: Salesforce/Apptus Tool

Rejected –Apptus would require an extensive customization effort due to limited out-of-the-box features; would create unnecessary integration complexity with existing in National Grid landscape applications (SAP Ariba, SAP Finance, and Primavera P6), and is untested in the Utilities industry. This tool doesn't satisfy US Capital Delivery Initiative business requirements.

Alternative 2: Salesforce/Conga Tool

Rejected –Conga would require an extensive customization effort due to limited out-of-the-box features; would create unnecessary integration complexity with existing in National Grid landscape applications (SAP Ariba, SAP Finance, and Primavera P6) and is not used in the Utilities industry for Contract Management. This tool doesn't satisfy US Capital Delivery Initiative business requirements.



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Alternative 3: SAP Fieldglass Tool

Rejected – SAP Fieldglass would require an extensive customization effort or a companion system to resolve significant out-of-the-box functionality gaps. This tool doesn't satisfy key US Capital Delivery Initiative business requirements.

Alternative 4: SAP Ariba Tool

Rejected – SAP Ariba is one of the National Grid applications. SAP Ariba is able to meet many of the CDI contract management needs, but does not fully support CDI. SAP Ariba paired with selected option Oracle Unifier will satisfy US Capital Delivery Initiative business requirements.

Alternative 5: Do Nothing/ Defer Investment

Rejected – Business will continue to be negatively impacted due to the un-addressed capabilities gaps / inefficiencies within the Contract Management business process.

Estimating Solution:

Alternative 1: Success Enterprise Tool Remediation

Rejected – based on the analysis completed during INVP 4972 it was concluded that the Success Enterprise Tool Remediation option is not going to be a prudent investment due to the following:

- The Remediation option doesn't exclude possible continued instability of the Success Enterprise platform.
- The Remediation option estimated cost and effort duration is relatively similar to the estimated cost and effort duration for the New Strategic tool option.
- The Remediation option doesn't enable any new functional capabilities while New Strategic tool will provide a significant functional capability gain, will improve end-users work productivity and, and will provide improved reporting functionality.

Alternative 2: Do Nothing/ Defer Investment

Rejected – Business will be negatively impacted by the continuation of the Success Enterprise tool performance issues. Success Enterprise's outdated infrastructure may not be able to support the addition of the US Gas LoB users.

Reporting & Analytics Solution:

Alternative 1: Do Nothing/ Defer Investment

Rejected – Business will continue to be negatively impacted by un-addressed capability gaps in reporting on current status of each complex capital project deliverable and KPIs.

Aligning SAP with P6 based on common WBS Solution

Alternative 1: One Line Earned Value Reporting



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Rejected – Temporary solution to report Earned Value at the funding project number level by rolling up actual costs (for operation codes) in SAP and budgeted cost (for activities) in Primavera P6. This solution does not include the ability to report Earned Value at the activity level.

Alternative 2: Map Operation Codes in SAP to WBS Activities in P6

Rejected – Temporary solution to map operation codes in SAP to WBS activities in Primavera P6 to report Earned Value by funding project by activity. This solution has the potential to partially or incorrectly map operation codes to activities, leading to inaccurate Earned Value metrics.

Alternative 3: Do Nothing/ Defer Investment

Rejected – Business will continue to be negatively impacted due to the un-addressed capabilities gaps / inefficiencies and inability to map actuals (cost and schedule) with forecast based on a common WBS for Gas and Electric complex capital projects.

Risk Management Solution:

Alternative 1: New Strategic Risk Management Tool

Rejected– US CDI chose to proceed with the @Risk tool, piloted as part of the INVP 4972, to avoid the challenges related to the introduction of new strategic Risk Management tool to the US CDI business community at the same time as the implementation of new US CDI business processes and new tools for Contract Management and Estimating Work Streams. The selected solution is relatively simple for CDI users' adoption and fits CDI business needs. The project for selection and implementation of the new strategic Risk Management tool is included within the proposed FY19-20 IS Investment plan.

Alternative 2: Do Nothing/ Defer Investment

Rejected – Business will continue to be negatively impacted by un- addressed capability gaps in standardized risk identification, risk documentation, cost analysis and management of risk through complex capital project lifecycle.

3.7 Safety, Environmental and Project Planning Issues

Not Applicable



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3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	Contract Management: Integration with SAP/Ariba may have licensing implications if any users interacting with SAP/Ariba via Unifier are not already licensed users of SAP/Ariba.	3	5	3	15	9	Mitigate	The project manager will work with the solution architect to understand the integration challenges and design a solution with the lowest risk possible.	Agreement must be obtained from Legal and SAP.	Work with the various integration teams to redesign and further minimize risk, while also seeking approval for no or low-cost licensing from SAP for affected users.
2	Contract Management: The SAP landscape is crowded this year, with limited opportunities to move work to Production. The proposed SAP integrations could be eliminated or delayed into FY20 if the complexity of work is too high or if production problems occur and push enhancement work out.	4	2	3	8	12	Mitigate	The PM will work with the SAP teams to identify opportunities on the schedule which would allow the integration work to move forward.	If production issues or other projects are deemed higher priority, the integration work could be reduced, eliminated or delayed.	Pursue alternative integrations and ways to minimize manual effort for users without a true integration.
3	F&A: Complexity of existing interfaces with the range of non-SAP systems and processes could result in additional scope items, extending the workshops and delaying completion of the F&A.	3	3	3	9	9	Mitigate	The project manager will work with business and service owners to map out all the non-SAP systems that need representation at the workshops.	Workshops might uncover new interfaces that need to be accounted for in the recommended solution.	Throughout the project, the project manager will work with the vendor and National Grid SAP and non-SAP system SMEs to monitor this risk and update National Grid Management on any corrective actions needed.

3.9 Permitting

Not Applicable

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

Not Applicable



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3.10.3 CIAC / Reimbursement

Not Applicable

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total	
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +		
INVP4771A	Contract Management	+/- 10%	CapEx	0.162	2.467	0.000	0.000	0.000	0.000	0.000	0.000	2.629
			OpEx	0.439	0.671	0.000	0.000	0.000	0.000	0.000	0.000	1.110
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.601	3.138	0.000	0.000	0.000	0.000	0.000	0.000	0.000
INVP4771B	Estimation	+/- 10%	CapEx	0.357	1.645	0.046	0.000	0.000	0.000	0.000	0.000	2.049
			OpEx	0.195	0.631	0.119	0.000	0.000	0.000	0.000	0.000	0.944
			Removal	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.015
			Total	0.552	2.276	0.180	0.000	0.000	0.000	0.000	0.000	0.000
INVP4771C	Reporting & Analytics	+/- 10%	CapEx	0.334	1.821	0.000	0.000	0.000	0.000	0.000	0.000	2.155
			OpEx	0.012	0.399	0.000	0.000	0.000	0.000	0.000	0.000	0.411
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.346	2.220	0.000	0.000	0.000	0.000	0.000	0.000	0.000
INVP4771D	Risk Management	+/- 10%	CapEx	0.049	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.056
			OpEx	0.027	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.028
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.075	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Project Sanction			CapEx	0.902	5.941	0.046	0.000	0.000	0.000	0.000	0.000	6.890
			OpEx	0.672	1.702	0.119	0.000	0.000	0.000	0.000	0.000	2.493
			Removal	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.015
			Total	1.575	7.643	0.180	0.000	0.000	0.000	0.000	0.000	9.398



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3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	0.902	5.940	0.000	0.000	0.000	0.000	0.000	6.842
OpEx	0.672	1.095	0.000	0.000	0.000	0.000	0.000	1.767
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	1.575	7.035	0.000	0.000	0.000	0.000	0.000	8.610

Variance (Business Plan-Project Estimate)

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	0.000	(0.001)	(0.046)	0.000	0.000	0.000	0.000	(0.048)
OpEx	0.000	(0.607)	(0.119)	0.000	0.000	0.000	0.000	(0.726)
Removal	0.000	0.000	(0.015)	0.000	0.000	0.000	0.000	(0.015)
Total Cost in Bus. Plan	0.000	(0.608)	(0.180)	0.000	0.000	0.000	0.000	(0.788)

3.11.3 Cost Assumptions

This estimate was developed in 2018 using the Standard IS Estimating Methodology. The accuracy level of estimate for each project is identified in Table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

Not Applicable

3.11.4.2 NPV Assumptions and Calculations

This is not an NPV project.

3.11.5 Additional Impacts

Not Applicable



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3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	David Way	Business Representative
PDM	Deborah Rollins	Head of PDM
BRM	Richard Sheer	Relationship Manager
PDM	Sally Seltzer	Program Delivery Director
IS Finance	Michelle Harris	Manager
IS Regulatory	Daniel DeMauro	Director
DR&S	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Director
Enterprise Architecture	Svetlana Lyba	Director

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Anand, Sonny
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



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4 Other Appendices

4.1.1 Project Cost Breakdown

Contract Management Work Stream

Project Cost Breakdown \$ (millions)					
Cost Category	sub-category	VOWD	FTC	FAC=VOWD+FTC	Name of Firm(s) providing resources
Personnel	NG Resources	0.108	0.238	0.347	
	SDC Time & Materials	0.069	0.226	0.294	IBM
		0.001	0.355	0.356	WiPro
		0.000	-	-	DXC
		0.000	-	-	Verizon
	SDC Fixed-Price	0.000	-	-	IBM
		0.000	-	-	WiPro
		0.000	-	-	DXC
		0.000	0.092	0.092	Verizon
	All other personnel	0.728	0.888	1.616	Oracle Primavera Services, Centric Consulting, FDM, FocalPoint
TOTAL Personnel Costs	0.906	1.799	2.705		
Hardware	Purchase	0.000	-	-	
	Lease	0.012	-	0.012	
Software		0.053	0.441	0.495	
Risk Margin			0.244	0.244	
AFUDC		0.006	0.082	0.089	
Other		0.000	0.195	0.195	
TOTAL Costs		0.978	2.762	3.740	



US Sanction Paper

Estimating Work Stream

Project Cost Breakdown \$ (millions)					
Cost Category	sub-category	VOWD	FTC	FAC=VOWD+FTC	Name of Firm(s) providing resources
Personnel	NG Resources	0.054	0.121	0.175	
	SDC Time & Materials	0.089	0.121	0.210	IBM
		0.000	-	-	WiPro
		0.000	-	-	DXC
		0.000	-	-	Verizon
	SDC Fixed-Price	0.000	-	-	IBM
		0.000	-	-	WiPro
		0.000	-	-	DXC
		0.000	0.075	0.075	Verizon
	All other personnel	0.228	1.509	1.737	Centric Consulting, FDM, Eos Group, LoadSpring
TOTAL Personnel Costs	0.371	1.825	2.197		
Hardware	Purchase	0.000	-	-	
	Lease	0.000	0.097	0.097	LoadSpring
Software		0.352	-	0.352	Eos Group
Risk Margin			0.192	0.192	
AFUDC		0.006	0.095	0.101	
Other		0.001	0.068	0.069	
TOTAL Costs		0.731	2.278	3.009	



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Reporting & Analytics Work Stream

The table below is inclusive of the Feasibility & Analysis study to align SAP and Primavera P6 on common WBS.

Project Cost Breakdown \$ (millions)					
Cost Category	sub-category	VOWD	FTC	FAC=VOWD+FTC	Name of Firm(s) providing resources
Personnel	NG Resources	0.031	0.075	0.106	
	SDC Time & Materials	0.000	0.027	0.027	IBM
		0.000	0.044	0.044	WiPro
		0.000	-	-	DXC
		0.000	-	-	Verizon
		0.000	-	-	IBM
	SDC Fixed-Price	0.000	-	-	WiPro
		0.000	-	-	DXC
		0.000	-	-	Verizon
		0.000	-	-	Verizon
All other personnel	0.808	1.304	2.113	Clearelligence, Centric Consulting, Vesta, FDM	
TOTAL Personnel Costs	0.840	1.451	2.291		
Hardware	Purchase	0.000	-	-	
	Lease	0.000	-	-	
Software		0.000	-	-	
Risk Margin			0.140	0.140	
AFUDC		0.010	0.073	0.083	
Other		0.000	0.053	0.053	
TOTAL Costs		0.849	1.716	2.566	



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Risk Management Work Stream

Project Cost Breakdown \$ (millions)					
Cost Category	sub-category	VOWD	FTC	FAC=VOWD+FTC	Name of Firm(s) providing resources
Personnel	NG Resources	0.017	-	0.017	
	SDC Time & Materials	0.000	-	-	IBM
		0.000	-	-	WiPro
		0.000	-	-	DXC
		0.000	-	-	Verizon
	SDC Fixed-Price	0.000	-	-	IBM
		0.000	-	-	WiPro
		0.000	-	-	DXC
		0.000	-	-	Verizon
	All other personnel	0.007	-	0.007	Centric Consulting, FDM
TOTAL Personnel Costs	0.024	-	0.024		
Hardware	Purchase	0.000	-	-	
	Lease	0.000	-	-	
Software		0.116	(0.058)	0.058	Palisades
Risk Margin			-	-	
AFUDC		0.001	0.000	0.002	
Other		0.000	0.000	0.000	
TOTAL Costs		0.141	(0.057)	0.084	

4.1.2 Benefiting Operating Companies

Operating Company Name	Business Area	State
Keyspan Energy Delivery - NY	Gas Distribution	NY
Keyspan Energy Delivery - LI	Gas Distribution	NY
Niagara Mohawk Power Corp	Electric Distribution	NY
Niagara Mohawk Power Corp - Gas	Gas Distribution	NY
Niagara Mohawk Power Corp - transmission	Transmission	NY
Massachusetts Electric Company	Electric Distribution	MA
Massachusetts Electric Company - transmission	Electric Transmission	MA
Nantucket Electric Company	Electric Distribution	MA
Boston Gas Company	Gas Distribution	MA
Colonial Gas Company	Gas Distribution	MA
Narragansett Gas Company	Gas Distribution	RI
Narragansett Electric Company	Electric Distribution	RI
Narragansett Electric Company - transmission	Transmission	RI
New England Power Company - transmission	Transmission	RI



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4.1.3 IS Ongoing Operational Costs (RTB)

This project will increase IS ongoing operations support costs as per the following tables. These are also known as Run the Business (RTB) costs.

Contract Management Work Stream

all figures in \$ thousands						
INV ID:	4771				Forecast Date:	6/19/2018
Investment Name:	Contract Management				Go-Live Date:	11/30/2018
Project Manager:	Elizabeth Rosa			PDM:	Michael Cowan	
All figures in \$ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 18/19	FY 19/20	FY 20/21	FY 21/22	FY 22/23	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB	155.1	611.2	611.2	611.2	626.6	2,615.3
Last Sanction Business Net Impact to RTB						-
Last Sanction Total Net Impact to RTB	155.1	611.2	611.2	611.2	626.6	2,615.3
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB	155.1	611.2	611.2	611.2	626.6	2,615.3
Business Budgeted Net Impact to RTB						-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	532.1	624.4	624.4	624.4	624.4	3,029.7
Business Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	(377.0)	(13.2)	(13.2)	(13.2)	2.2	(414.4)
Business Budgeted Net Impact to RTB Variance	-	-	-	-	-	-

An increase in expected RTB in FY 18/19 occurred due to the schedule which Oracle uses to renew licensing. The original expectation was renewal of 85 licenses in February of 2019, followed by renewal of 215 additional licenses in August of 2019, and then repeating that pattern; however, Oracle instead billed for a partial year in August 2018 of 215 licenses and will renew all 300 licenses once per year, in February. This causes the cost to fall earlier than expected at the time of Requirements & Design sanction.

The costs presented here assume that the existing 5-year contract with Oracle will be renewed; this renewal is reflected in the costs shown for FY 22/23.



US Sanction Paper

Estimating Work Stream

all figures in \$ thousands						
INV ID:	INVP 4771				Forecast Date:	06/19/18
Investment Name:	Success Enterprise				Go-Live Date:	3/30/2019
Project Manager:	Don Barone			PDM:	Michael Cowan	
All figures in \$ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 18/19	FY 19/20	FY 20/21	FY 21/22	FY 22/23	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB		50.0	50.0	50.0	50.0	200.0
Last Sanction Business Net Impact to RTB						-
Last Sanction Total Net Impact to RTB	-	50.0	50.0	50.0	50.0	200.0
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB	8.3	50.0	50.0	50.0	50.0	208.3
Business Budgeted Net Impact to RTB						-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	-	136.8	133.4	133.4	133.4	537.1
Business Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	8.3	(86.8)	(83.4)	(83.4)	(83.4)	(328.8)
Business Budgeted Net Impact to RTB Variance	-	-	-	-	-	-

Reporting & Analytics Work Stream

all figures in \$ thousands						
INV ID:	4771				Forecast Date:	06/13/18
Investment Name:	Reporting Analytics				Go-Live Date:	9/28/2018
Project Manager:	Elizabeth Rosa			PDM:	Michael Cowan	
All figures in \$ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 18/19	FY 19/20	FY 20/21	FY 21/22	FY 22/23	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB						-
Last Sanction Business Net Impact to RTB						-
Last Sanction Total Net Impact to RTB	-	-	-	-	-	-
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB						-
Business Budgeted Net Impact to RTB						-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Business Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	-	-	-	-	-	-
Business Budgeted Net Impact to RTB Variance	-	-	-	-	-	-



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Risk Management Work Stream

all figures in \$ thousands						
INV ID:	INVP 4771				Forecast Date:	6/19/2018
Investment Name:	Risk Management				Go-Live Date:	4/1/2018
Project Manager:	Don Barone			PDM:	Michael Cowan	
All figures in \$ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 18/19	FY 19/20	FY 20/21	FY 21/22	FY 22/23	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB	30.1	34.6	35.1	35.6	36.5	171.8
Last Sanction Business Net Impact to RTB						-
Last Sanction Total Net Impact to RTB	30.1	34.6	35.1	35.6	36.5	171.8
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB	60.1	34.6	35.1	35.6	36.5	201.9
Business Budgeted Net Impact to RTB						-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	7.2	7.2	14.4
Business Funded Net Impact to RTB Forecasted at Go-Live	-	-	-	-	-	-
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	60.1	34.6	35.1	28.4	29.3	187.5
Business Budgeted Net Impact to RTB Variance	-	-	-	-	-	-



US Sanction Paper

Title:	Hicksville Fiber Upgrades	Sanction Paper #:	USSC-18-165_V2.0
Project #:	INVP 4828 Capex: S007834	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	8/21/2018
Author:	Aravind Lochan / Andrew Yee	Sponsor:	Barry Sheils, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	Andrew Costello

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of INVP 4828 in the amount of \$1.259M with a tolerance of +/- 10% for the purposes of full implementation.

This sanction amount is \$1.259 M broken down into:

- \$ 1.057 M Capex*
- \$ 0.203 M Opex*
- \$ 0.000 M Removal*

1.2 Project Summary

This project will replace the aged multi-mode fiber optic plant that supports National Grid's Hicksville office campus with an optimally routed single mode fiber optic cable plant. Currently, the Hicksville campus fiber cable plant is approximately 30 years old and is not routed efficiently in the campus. There are several failed fiber stands that put the integrity of the campus communications at risk, and the campus uses a multi-mode fiber cable specification which is no longer the industry standard and unable to support today's high speed networking requirements.

The project will also include the associated replacement of the Hicksville LAN switches' multimode fiber interfaces GBICs (GigaBit Interface Converters) with single mode fiber interfaces as part of the migration to the new fiber facilities.

1.3 Summary of Projects

Project Number	Project Title	Estimate Amount (\$M)
INVP 4828	Hicksville Fiber Upgrade Project	1.259
Total		1.259

1.4 Associated Projects

N/A



US Sanction Paper

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Potential Investment Tolerance
3/13/18	USSC	\$1.048 M	\$1.906 M	Partial	+/- 25%

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
March 2019	Project Closure Sanction

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	This project is proposed in order to ensure that National Grid's network estate continues to be reliable and is able to meet new business demands.

1.8 Asset Management Risk Score

Asset Management Risk Score: 41

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability
 Environment
 Health & Safety
 Not Policy Driven

1.9 Complexity Level

- High Complexity
 Medium Complexity
 Low Complexity
 N/A

Complexity Score: 16



US Sanction Paper

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

Yes No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY19 - 23	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input checked="" type="radio"/> Under <input type="radio"/> NA	\$0.107 M

1.12 If cost > approved Business Plan how will this be funded?

N/A

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
CapEx	0.059	0.997	0.000	0.000	0.000	0.000	0.000	1.056
OpEx	0.007	0.196	0.000	0.000	0.000	0.000	0.000	0.203
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.066	1.193	0.000	0.000	0.000	0.000	0.000	1.259

1.14 Key Milestones

Milestone	Target Date: (mm/dd/yyyy)
Start Up	January 2018
Partial Sanction	March 2018
Begin Requirements and Design	March 2018
Project Sanction	August 2018
Begin Development and Implementation	August 2018
Move to Production / Last Go Live	March 2019
Project Complete	March 2019



US Sanction Paper

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input type="checkbox"/> Contractor	
Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green

1.16 Key Issues (include mitigation of Red or Amber Resources)

N/A

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative

1.18 List References

N/A



US Sanction Paper

2 Decisions

I:

- (a) APPROVED this paper and the investment of \$1.259 M and a tolerance of +/- 10%
- (b) NOTED that Andrew Costello is the Project Manager and has the approved financial delegation.

Signature.....Date.....

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



US Sanction Paper

3 Sanction Paper Detail

Title:	Hicksville Fiber Upgrades	Sanction Paper #:	USSC-18-165_V2.0
Project #:	INVP 4828 Capex: S007834	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	8/21/2018
Author:	Aravind Lochan /Andrew Yee	Sponsor:	Barry Sheils Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	Andrew Costello

3.1 Background

The fiber cable network infrastructure is critical to the running of all services and the productivity of all of the end users located at Hicksville campus.

The Hicksville campus fiber cable plant is approximately 30 years, is not routed efficiently in the campus, has many failed fiber stands that put the integrity of the campus communications at risk, and uses a multi-mode fiber cable specification which is no longer the industry standard and unable to support today's high speed networking requirements.

Therefore, it is vital that this network infrastructure is reliable with high availability and also that the bandwidth it provides is sufficient to enable the required performance.

This paper seeks funds to upgrade fiber infrastructure at National Grid's Hicksville office, which is no longer within current standards and identified as a priority to upgrade.

3.2 Drivers

The drivers for this project are the age of the fiber and potential for failure to impact a large number of users in the Hicksville campus.

- A large amount of the fiber has failed over its 30 years and the facility lacks sufficient spare fibers to recover the services in the event of a failure.
- The fiber lengths to connect a number of IDF closets in the campus exceed current network equipment specifications.
- Upgrading fiber infrastructure provides improved end user productivity and therefore provides the business with enhanced capability to utilize advanced technology (e.g. cloud based applications, enhanced network security, future wireless capabilities, and enhanced network management and control).
- Internet applications, internet services and file shares etc., will perform better in terms of latency and throughput with upgraded fiber infrastructure.



US Sanction Paper

3.3 Project Description

This Project addresses the replacement of Multi Mode Fiber to Single Mode fiber across National Grid’s Hicksville corporate facility :

- Rebuild existing (21) Physical IDF’s (Intermediate Distribution Frame) closets (An intermediate distribution frame (IDF) closet is a free-standing or wall-mounted rack for managing and interconnecting the telecommunications cable between end user devices and a MDF (Main Distribution Frame). For example, an IDF might be located on each floor of a multi-floor building routing the cabling down the walls to an MDF on the first floor. The MDF would contain cabling that would interconnect to the phone company or to other buildings).
- Build a new IDF Closet in Fleet Building with Category 6 cabling for approximate (25) workstations and WIFI (Wireless connectivity)
- Build a new MDF (Main Distribution Frame) in Main Office Building.
- Single mode fiber will be laid from Operations building by using the underground 4” new conduit under the parking lot
- Aerial single mode fiber optic cables will be laid in the existing poles of 100 Old Country building
- SFPs (Simple Form-factor Pluggable) fiber optic interfaces will be installed in the switches of the IDF’s closets and at the MDF Data Center
- Single mode migration activity will be scheduled with-in ServiceNow and sent for approval by the National Grid change request process
- Post migration testing will be conducted to ensure and validate objectives have been met

3.4 Benefits Summary

Type	Benefit	Description
Intangible (Indirect benefits)	Ability to add new services	Migration to single mode fiber supports network equipment specifications and future high speed requirements
Intangible (Indirect benefits)	Maximum utilization / Increased access	Continued reliable communication on Hicksville campus. Mitigating risk of communications on Hicksville campus Improved capacity / bandwidth to improve / expand communication capability.



US Sanction Paper

3.5 Business and Customer Issues

N/A

3.6 Alternatives

Alternative 1: Do nothing – This option is not viable as it will not address the critical need to maintain the reliability and effectiveness of National Grid’s systems.

Alternative 2: Defer investment – This option is not recommended, as it does not mitigate the risk from running applications on older, non-reliable network. National Grid’s Hicksville corporate facility have not had an upgrade for many years and are running on the minimum capacity available, putting them at risk of failure.

3.7 Safety, Environmental and Project Planning Issues

There are no significant issues beyond what has been described elsewhere.

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	There is a risk of delay with third party deliverables	3	3	4	9	12	Mitigate	Engage early with Third Parties and follow up		
2	There is a risk of adverse weather conditions impacting key activities thereby impacting project timescales.	4	3	3	12	12	Accept	Effective and proactive planning will be critical as a workaround.		

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operating company receiving allocations of these costs.

3.10.2 Customer Impact

N/A



US Sanction Paper

3.10.3 CIAC / Reimbursement

N/A

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total	
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +		
					2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
INVP 4828	Hicksville Fiber Upgrade Project	Est Lvl (e.g. +/- 10%)	CapEx	0.059	0.997	0.000	0.000	0.000	0.000	0.000	0.000	1.056
			OpEx	0.007	0.196	0.000	0.000	0.000	0.000	0.000	0.000	0.203
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.066	1.193	0.000	0.000	0.000	0.000	0.000	0.000	1.259
Total Project Sanction			CapEx	0.059	0.997	0.000	0.000	0.000	0.000	0.000	0.000	1.056
			OpEx	0.007	0.196	0.000	0.000	0.000	0.000	0.000	0.000	0.203
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.066	1.193	0.000	0.000	0.000	0.000	0.000	0.000	1.259

3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	0.059	1.000	0.000	0.000	0.000	0.000	0.000	1.059
OpEx	0.007	0.300	0.000	0.000	0.000	0.000	0.000	0.307
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.066	1.300	0.000	0.000	0.000	0.000	0.000	1.366

Variance (Business Plan-Project Estimate)

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	(0.000)	0.003	0.000	0.000	0.000	0.000	0.000	0.003
OpEx	(0.000)	0.104	0.000	0.000	0.000	0.000	0.000	0.104
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	(0.000)	0.107	0.000	0.000	0.000	0.000	0.000	0.107



US Sanction Paper

3.11.3 Cost Assumptions

This estimate was developed in 2018 using the Standard IS Estimating Methodology which includes an assessment of project resource needs. Example of these resource needs include hardware, internal and contract labor required to deliver the project. The accuracy level of estimate for each project is identified in Table 3.11.1 & 4.2.1.

3.11.4 Net Present Value / Cost Benefit Analysis

N/A

3.11.4.1 NPV Summary Table

N/A

3.11.4.2 NPV Assumptions and Calculations

N/A

3.11.5 Additional Impacts

N/A

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	N/A	Business Representative
PDM	Helen Smith	Head of PDM
BRM	Brian Detota	Relationship Manager
PDM	Douglas Campbell	Program Delivery Director
IS Finance	Michelle Harris	Director
IS Regulatory	Dan DeMauro	Director
DR&S	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Director
Enterprise Architecture	Joe Clinchot	Director



US Sanction Paper

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Patricia Easterly
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego

4 Appendices

4.1 Sanction Request Breakdown by Project

N/A

4.2 Other Appendices

4.2.1 Project Cost Breakdown

Project Cost Breakdown \$ (millions)					
Cost Category	sub-category	VOWD	FTC	FAC=VOWD+FTC	Name of Firm(s) providing
Personnel	NG Resources	0.121	0.207	0.328	
	SDC Time & Materials	0.000	-	-	IBM
		0.000	-	-	WiPro
		0.000	-	-	DXC
		0.000	-	-	Verizon
	SDC Fixed-Price	0.000	-	-	IBM
		0.000	-	-	WiPro
		0.000	-	-	DXC
		0.000	0.073	0.073	Verizon
	All other personnel	0.003	0.432	0.435	
TOTAL Personnel Costs	0.124	0.712	0.836		
Hardware	Purchase	0.000	0.313	0.313	
	Lease	0.000	-	-	
Software		0.000	-	-	
Risk Margin			0.026	0.026	
AFUDC		0.000	0.039	0.039	
Other		0.000	0.045	0.045	
TOTAL Costs		0.124	1.135	1.259	Should match Financial Summary Total



US Sanction Paper

4.2.2 Benefiting Operating Companies

Benefiting Operating Companies	Business Area	State
Niagara Mohawk Power Corp.- Electric Distr.	Electric Distribution	NY
Massachusetts Electric Company	Electric Distribution	MA
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
Boston Gas Company	Gas Distribution	MA
Narragansett Electric Company	Electric Distribution	RI
Niagara Mohawk Power Corp. - Transmission	Transmission	NY
Niagara Mohawk Power Corp. - Gas	Gas Distribution	NY
New England Power Company – Transmission	Transmission	MA, NH, RI, VT
KeySpan Generation LLC (PSA)	Generation	NY
The Narragansett Gas Company	Gas Distribution	RI
Colonial Gas Company	Gas Distribution	MA
The Narragansett Electric Company – Transmission	Transmission	RI
National Grid USA Parent	Parent Company	
Nantucket Electric Company	Electric Distribution	MA
NE Hydro - Trans Electric Co.	Inter Connector	MA,NH
KeySpan Energy Development Corporation	Non-Regulated	NY
KeySpan Port Jefferson Energy Center	Generation	NY
New England Hydro - Trans Corp.	Inter Connector	MA, NH
KeySpan Services Inc. Service Company	Service Company	
KeySpan Glenwood Energy Center	Generation	NY
Massachusetts Electric Company – Transmission	Transmission	MA
NG LNG LP Regulated Entity	Gas Distribution	MA, NY, RI
Transgas Inc	Non-Regulated	NY
Keyspan Energy Trading Services	Other	NY
KeySpan Energy Corp. Service Company	Service Company	
New England Electric Trans Corp	Inter Connector	MA
New England Electric Trans Corp	Inter Connector	MA

4.2.3 IS Ongoing Operational Costs (RTB):

This is no RTB impacts as a result of this project

4.3 NPV Summary (if applicable)

N/A

4.4 Customer Outreach Plan

N/A



US Sanction Paper

Title:	DG IOAP Phase 2 Screens C-F and CYME Server	Sanction Paper #:	USSC-18-291 v2
Project #:	INVP 5037 Capex: S007931	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	1/22/2019
Author:	Lydia Barrett	Sponsor:	Carol Sedewitz, VP Electric Asset Management
Utility Service:	IT	Project Manager:	Lydia Barrett

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of INVP 5037 in the amount of \$2.937M with a tolerance of +/- 10% for the purposes of Full Implementation.

This sanction amount is \$2.937M broken down into:

- \$2.511M Capex*
- \$0.426M Opex*
- \$0.000M Removal*

1.2 Project Summary

In the September 2016 New York Interconnection Online Application Portal (IOAP) Functional Requirements report, utilities were given a recommended deadline of “end of 2017” to automate New York Standard Interconnection Requirements (NY SIR) technical screenings in the IOAP Phase 2. Final requirements for screens C-F were published by the New York Public Service Commission (PSC) in April 2018. Automation of preliminary technical screens A and B were delivered in January 2018. This project will deliver on automating the preliminary technical screens C-F, including upgrading the Company’s CYME power system engineering software to a server-based platform to support the automation. The upgraded system will eliminate multiple manual processes and workarounds for all distribution planning engineers across the New York, Massachusetts and Rhode Island service territories.



US Sanction Paper

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
INVP 5037 Capex: S007931		DG IOAP Phase 2 Screens C-F and CYME Server	2.937
Total			2.937

1.4 Associated Projects

Project Number	Project Title	Estimate Amount (\$M)
INVP 4748	DG IOAP Phase 2 Feasibility Study	0.296
INVP 5023	DG IOAP Phase 2 Screens A & B	0.406
Total		0.702

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Sanction Type	Potential Investment Tolerance
8/28/18	USSC	\$1.045M	\$2.687M	Partial Sanction	+/- 25%

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
April 2020	Project Closure Sanction



US Sanction Paper

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input checked="" type="radio"/> Mandatory	Mandatory for automation of DG IOAP Screens C-F: Reforming the Energy Vision (REV) - NY Public Service Commission (PSC) mandate (Case # 14-M-0101)
<input type="radio"/> Policy- Driven	Policy-Driven for CYME Server and centralized database in support of the above mandate
<input type="radio"/> Justified NPV	
<input type="radio"/> Other	

1.8 Asset Management Risk Score

Asset Management Risk Score: 49

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability
 Environment
 Health & Safety
 Not Policy Driven

1.9 Complexity Level

- High Complexity
 Medium Complexity
 Low Complexity
 N/A

Complexity Score: 12

1.10 Process Hazard Assessment

A Process Hazard Assessment (PHA) is required for this project:

- Yes
 No



US Sanction Paper

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IT Investment Plan FY19-23	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	\$0.244M

1.12 If cost > approved Business Plan how will this be funded?

Re-allocation of budget within the IT business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements.

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2018/19	Yr. 2 2019/20	Yr. 3 2020/21	Yr. 4 2021/22	Yr. 5 2022/23	Yr. 6 + 2023/24	
CapEx	0.000	0.738	1.773	0.000	0.000	0.000	0.000	2.511
OpEx	0.000	0.274	0.152	0.000	0.000	0.000	0.000	0.426
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	1.012	1.925	0.000	0.000	0.000	0.000	2.937

1.14 Key Milestones

Milestone	Target Date: (Month Year)
Start Up	May 2018
Partial Sanction	August 2018
Begin Requirements and Design	August 2018
Project Sanction	January 2019
Begin Development and Implementation	January 2019
Move to Production / Last Go Live	December 2019
Project Closure	April 2020



US Sanction Paper

1.15 Resources, Operations and Procurement

Resource Sourcing			
Engineering & Design Resources to be provided	<input checked="" type="checkbox"/> Internal	<input type="checkbox"/> Contractor	
Construction/Implementation Resources to be provided	<input checked="" type="checkbox"/> Internal	<input checked="" type="checkbox"/> Contractor	
Resource Delivery			
Availability of internal resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green

1.16 Key Issues (include mitigation of Red or Amber Resources)

N/A

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative
Impact on adaptability of network for future climate change:	<input checked="" type="radio"/> Neutral	<input type="radio"/> Positive	<input type="radio"/> Negative

1.18 List References

N/A



US Sanction Paper

2 Decisions

I:

- (a) APPROVE this paper and the investment of \$2.937M and a tolerance of +/-10% for the purposes of Development and Implementation.
- (b) APPROVE the run-the-business (RTB) of \$0.159M (per annum) for 5 years.
- (c) NOTE that Michelle McNaught is the Program Delivery Director and has the approved financial delegation.

Signature.....Date.....

David H. Campbell, Vice President ServCo Business Partnering, USSC Chair



US Sanction Paper

3 Sanction Paper Detail

Title:	DG IOAP Phase 2 Screens C-F and CYME Server	Sanction Paper #:	USSC-18-291 v2
Project #:	INVP 5037 Capex: S007931	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	1/22/2019
Author:	Lydia Barrett	Sponsor:	Carol Sedewitz, VP Electric Asset Management
Utility Service:	IT	Project Manager:	Lydia Barrett

3.1 Background

New York’s Reforming the Energy Vision’s (REV’s) Phase 1 objectives reflect an increasing need to adapt to a changing energy landscape. Distributed Generation (DG) grid interconnections in New York are growing at an accelerated rate. REV aims to address development of a utility-customer engagement Web platform for interconnections called the Interconnection Online Application Portal (IOAP) for all New York utilities. REV Phase 1 proposes that the IOAP be rolled out in phases – application management (Phase 1), automation of Standardized Interconnection Requirements (SIR) technical screenings (Phase 2), and full automation of all processes (Phase 3).

In the September 2016 New York Interconnection Online Application Portal Functional Requirements report (IOAP), utilities were given a recommended deadline of “end of 2017” to automate NY SIR technical screenings in the IOAP (DG IOAP Phase 2).

The Online Application Portal (Phase 1) for the New York territory was implemented in May 2017 (INVP 4411A). A Feasibility and Analysis (F&A) study for IOAP Phase 2 (INVP 4748) was undertaken and completed in October 2017 to study the available requirements from the PSC, design for screens A and B, and investigate preliminary options for screens C-F.

Since the start of the F&A study, changes to Screens D, E, and F were submitted by EPRI (Electric Power Research Institute) and the ITWG (Interconnection Technical Working Group). Because the IOAP requirements were not finalized by the NY PSC, IOAP Phase 2 would be completed with two (2) subsequent efforts.

INVP 5023 was undertaken to deliver on automation of Screens A and B, while continuing the effort of F&A for Screens C-F based on red-line versions of the requirements for the preliminary technical screens. Automation of Screens A and B was delivered in January 2018. The F&A effort conducted analysis of several options for



US Sanction Paper

delivering on Screens C-F. However, without a final version of the requirements from the NY SIR, a final solution was not decided. A final version of the NY SIR was delivered in April 2018, which allowed finalizing the IOAP solution. In order to meet the new mandated date of July 19, 2018 of the tariff, an interim solution was implemented while a robust enterprise solution was planned. This second effort, to fully automate Screens C-F, is outlined in this proposal.

Information to perform preliminary technical screens is stored in the existing business system, CYME. CYME is utilized by Distribution Planning Asset Management (DPAM) group and Electric Asset Management (EAM) engineers to perform the manual evaluation of Screens C-F. The CYME Server will provide the platform required to host CYME application programming interfaces (APIs) necessary to automate the technical screens C through F.

CYME is also used for load flow analysis and the tracking and management of feeder information. Engineers currently work in isolated CYME instances which require the manual exporting of individual files by region and manual upload by each engineer when completing their assessment for other groups to be able to access the data. This distributed system inhibits model sharing, the ability to change assets universally, and creates the potential for data loss.

Implementing the CYME Server in conjunction with a centralized database will provide a solid basis for the automation of Screens C-F, as well as future additional processes performed manually today for all National Grid jurisdictions. It will eliminate the potential of safety and reliability issues for customers and field technicians due to the delay in data consolidation coupled with the removal of human intervention.

Note that the preliminary technical screens differ by jurisdiction and the proposed solution will consider that additional jurisdictions may require automation in the future.

3.2 Drivers

- The investment into the IOAP supports National Grid's alignment to the NY PSC's REV initiatives.
- Satisfy requirements set forth by the NY PSC will maintain National Grid's reputation and position the Company as a leader in this space.
- This project is directly in line with "Our Customers" in National Grid's Bring Energy to Life model.
- Automation of NY SIR technical screenings is expected to result in increased customer satisfaction (accelerated utility feedback on applications) and refocused engineering resources to complex projects and studies.



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- The centralization of the CYME database will enable engineers to work collaboratively across regions and engineering disciplines because of real-time updates as well as provide additional protection against lost data.

3.3 Project Description

This project will automate preliminary technical screens C-F per the New York PSC mandate, and implement the CYME Server product along with a centralized CYME database. The technical screenings provide interconnection viability feedback to customers and trade allies. Automation of the technical screenings will streamline the DG application process for customers and National Grid engineering groups. Proper feedback of technical screening information is expected to be integrated into the IOAP as well to foster transparency to customers. Technical screens will be performed for all complex NY DG applications.

The project will consist of the following:

- Plan, design, document and test necessary applications and/or tools to deploy automation of SIR technical screening in IOAP:
 - Screen C - EPS Rating Exceeded Test
 - Is the EPS rating exceeded with addition of DG?
 - Screen D - Line Configuration Test
 - Is the line configuration compatible?
 - Screen E - Simplified Penetration Test
 - Is aggregate DG, including DG in the queue, less than 15% of feeder peak load?
 - Screen F - Simplified Voltage fluctuation Test
 - Is new DG less than 10% of the feeder rating? OR
 - Does new DG cause a voltage rise greater than 3% of nominal?
- Modify the existing workflow within the IOAP (also known as National Grid Customer Application Portal – nCAP) to initiate automated screens when an application is submitted
- Implement CYME Server & centralize CYME Network Model database
- Integrate internal data systems to IOAP nCAP portal
- Provide additional reporting capabilities

During the Requirements & Design phase of the project, the following were accomplished:

- Documented Business Requirements for DG IOAP Technical Screens C-F, CYME Server and Centralized Database



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- Developed Solution Design
- Provisioned the development environment infrastructure to support the proof of concept
- Completed Proof of Concept for CYME Desktop Virtualization and Centralized Database connectivity
- Finalized Solution Implementation Roadmap

3.4 *Benefits Summary*

- The investment into the IOAP supports National Grid's alignment to the NY PSC's REV initiatives.
- Satisfying requirements set forth by the NY PSC is expected to further National Grid's reputation and position as a leader in this space.
- Automation of SIR technical screenings is expected to improve customer satisfaction by providing accelerated utility feedback on applications.
- Simplification and automation of manual processes of maintaining distribution system information will drive efficiencies within the business.
- The solution will provide the ability to track changes to feeder models and apply changes related to assets universally.

3.5 *Business and Customer Issues*

There are no significant business issues beyond what has been described elsewhere.

3.6 *Alternatives*

Alternative 1: Defer Screen C-F Automation

Deferring Screens C-F would leave National Grid non-compliant with IOAP Phase 2, PSC Case # 14-M-0101.

Alternative 2: Automate Screens C-F without CYME Server

This option is rejected because it would require additional interfaces to be built to consolidate information prior to running each screening, would require the continuation of additional manual processes and the potential for safety and reliability issues.



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3.7 Safety, Environmental and Project Planning Issues

There are no significant business issues beyond what has been described elsewhere.

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	Business & Vendor resources may not be available as needed on the project.	3	4	4	12	12	Mitigate	Get a firm commitment for IT partner, Vendor and Business resources early on with an appropriate backfill resource plan as needed.	Cost and Schedule impacts	Re-prioritize deliverables and adjust resource allocation or secure alternate resources to keep cost and schedule in check.

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

Recovery will occur at the time of the next rate case for any operation company receiving allocations of these costs.

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A



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3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total	
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +		
					2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
INVP 5037 Capex: S007931	DG IOAP Phase 2 Screens C-F and CYME Server	Est LM (+/- 10%)	CapEx	0.000	0.776	1.720	0.000	0.000	0.000	0.000	0.000	2.496
			OpEx	0.000	0.274	0.167	0.000	0.000	0.000	0.000	0.000	0.441
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	1.050	1.887	0.000	0.000	0.000	0.000	0.000	0.000
Total Project Sanction			CapEx	0.000	0.738	1.773	0.000	0.000	0.000	0.000	0.000	2.511
			OpEx	0.000	0.274	0.152	0.000	0.000	0.000	0.000	0.000	0.426
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	1.012	1.925	0.000	0.000	0.000	0.000	0.000	0.000

3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	0.000	1.754	0.000	0.000	0.000	0.000	0.000	1.754
OpEx	0.000	0.850	0.089	0.000	0.000	0.000	0.000	0.939
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	2.604	0.089	0.000	0.000	0.000	0.000	2.693

Variance (Business Plan-Project Estimate)

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	
CapEx	0.000	1.016	(1.773)	0.000	0.000	0.000	0.000	(0.757)
OpEx	0.000	0.576	(0.063)	0.000	0.000	0.000	0.000	0.513
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	1.592	(1.836)	0.000	0.000	0.000	0.000	(0.244)

3.11.3 Cost Assumptions

This estimate was developed in 2018 using the standard IS estimating methodology, which includes an assessment of project costs. Examples of these project costs are internal and contract labor, hardware and software to deliver the project, cost of living adjustments for multi-year projects, AFUDC for capital investments, risk, as well as ongoing support costs. Standard rates are used in the estimate to promote consistency



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(ex: internal labor rates, cost of living adjustments %, AFUDC % and risk %). The accuracy level of estimate is identified in table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

This is not an NPV project.

3.11.5 Additional Impacts

None.

3.12 Statements of Support

3.12.1 Supporters

The supporters listed have aligned their part of the business to support the project.

Department	Individual	Responsibilities
Business Department	Kevin Stablewski / Wajiha Mahmoud	Business Representative
Business Partner (BP)	Orla Daly	Relationship Manager
Program Delivery Management (PDM)	Michelle McNaught	Program Delivery Director
IT Finance	Michelle Harris	Manager
IT Regulatory	Daniel DeMauro	Director
Digital Risk and Security (DR&S)	Elaine Wilson	Director
Service Delivery	Mark Mirizio	Manager
Enterprise Architecture	Joe Clinchot	Director

3.12.2 Reviewers

The reviewers have provided feedback on the content/language of the paper.

Function	Individual
Regulatory	Harvey, Maria
Jurisdictional Delegate - Electric NE	Easterly, Patricia
Jurisdictional Delegate - Electric NY	Harbaugh, Mark A.
Jurisdictional Delegate - FERC	Hill, Terron
Jurisdictional Delegate - Gas NE	Currie, John
Jurisdictional Delegate - Gas NY	Wolf, Don
Procurement	Chevere, Diego



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4 Appendices

4.1 Sanction Request Breakdown by Project

N/A

4.2 Project Cost Breakdown

Project Cost Breakdown \$ (millions)						
Cost Category	sub-category	Value of Work to Date (VOWD)	Forecast to Complete (FTC)	Forecast At Completion (FAC=VOWD+FTC)	Name of Firm(s) providing resources	
Personnel	NG Resources	0.292	0.393	0.685		
	SDC Time & Materials		0.117	0.240	0.357	IBM
			0.035	0.232	0.267	WiPro
			0.019	0.045	0.064	DXC
			0.000	0.019	0.019	Verizon
	SDC Fixed-Price		0.000	-	-	IBM
			0.000	-	-	WiPro
			0.000	-	-	DXC
			0.000	-	-	Verizon
	All other personnel	0.140	0.868	1.008	Accenture, CYME	
	TOTAL Personnel Costs	0.603	1.797	2.400		
Hardware	Purchase	0.000	-	-	-	
	Lease	0.000	0.014	0.014	-	
Software		0.003	0.152	0.155	JIRA, CYME, SQL DB, Win Server	
Risk Margin			0.164	0.164		
AFUDC		0.001	0.111	0.113		
Other		0.010	0.082	0.091	Shared OH, Expenses	
TOTAL Costs		0.617	2.320	2.937		

4.3 Benefiting Operating Companies

This investment will be allocated in two ways. The work will be allocated to the electric distribution companies as follows:

4.3.1.1 DG IOAP Screens C-F Automation

Work to implement the robust automation of DG IOAP Phase 2 technical screens C-F will be allocated only to Niagara Mohawk Power Electric Distribution because this is mandated work from the NY PSC and will not be implemented in other jurisdictions.



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Operating Company Name	Business Area	State
Niagara Mohawk Power	Electric Distribution	NY

4.3.1.2 CYME Server and Centralized Database

CYME Server and centralized database work will be allocated to the following companies because all Electric Distribution will benefit. Allocation is based upon the number of customers.

Benefiting Operating Companies Table:

Operating Company Name	Business Area	State
Niagara Mohawk Power	Electric Distribution	NY
Massachusetts Electric	Electric Distribution	MA
Nantucket Electric Company	Electric Distribution	MA
Narragansett Electric Company	Electric Distribution	RI

4.4 IS Ongoing Operational Costs (RTB):

This project will increase IT ongoing operations support costs as per the following table. These are also known as Run the Business (RTB) costs.

The increase in RTB is attributed to the software licenses, hardware lease, interface operational support cost, and application support cost.

All figures in \$ thousands	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Total
	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	
Last Sanctioned Net Impact to RTB						
Last Sanction IS Net Impact to RTB	25.5	29.5	29.5	29.5	29.5	143.5
Last Sanction Business Net Impact to RTB	135.6	187.8	187.8	187.8	187.8	886.8
Last Sanction Total Net Impact to RTB	161.1	217.3	217.3	217.3	217.3	1,030.3
Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB	28.5	29.0	29.0	29.0	29.0	144.5
Business Budgeted Net Impact to RTB	-	-	-	-	-	-
Currently Forecasted Net Impact to RTB						
IS Funded Net Impact to RTB Forecasted at Go-Live	29.0	121.2	121.2	121.2	121.2	513.9
Business Funded Net Impact to RTB Forecasted at Go-Live	9.5	37.8	37.8	37.8	37.8	160.7
Variance to Planned/Budgeted Net Impact to RTB						
IS Investment Plan Net Impact to RTB Variance	(0.5)	(92.2)	(92.2)	(92.2)	(92.2)	(369.4)
Business Budgeted Net Impact to RTB Variance	(9.5)	(37.8)	(37.8)	(37.8)	(37.8)	(160.7)

4.5 NPV Summary (if applicable)

N/A



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4.6 Customer Outreach Plan
N/A