

CONFIDENTIAL DRAFT

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AGENDA ITEM: TBC

Gas Business Enablement (GBE)

Executive Owner(s): Dean Seavers, US CEO

Forum: Executive Committee | Meeting Date: 16/2/2017

Executive Summary

CONTEXT

The US Gas Business is facing significant challenges. These include improving compliance performance, continuing to successfully deliver the growing capital program, meeting the demand for customer connections, supporting evolving customer and regulatory expectations, and ultimately making the business run more effectively. These significant challenges are amplified by the complexity created by the disparate legacy processes and systems currently utilized across the operating companies. Further, many of the IS systems are nearing the end of their life, adding to the risk that core operations and future growth will be jeopardized.

The Gas Business Enablement (GBE) program has been co-developed with the US Gas Business, IS, Procurement and HR to meet these challenges. Its objectives are to reduce risk, deliver a step change in business performance, and enable future growth. The program team was mobilized in June 2016 with the support of key resources from the Gas Business and IS to ensure the program had the right capabilities and experience from the start. Since then they have engaged industry experts, completed 'go-see' visits, formed links with other National Grid programs in the US and UK, implemented pilots to test new concepts, and heavily engaged the gas business to develop a solution, roadmap and business case.

The solution is focused on standardizing and simplifying operational processes onto new asset, work and mobility systems (a core backbone). A discrete set of enhanced capabilities focused on customer, asset management and data supplement the backbone. A refined operating model and value framework aim to embed and sustain a culture of accountability and compliance. Industry standard solutions, an innovative release strategy, modern delivery methods and robust governance are used to support the successful delivery of the desired business outcomes.

The roadmap is phased and prioritized over five years to reduce operational risk while balancing deliverability, accelerating value creation where possible, and aligned to support regulatory recovery. The backbone and enhanced capabilities will leave the business well positioned to adapt to future needs including changing regulations, expanding to the electric business, and delivering enhanced customer services in the context of NY REV, MA Gridmod or RI Docket 4600.

The recommended roadmap is forecast to cost \$458M over 5 years with a first-year cost of \$84M. Once fully implemented there are estimated incremental support costs (RTB) of \$18M a year. Although this is primarily an asset replacement program, there are a broad range of tangible and intangible benefits associated with the investment. These include quantifiable annual benefits of \$40M a year to be achieved once the system is fully implemented and stabilized. The costs and benefits will be included in future US rate cases starting with Niagara Mohawk in early FY18. An annual sanctioning approach will give the Committee visibility of progress and optionality for the future trajectory of the roadmap based on performance, regulatory support and market needs.

QUESTIONS

1. What is Gas Business Enablement and why is it needed now?
2. What is the approach to the solution and is there anything unique?
3. What options were considered, what is the investment for the preferred option?
4. What are the anticipated benefits and business case for this investment?
5. What are the key risks to the program and how are you mitigating them?
6. What visibility/controls are there to ensure the program does not go off track?

Author(s): Johnny Johnston, SVP, Gas Business Enablement

Date of last paper: 19 October 16 | Date of next paper: September 17

nationalgrid

CONCLUSION

The US Gas Business is facing significant risk and performance challenges that require action. The recommended GBE roadmap addresses these challenges and leaves the business well placed to meet future regulatory, customer and stakeholder needs. The program applies lessons from the past to facilitate successful delivery. The immediate need, expected regulatory support and anticipated benefits support the overall approach and investment.

INPUT SOUGHT

(1) Approve an FY18 GBE budget of \$84M (\$30M Opex and \$54M Capex) with an incremental \$9M contingency for the recommended roadmap. Note that FY19 funding will be requested in September 2018 and that there will be a four-year funding commitment to complete the backbone. (2) Endorse the proposed \$458M (\$178M Opex and \$280M Capex) with an incremental \$61M contingency, five year roadmap. Note that the anticipated annual benefits are \$40M a year (\$11M Opex and \$29M Capex) and there will be an estimated incremental RTB costs of \$18M a year. (3) Endorse the proposed annual sanctioning approach to provide on-going assurance, and (4) Delegate Authority to the GBE Steering Group to continue regular oversight of the GBE program

The Report - ANALYSIS

1. What is Gas Business Enablement and why is it needed now?

Gas Business Enablement (GBE) is proposed as a holistic transformation of the US gas business to address three specific challenges the business is facing:

- **The increasing risk of reliably delivering core operations with a growing list of core systems that are aging with a corresponding reduction in support.** Within two years, 94% of the front office systems will be at 'end of life', up from 79% today. The average age of these systems is 14 years old versus an industry benchmark of six. Due to growing down time and reduced ability to make changes to these systems, it is increasingly difficult to support safe, compliant operations and meet ongoing regulatory obligations.
- **The need for a step change in business performance.** There are several examples where the company needs to do better. These include the \$40M in compliance penalties the gas business has or is negotiating from the last three years, our inability to respond to regulatory needs (for example, it took 10 months to implement a shorter appointment window in MA), and the significant reliance on paper, which is a challenge to efficiency and effective record keeping. In short, our current systems no longer support the way we need to work, manage performance, and empower our employees to serve our customers.
- **Continued successful delivery of the capital program.** Over recent years the capital delivery program has tripled to over \$2bn a year, largely in response to customer and regulatory requirements. This has put significant strain on the legacy approach and supply chain. Modern supported solutions with an integrated supply chain are necessary to reliably deliver this significant growth area for National Grid.

In addition to addressing these challenges, GBE will help National Grid be more prepared to respond to the fast changing energy and technology environments. Ensuring that the capabilities being delivered remain prudent and relevant to the business. To respond to these challenges, GBE has the following key elements:

1. **Integrate, standardize, and simplify** our core delivery processes and systems onto a modern platform (comprising 19 best-of-breed solution components from the 99 disparate applications today). This includes industry standard core enterprise asset management, work management, and geospatial information systems (GIS - *i.e.*, mapping solution) to process all gas assets, records, and transactional data and to allow the management of assets and administration of work more holistically. This will improve capital delivery effectiveness, reduce compliance breaches and lead to better employee utilization.

2. **Build a flexible, digital interaction platform** on top of the core systems to allow our customers, call center and field employees to operate on the same platform. This will significantly improve the experience for our customers by making National Grid a much easier company to do business with, and putting information and control into customers' hands (examples can be seen in Appendix G). It will also significantly improve our employee's experience, giving them a platform that makes it easy to get and complete work. This supports Operations in the short term by allowing more to be completed with appointments and improving customer satisfaction. It also builds invaluable capabilities necessary in the evolving future energy marketplace.
3. **Creating a performance focused organization** with focus on end-to-end process, a strengthened value framework and revised and clarified accountability aligned with API 1173 (Federal Process Safety guidelines) requirements. These business capabilities ensure that business outcomes are realized and will drive desired behavioural changes throughout the organization necessary to deliver a step change in performance

The greatest imperative for immediate action is that 79% of the front office systems are already at 'end of life'. Because of this, the business is carrying significant risk, is experiencing heightened levels of frustration and overall ineffectiveness. This will intensify in the future as the reliability of these systems deteriorates. The existing systems hinder the business' ability to effectively support delivery of the growing US gas capital program, address the evolving regulatory environment around gas safety and compliance, and meet changing customer expectations.

2. What is the approach to the solution and is there anything unique?

This is a large program that will take multiple years to complete. National Grid has worked with two of the top system integrators (SI) in the US, Accenture and PWC, to complete a high-level design and develop a roadmap that leverages modern approaches to minimize risk and maximise the likelihood that the desired business outcomes are successfully delivered. This work includes:

- **Developing a core backbone solution and building incremental enhanced capabilities.** The core includes implementing asset, work management and mapping solutions over the first four years. The core solution uses tried and tested utility solutions that will be implemented with minimal customization and standardized business processes across the enterprise. Focusing on the core first and implementing it as quickly as possible will help to reduce risk and create the foundation for the value adding enhancements. The enhanced capabilities build on the core and are focused on adding incremental value to National Grid's customers throughout the five-year program. The full set of initiatives and high level roadmap can be seen in Appendix A and B.
- **Phasing implementation.** The approach avoids a 'big bang' implementation by breaking down the program based on work types and geography and prioritizing work types to accelerate delivery and manage risks. For geography, Rhode Island has been identified as the optimal test bed given its significant reliance today on paper-based operations and its manageable scale. A strict stage-gate methodology will be employed to manage delivery and implementation in other geographies/OpCo's, once pre-defined thresholds of performance have been successfully demonstrated in Rhode Island.
- **Leveraging agile development techniques.** Traditionally, projects like this would be developed using waterfall techniques with long cycle time between business requirements and a solution. In *agile* development, the business and IS teams work more collaboratively in short-cycle scrums to prioritize functionality and get to a minimum viable product (MVP). This is the simplest solution that can be implemented, with future enhancements continuously prioritized by value and added as the team learns with the solution. Agile development offers many benefits including earlier release of initial functionality, continuously reprioritized enhancements based on learning, and higher success rates. Agile is a well-established approach utilized by a growing number of utilities. It was successfully used in one of the GBE pilots.

- Taking a ‘cloud first’ approach.** Putting as much of the solution into the cloud as appropriate will provide several benefits including faster implementation and enhancement adoption, fewer upgrades to legacy infrastructure, reduced risk of obsolescence, and the opportunity to enhance security. Cloud solutions also provide strategic advantages: Software in the cloud is easier to keep up to date, and so key external interfaces such as those required in strategic partnership are easier to accomplish. Cloud solutions can also be more easily scaled for additional capacity when required to enable growth. Also, cloud instances can be managed more dynamically, providing important flexibility to refine solutions as market requirements change over time while at the same time discouraging customization due to the adoption of standard services.

Lessons from previous programs have been built into GBE from the start. The table below shows specifically how the root causes and lessons of the US Foundations Program have been built into the GBE program. National Grid’s Critical Success Factors have also been embedded into the GBE program from the beginning.

USFP Root Causes	GBE Program Actions
Weak human capital infrastructure	Strong Leadership team built, talent from business and IS inserted with external hires with specific required capability to support (e.g. scaled agile, cloud & data architects, change management experts) – 70% of Band Cs are Hypo or promotable. Dedicated HRBP to support attraction & development of talent
Personnel churn	Plan to work with HR on retention arrangements for key personnel. Talent Management Plans (including Succession Plans) being built for all aspects of program organization.
Program Management Weakness	PMO setup with USFP BI lead and additional National Grid resources to limit over-reliance on contractors, Critical Success Factors implemented, first pulse check from Program Assurance positive
Little clarity on roles, responsibilities, authority w/ US and with PLC	Single Executive Sponsor – Dean Seavers Single Program Sponsor – Johnny Johnston See RACI in Appendix F that clearly defines roles
Poor Organizational Change Management	External VP hired for their change management capability. Change Management capability build planned for business leadership team as part of the program. A transformational scope developed that includes a number of initiatives supporting change management
Absence of useful metrics	Program metrics developed for phase 1 and reviewed on a weekly basis in the team hub. Approach will be refreshed for the next phase with metrics for delivery, readiness and benefits
Poor risk awareness	Risk reviewed weekly by the project team in the project hub. Key risks fed into the Steering Group on a monthly basis. Actions/owners are documented and follow ups tracked.
Poor management of Business Objectives, Budget, and Schedule trade-offs	Design Authority implemented with business VPs to ensure program is aligned to business needs and effectively manages tradeoffs. Steering Group in place to have oversight program is running to costs & schedule

Uniqueness can add risk to a program. The main elements of the backbone solution are industry standard and are not unique. Software selection is still in progress, but all the core solutions identified have been demonstrated at scale and can be integrated as necessary with legacy National Grid systems. The ‘cloud first’ and agile approaches are somewhat new to National Grid but well used in other industries. There is one area where a more innovative approach is being proposed - the interaction platform for customers. Negotiations continue to develop this solution in partnership with one of the biggest customer relationship management (CRM) providers in the world. This new approach is being progressed because of the significant strategic value it provides. It will be closely managed and there are standard utility approaches to fall back to if necessary.

3. What options were considered, what is the investment for the preferred option?

Five main options below were considered. Complete deferral was not considered as a credible option based on the challenges identified in this paper and the need as a minimum to address the aging IS systems:

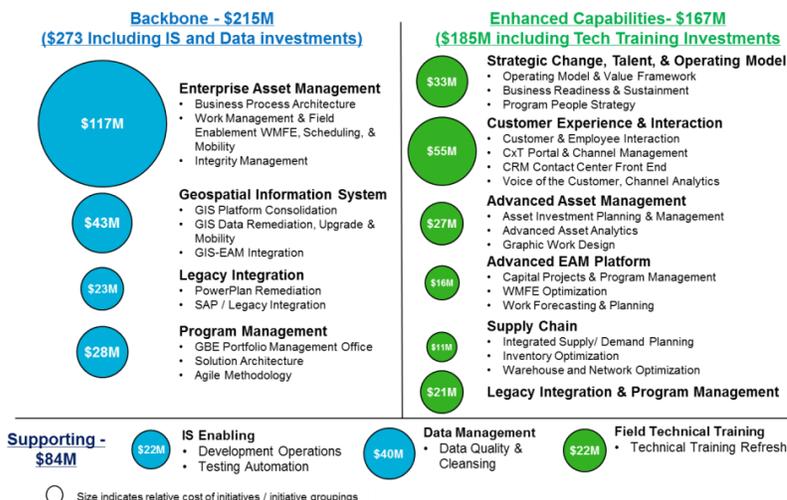
1. Legacy Stabilization – this option would deliver tactical patches, upgrades and replacement of the legacy systems, without looking to enhance or integrate (i.e., a temporary solution).
2. Backbone Only – this option is primarily a technology replacement program focused on reducing risk by replacing the legacy solutions with industry standard enterprise asset and work management solutions. This was identified as a ‘de-scoped’ alternative to options three and four if they were deemed too ambitious or unaffordable.
3. Value Scope (Transformation Prioritized) – this option recommends a prioritized business transformation focused on implementing the backbone solution over three years and enhanced capabilities over five years to support incremental value realization.
4. Value Scope (Rate Case Aligned) – this option has a similar transformational scope and cost as option three, however the phasing was extended to better align with anticipated rate case revenues. In this option the backbone is replaced over four years.
5. Value Scope (Big Bang Approach) – this option looked to implement a holistic business transformation solution as quickly as possible (~3 years).

The table to the right shows a summary assessment of the options. It can be seen option 4 is the preferred and recommended option as it scores the highest overall by best balancing risk reduction, timely delivery of benefits and cost recovery.

Option:	Risk Mitigation	Time to value	Benefits	Regulatory Recovery
1. Legacy Stabilization	☐	☐	☐	☐
2. Backbone Only	☐	☐	☐	☐
3. Value Scope Transformation Prioritized	☐	☐	☐	☐
4. Value Scope Rate Case Aligned	●	☐	☐	☐
5. Value Scope Big Bang Approach	☐	●	☐	☐

The forecasted total investment for the recommended Option 4 is \$458M (+\$61M contingency) over 5 years for the US enterprise. It should be noted that the first-year request is for \$84M (+\$9M contingency). A summary of major components of the investment can be seen below; further detail on FY18’s investments can be seen in Appendix C. A detailed breakdown in costs by year, OpCo and Capex/Opex can be seen in Appendix D. It is estimated that RTB costs will increase by \$18M a year as a fully supported model for all major platforms is reintroduced. The investment estimates were developed with Accenture and validated by PWC. Accenture has a track record for developing prudent forecasts that have been successfully delivered.

Key Investments for Option 4 – Value Scope (Rate Case Aligned)
Total Costs \$458M over 5 years

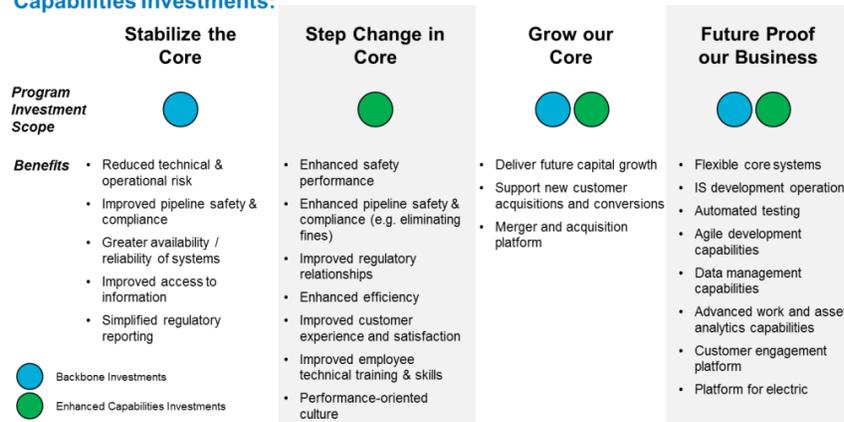


The governance and program approach has been designed around an annual Executive Committee review & sanctioning process. This will allow the program to be modified based on regulatory support, delivery performance, and any changing market conditions that the program needs to respond to. This would also enable the program to be stopped if necessary. However, stopping the program in the first four years would involve a write off as the early years contain multiyear foundational activities.

4. What are the anticipated benefits and business case for this investment?

The first objective of GBE is to consolidate the many duplicate and aging applications and replace a number of aged systems across the enterprise. The primary benefit is the reduced operational risk. This is the focus of the ‘backbone’ investments and, as such, should be seen as asset replacement investment, similar to replacing leak prone pipe with plastic pipe. They do lay the foundation for enhanced capabilities that will drive a broader range of benefits and performance improvements. The table below summarizes the range of benefits associated with the backbone and enhanced capabilities investments. The close alignment with Shaping our Future can be seen.

Summary of Option 4 benefits for the Backbone and Enhanced Capabilities Investments:



Once embedded, there are anticipated benefits of \$40M a year associated with the enhanced capability investments, including creating additional capacity (i.e. through productivity improvements). In many cases, it is anticipated that this capacity will be used for incremental work, avoiding incremental hires, rather than a direct reduction in costs. The major components are as follows:

- \$17.1M in capacity realized through incremental work, reduced overtime and contractor usage through better planning, resource optimization and reduction in non-productive activities enabled by the new processes, systems, metrics and visibility.
- \$4.4M in resource reallocation as a result of enhanced program capabilities allowing for a shift in focus for clerical support staff.
- \$13.5M in reduced compliance fines as a result of more accurate data collection, improved scheduling transparency and more robust reporting.

Further detail including the remaining components, a breakdown by year, OpCo, and Capex/Opex can be seen in Appendix E.

Over a 5-year period, the \$40M annual benefits will amount to \$198M, which is greater than the \$185M investment in the enhanced capabilities. It is anticipated that these costs and benefits will be filed in each of our rate cases starting with Niagara Mohawk in April 2017, with the anticipation that they will be recovered if prudence can be demonstrated.

While accountability for successful program delivery sits with the GBE team, accountability for realizing performance improvements and associated benefits lies with the US gas team. A value framework is being developed to create operational KPIs that will track and support realization of the aspirational benefits. These will be aligned to the new dedicated process leads and operational VPs to drive benefits realization. A more detailed RACI table can be found in Appendix F.

5. What are the key risks to the program and how are you mitigating them?

Beyond those risks outlined earlier in the paper, the following table summarizes the key delivery risks to the GBE program and their mitigations:

Risk	Definition	Key Mitigations
Scope creep	Scope and cost of program increases because of failure to stay focused on objectives	Value framework helps manage scope/value tradeoffs Agile approaches help identify most relevant solutions Sanctioning waves allow total costs to be reevaluated
Cost overruns	Costs of program are greater than forecast due to unbudgeted challenges, poor management or poor forecasting	Experienced partners used to build plan and forecast Robust project management approach with governance to provide clear visibility to progress to plan
Data quality	Cost and complexity of data conversion and cleansing is much greater than anticipated	Data discovery allows bottom up profiling of data and data quality
Resources / Capabilities	Business is unable to provide adequate resources and delivery capabilities to successfully manage the program	Resource plan has manageable ramp up Strong business support to date Robust commercial process to find partners with desired capability at the right price
Change Capacity	The business' capacity to incorporate new capabilities and absorb change limits the pace of the program	Change office and ongoing organizational health metrics to diagnose organizational state GBE manages change portfolio for gas business
Process Change	The program is unable to overcome organizational inertia and culture to achieve changes in operating practices and behaviors	Agile approaches to engage employees more actively in design of new practices and processes Alignment of operating model attributes to drive accountability for desired behaviors and outcomes
Business disruption	The program causes performance of the business to be reduced because of disruptions to operations	Disciplined release planning anticipates complications Change Office reinforces disciplined role and change planning
Sustainment of performance and value	Program fails to realize sustainable improvement in the performance of the business	Value framework identifies specific performance parameters for every initiative Operating Model strengthens accountability framework for the business
Market context	Capabilities delivered lose relevance because of dramatic changes in market and or regulatory environment	Waves revisits context of each investment Agile approaches improve relevance of solution approach
Change in strategic priorities	Business priorities change over time and reduce priority for further program investments	Sanction schedule provides for regular investments Input from US leadership and Group Executive Ongoing input from GBE steering group

6. What visibility/controls are there to ensure the program does not go off track?

GBE is a significant and complex program that will need to actively manage many risks to ensure success. There are several layers of governance and controls to help the program stay on track and give visibility to any challenges:

1. National Grid's Critical Success Factors have been fully implemented. This includes the creation of a strong program team with talent from across the organization including several senior leaders dedicated to the program.
2. A Design Authority of business and IS leaders ensures that critical design features of the solution and operating practices are understood and the business can support.
3. During the strategic assessment phase, significant value was created using an Assurance Partner. An assurance partner will continue to be used in the next phase, with a key part of their role focused on providing progress feedback directly into the Steering Group.
4. The program has a Steering Group including two Executive Committee members that meets monthly to review progress, support key decisions and ensure the program stays on track

5. Group Audit is building a capability to provide incremental program assurance capabilities. Early pulse checks of GBE have been positive. However, they will continue to assess the program's progress.
6. The proposed annual sanctioning approach has been designed to give regular visibility to the Executive Committee on progress against defined milestones, giving optionality as the program progresses to deliver maximum value.
7. External audit will monitor the program's performance throughout implementation, and conduct audits as is deemed necessary.

Ultimately it will be the business results that will demonstrate successful delivery of the program. However, there will be a number of milestones as the program progresses that will be leading indicators for success. The table below has the key outputs that the Committee should anticipate the program delivering by September and March in FY18 to measure progress as support is requested for FY19 spend:

By September 2017
1. Selection, contracting and mobilization with System Integrator (SI) Partner(s)
2. On boarding and mobilization of internal resources with a target of 60 resources by September 2017
3. Software selections and contracting for Enterprise Asset Management (EAM) and Scheduling & Mobility vendors
4. Successfully filed GBE as part of Niagara Mohawk (NY), Boston and Colonial Gas (MA) rate cases
5. Refined program plan, change plan and program forecast with updated budgets for FY18 & FY19
6. Value framework developed to identify business KPIs to drive the benefits
By March 2018
1. Standardized enterprise wide business process architecture designed and agreed with the Business down to L4
2. Basic scheduling, dispatch, field data capture and field collections of payments functionality in RI
3. Field device deployments to I&R, Corrosion and CMS Collections representatives in RI
4. EAM/Work Management system capabilities with improved data quality supporting RI
5. Successfully filed GBE as part of Narragansett Gas (RI) rate case

CONCLUSION

The US Gas Business is facing significant risk and performance challenges that require action. The recommended GBE roadmap addresses these challenges and leaves the business well placed to meet future regulatory, customer and stakeholder needs. The program applies lessons from the past to facilitate successful delivery. The immediate need, expected regulatory support and anticipated benefits support the overall approach and investment.

APPENDICES:

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|--|---|
| A – Initiative List | E – Benefits Detail |
| B – High Level Roadmap of Capabilities | F – Accountability matrix for GBE program |
| C – Year 1 Capabilities / Assets Delivered | G – Customer & Employee Experience Benefits |
| D – Cost Detail | |

APPENDIX A – Initiatives list

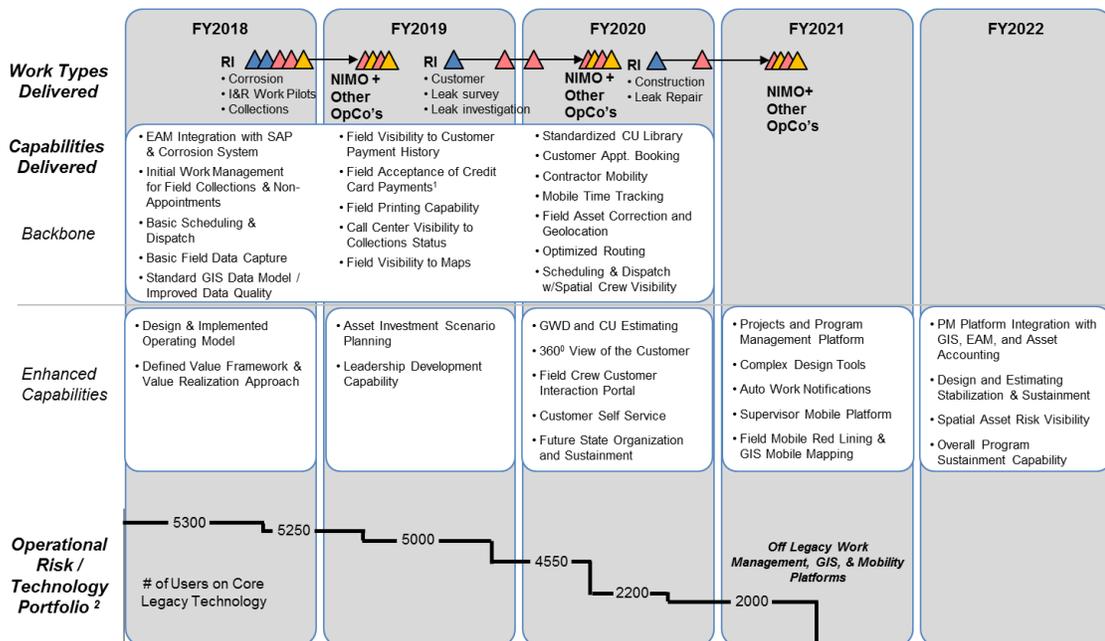
The program work streams and the initiatives within each work stream.

Work Streams	Initiatives
#1 Portfolio Office	#1A Gas Business Enablement Portfolio Office #1B Solution Architect & Agile Coaches
#2 Business Enablement	#2A Program Level People Strategy #2B Program Business Readiness & Sustainment #2C Operating Model & Value Framework
#3 Work Management	#3A Business Architecture Design #3B Work Management & Field Enablement #3C Projects & Program Management
#4 Asset Management	#4A Engineering, Design, Estimating & Mobility #4B Asset Investment Planning & Management #4C Integrity Management #4D Asset - Advanced Analytics
#5 Customer Engagement	#5A Contact Center Front End Solution #5B Support Interaction #5C Customer Interaction #5D Supporting through Data #5E Structured Experiences
#6 Supply Chain	#6A SC Business Architecture Design #6B Integrated Supply & Demand Planning #6C Capability Building #6D SC Master Data Improvements #6E Inventory Optimization #6F Warehouse & Network Optimization
#7 Data Management	#7A Data Management
#8 Information Services Enabling	#8A Remediation & Integration #8B Technology Initiatives #8C Enabling Capabilities

APPENDIX B – High Level Roadmap of Capabilities to be delivered over five years

The backbone capabilities will be delivered in just under four full years while the enhanced capabilities will be delivered over the full five-year timeframe. The bottom portion of the depiction highlights the # of users on legacy EAM, Scheduling, Mobility and GIS platforms that will transition to the new platforms over time illustrating the reduction in technology risk.

Backbone and Enhanced Capabilities Delivered by FY



¹ Pending Regulatory Approval

² Legacy backbone applications estimated to go from 42 out of 117 total applications currently to 6 out of 22 post implementation

▲ Start ▲ Pilot ▲ Deployment

Author(s): **Johnny Johnston, SVP, Gas Business Enablement**

Date of last paper: **19 October 16** | Date of next paper: **September 17**



APPENDIX C – Year 1 Capabilities / Assets Delivered and/or Work Commenced

The following list details the capabilities and assets that are expected to be delivered in FY2018 as well as work to commence.

- Business Enablement
 - Complete Future State Culture Definition
 - Commence Labor Contract Strategy & Implementation Support
 - Commence Leadership Capability Development
- Work Management
 - Complete Powerplan Remediation
 - Complete Business Architecture Design (Level 4 Process Design)
 - Deploy Initial Corrosion, I&R and Collections Work Management Capabilities in RI
- Asset Management
 - Complete Asset Investment Planning Management (AIPM) Enhancements including Integrations
 - Complete Integrity Management – Pressure Regulating Facilities & Risk Management Solution for Transmission and Distribution Mains
 - Commence GIS Data Remediation and Consolidation
- Customer Experience
 - Complete Customer & Employee Journey Mobilization
- Data Management
 - Complete Pre-GBE Deployment & Data Profiling
- IS
 - Complete Application (Environment) Infrastructure Upgrades
 - Complete First Iteration of Development Operations & BPA Enablement
 - Complete Comprehensive Integration Services Enhancements

APPENDIX D – Cost Detail (\$m)

CapEx Allocated to OpCo's by FY

OpCo	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	Total
Brooklyn Union Gas (KEDNY)	(\$16.3)	(\$30.3)	(\$21.1)	(\$13.6)	(\$2.9)	(\$0.2)	(\$84.3)
Keyspan Gas East (KEDLI)	(\$11.7)	(\$21.7)	(\$15.1)	(\$9.7)	(\$2.1)	(\$0.2)	(\$60.4)
NiagraMohawk Gas	(\$6.8)	(\$12.5)	(\$8.7)	(\$5.6)	(\$1.2)	(\$0.1)	(\$34.9)
Boston Gas	(\$12.6)	(\$23.4)	(\$16.3)	(\$10.5)	(\$2.2)	(\$0.2)	(\$65.3)
Colonial Gas	(\$2.8)	(\$5.2)	(\$3.6)	(\$2.3)	(\$0.5)	(\$0.0)	(\$14.6)
Narragansett Gas	(\$4.0)	(\$7.5)	(\$5.2)	(\$3.3)	(\$0.7)	(\$0.1)	(\$20.8)
Total CapEx	(\$54.3)	(\$100.5)	(\$69.9)	(\$45.1)	(\$9.6)	(\$0.7)	(\$280.2)

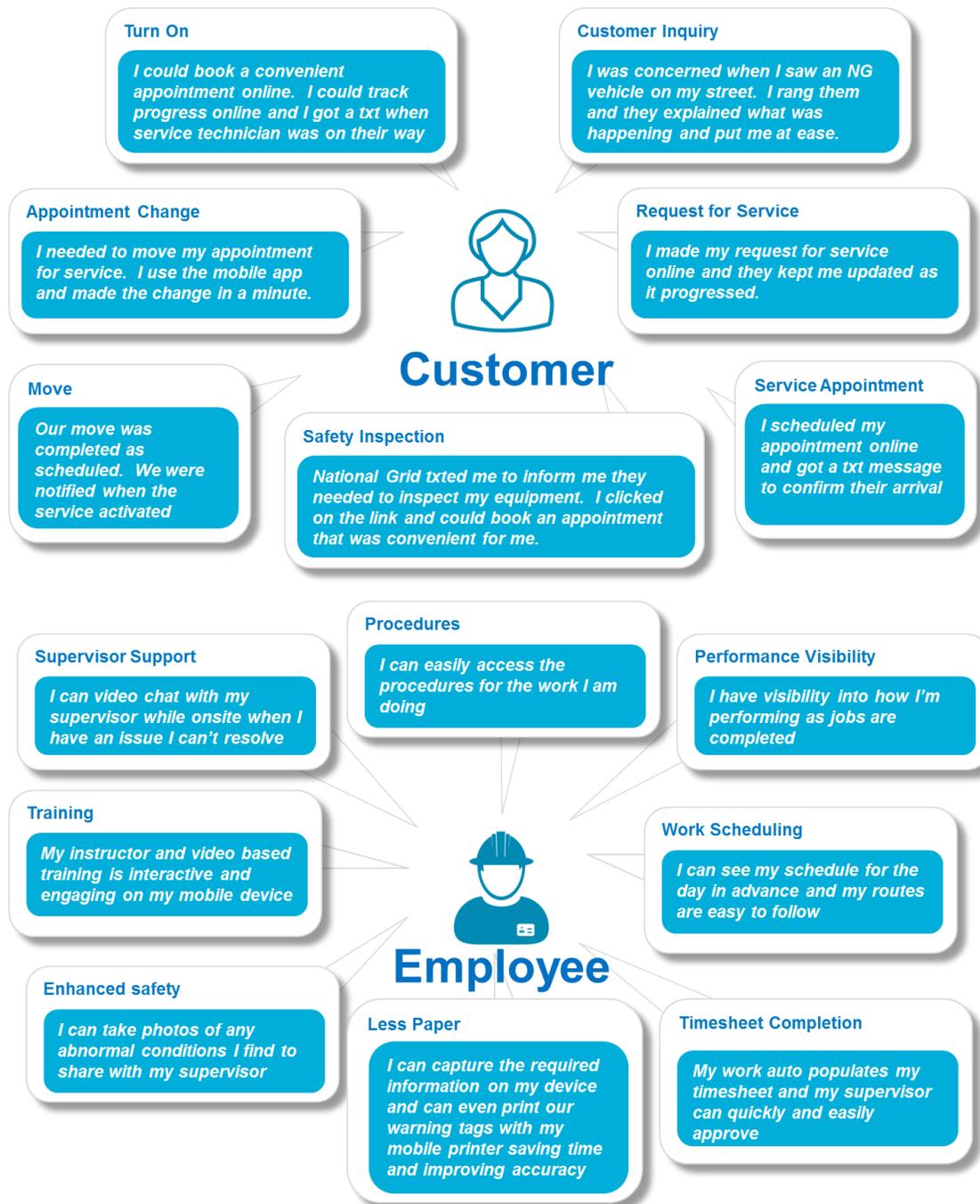
Opex Allocated to OpCo's by FY

OpCo	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	Total
Brooklyn Union Gas (KEDNY)	(\$9.1)	(\$20.5)	(\$13.6)	(\$7.2)	(\$2.9)	(\$0.2)	(\$53.6)
Keyspan Gas East (KEDLI)	(\$6.5)	(\$14.7)	(\$9.7)	(\$5.1)	(\$2.1)	(\$0.2)	(\$38.3)
NiagraMohawk Gas	(\$3.8)	(\$8.5)	(\$5.6)	(\$3.0)	(\$1.2)	(\$0.1)	(\$22.1)
Boston Gas	(\$7.0)	(\$15.9)	(\$10.5)	(\$5.6)	(\$2.3)	(\$0.2)	(\$41.4)
Colonial Gas	(\$1.6)	(\$3.6)	(\$2.3)	(\$1.2)	(\$0.5)	(\$0.0)	(\$9.3)
Narragansett Gas	(\$2.2)	(\$5.1)	(\$3.3)	(\$1.8)	(\$0.7)	(\$0.1)	(\$13.2)
Total Opex	(\$30.2)	(\$68.2)	(\$45.1)	(\$23.9)	(\$9.8)	(\$0.8)	(\$177.9)

Total CapEx and Opex Allocated to OpCo's by FY

OpCo	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	Total
Brooklyn Union Gas (KEDNY)	(\$25.4)	(\$50.8)	(\$34.6)	(\$20.7)	(\$5.8)	(\$0.5)	(\$137.9)
Keyspan Gas East (KEDLI)	(\$18.2)	(\$36.4)	(\$24.8)	(\$14.9)	(\$4.2)	(\$0.3)	(\$98.7)
NiagraMohawk Gas	(\$10.5)	(\$21.0)	(\$14.3)	(\$8.6)	(\$2.4)	(\$0.2)	(\$57.0)
Boston Gas	(\$19.7)	(\$39.3)	(\$26.8)	(\$16.1)	(\$4.5)	(\$0.4)	(\$106.7)
Colonial Gas	(\$4.4)	(\$8.8)	(\$6.0)	(\$3.6)	(\$1.0)	(\$0.1)	(\$23.9)
Narragansett Gas	(\$6.3)	(\$12.5)	(\$8.5)	(\$5.1)	(\$1.4)	(\$0.1)	(\$33.9)
Total	(\$84.5)	(\$168.7)	(\$115.0)	(\$68.9)	(\$19.4)	(\$1.5)	(\$458.1)

APPENDIX G – Customer & Employee Experience Benefits



Date of Request: June 7, 2019
Due Date: June 19, 2017

Request No. DPS-275 IS-4
NMPC Req. No. NM-738

NIAGARA MOHAWK POWER CORPORATION d/b/a NATIONAL GRID
Case No. 17-E-0238 and 17-G-0239 –
Niagara Mohawk Power Corporation d/b/a National Grid – Electric and Gas Rates

Request for Information

FROM: DPS Staff, Andy Timbrook
TO: National Grid, Information Services Panel
SUBJECT: **IS PROJECT JUSTIFICATIONS**

Request:

In this interrogatory, all requests for data, workpapers or supporting calculations should be construed as requesting any Word, Excel or other computer spreadsheet models in original electronic format with all formulae intact.

Provide the following information for each proposed project listed in Exhibit__(ISP-3):

1. A full description of the project.
2. All whitepapers and/or sanction papers associated with the project. This should include a cost/benefit analysis and a list of alternatives considered, with the reasoning as to why those alternatives were not selected. Include all management presentations, business case analysis, budget presentations and actual management approvals as they relate to the approved project.
3. The analysis for selecting an in-house solution or lease/software-as-a-service solution, where applicable.

Response:

1. Please see Attachment 1 for the reference to the sanction papers or investment request summary that includes a full description of the project. The documents themselves are included in Attachments 2-7.
2. Please see Attachments 1-7.. Information Services (“IS”) projects are undertaken for a number of reasons such as meeting legal or regulatory requirements, maintaining IS system reliability, addressing loss of vendor or version support, or providing service enhancements. Although IS projects can enable economic benefits, many projects are selected for other

factors. Discussion of benefits and project costs, and the reasoning behind the alternatives considered and selected are standard elements of IS sanction papers. The Physical Security projects did not have a sanction paper as they are facilities-related and the governance process of National Grid’s Facilities department does not require a sanction paper for projects under \$1 million. Physical security work typically consists of a number of small capital replacement projects that are approved under the Delegation of Authority process. A summary of the specific physical security work covered in each project was provided in Attachment 1 to DPS-115. With respect to other analysis and presentations, please see the following attachments for steering group and budget presentations.

INVP 4397	Ariba Status	Attachment 8 - pgs. 1-10
INVP 4395	Mobile Device Refresh	Attachment 8 - pgs. 23-37
INVP 4408	DMS Replacement	Attachment 8 - pgs. 38-51
INVP 3737	CNI GMS SCADA Upgrade	Attachment 8 - pgs. 52-65
INVP 4398	Storms IScheduler Stabilization Project	Attachment 8 - pgs. 66-79
INVP 3932	IVR Replacement and Call Center Technology Upgrade	Attachment 8 - pgs. 80-93
	FY18 US Investment Plan Budget Presentation	Attachment 8 - pgs. 11-22
INVP 4572	Gas Business Enablement (GBE) – Steering Group Presentations	Attachment 5a - REDACTED
INVP 4572	Gas Business Enablement – Steering Group Presentations	Attachment 5b - CONFIDENTIAL
INVP 4572	Gas Business Enablement – Steering Group Presentations	Attachment 5c
INVP 4572	GBE – Business Case	Attachment 9
INVP 4572	GBE – Group Executive Paper	Attachment 10

3. The IS Project Manager (“PM”) makes an evaluation as to whether off the shelf, market ready applications are available that meet National Grid’s business requirements and specifications or whether the application must be built in-house or purchased and then heavily configured and customized to meet National Grid’s needs. To facilitate this evaluation, the PM gathers business requirements and specifications and then, using standard Procurement department processes, solicits RFI and/or RFPs to test the market response. An evaluation of the proposals is made taking into consideration the best fit of meeting needs, cost and other considerations and a decision is rendered which could lead to entering into a Software as a Service (“SaaS”) contract, licensing software or internally building the application or a combination thereof. This information is then incorporated into the sanction papers noted above

With respect to the Gas Business Enablement (“GBE”) Program, as noted in the initial testimony of the Gas Infrastructure and Operations Panel, the Company is in the process of evaluating the potential use of on-premise versus cloud-based offerings like SaaS for a number of core systems to determine the best option for functional and technical requirements and total cost. In addition to the benefits discussed in the initial testimony, a number of factors are evaluated in an analysis of selecting an on-premise or SaaS solution including but not limited to:

- functional/technical (including security) requirement fit and customization necessary (requirement fit becomes easier to achieve as cloud computing becomes more commonplace);
- total cost;
- predictability of costs (*i.e.*, regular subscription fees under SaaS);
- economies of scale resulting from traditional costs (*e.g.* data center, computing storage, network infrastructure, and software upgrade and maintenance costs) which are borne by the supplier and spread across multiple customers; and
- cash flow and accounting treatment options resulting from variations of cloud offerings (*e.g.* Infrastructure as a Service or IaaS, Platform as a Service or PaaS).

Name of Respondent:
Thomas Gill

Date of Reply:
June 19, 2017

Date of Request: June 26, 2019
Due Date: July 6, 2017

Request No. DPS-275 IS-4 SUPPLEMENTAL
NMPC Req. No. NM-738

NIAGARA MOHAWK POWER CORPORATION d/b/a NATIONAL GRID
Case No. 17-E-0238 and 17-G-0239 –
Niagara Mohawk Power Corporation d/b/a National Grid – Electric and Gas Rates

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3. The analysis for selecting an in-house solution or lease/software-as-a-service solution, where applicable.

Response:

2. Please see Attachment 5, which was inadvertently omitted from the Company's initial response.

Name of Respondent:
Thomas Gill

Date of Reply:
July 3, 2017



US Sanction Paper

Title:	Gas Business Enablement	Sanction Paper #:	USSC-17-222
Project #:	INVP 4572	Sanction Type:	Partial Sanction
Operating Company:	National Grid Svc Company	Date of Request:	May 30, 2017
Author:	Wayne S. Watkins / Kenneth C. Healy	Sponsor:	Johnny Johnston-SVP Gas Business Enablement
Utility Service:	Gas	Project Manager:	Kenneth C. Healy

1 Executive Summary

1.1 Sanctioning Summary

This paper requests partial sanction of INVP 4572 in the amount of \$84.5 million, with a tolerance of +/- 10% for the purposes of completing the first of five years of development and implementation of the Gas Business Enablement program (GBE), this phase of which is expected to be completed during the period April 2017 through March 2018 (FY18). The partial funding approach will provide transparency of progress as the program moves through its various stages.

This sanction amount is \$84.5 million broken down into:

- \$56.5 million Capex
- \$28.0 million Opex
- \$0 Removal

NOTE the total anticipated investment in GBE is \$478.284 million with a tolerance of +/- 13%, contingent upon submittal and approval of additional program partial sanction papers as new phases of the program are presented. The total anticipated investment includes \$20.142 million which was invested in FY17 for assessment of processes and applications, high level design for the program, development of the business case, early enabling investments and procurement and mobilization activities. The \$84.500 million for FY18 is not a standalone investment; future investments will be required to complete GBE and enable further capabilities along a five-year roadmap from the initial investments.

NOTE that the GBE Program has adopted an annual sanctioning approach, which will include periodic reviews of project progress, deliverables, and funding requirements over multiple sanctions, with the GBE Steering Group providing oversight of the program's progress.



US Sanction Paper

1.2 Project Summary

The US Gas Business is facing significant challenges. These include improving gas safety performance, continuing to successfully deliver the growing capital program, meeting the demand for customer connections, supporting evolving customer and regulatory expectations, and running the business more effectively. These challenges are amplified by the complexity created by disparate legacy processes and systems currently in use across the business. This is particularly acute with regards to information systems, most of which are nearing end of life, and are beginning to create unacceptable risks to core operations and future growth.

The proposed solution is focused on standardizing and simplifying operational processes into new asset management, work management, and mobility systems (the core backbone). Enhanced capabilities focused on the customer experience, asset and work management, and data supplement the core backbone. A refined operating model and value framework will embed and sustain a culture of accountability and compliance. Industry standard solutions, an innovative release strategy, modern delivery methods, and robust governance will support the successful delivery of the desired business outcomes.

Although primarily an asset replacement program, there are a broad range of anticipated benefits including improved gas safety and operational performance, as well as enhanced customer experience and service.

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
4572		Gas Business Enablement	478.284
Total			478.284

1.4 Associated Projects

N/A



US Sanction Paper

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Paper Title	Sanction Type	Tolerance

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
November 2017	Partial Sanction – GBE Phase 2

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	GBE is primarily an asset replacement program.

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: 30

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 (\$)
Gas Business Enablement. FY18-FY23	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	\$373.7m

1.12 If cost is not aligned with approved Business Plan how will this be funded?

GBE is replacing aged and core systems to manage our related gas assets and support the safe delivery of service to our customers. The Company will request recovery of costs of GBE through future rate cases. In the interim, the Senior Executive Sanctioning Committee has approved funding through FY18. The full program costs will be built into the next iteration of the business plan for future years.



US Sanction Paper

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	56.504	104.639	73.693	47.613	10.332	0.815	293.596
OpEx	20.142	27.972	64.102	41.339	21.317	9.087	0.729	184.688
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	20.142	84.476	168.741	115.032	68.930	19.419	1.544	478.284

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	04/2017
Partial Sanction	05/2017
Begin Requirements and Design	05/2017
Begin Development and Implementation	07/2017
Partial Sanction	11/2017
Partial Sanction	11/2018
Partial Sanction	11/2019
Full Sanction	11/2020
Move to Production / Last Go Live	03/2021
Project Complete	03/2022
Project Closure Sanction	07/2022

NOTE that the timelines above cover the anticipated GBE roadmap, including beyond this partial sanction. The sanctioning approach will include periodic reviews of project progress, deliverables, and funding requirements over multiple sanctions. The next sanction request will occur in Q3 FY18.

1.14 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 checked="" type="radio"/> Amber	<input type="radio"/> Green
Availability of external resources to deliver project:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green



US Sanction Paper

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

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

1	To successfully deliver a program of this scale requires a strong internal team. To date, 59 resources have been hired into the GBE team; over the next 12 months that number will grow significantly with a mix of internal, external, and consulting resources to ensure that National Grid has the required resources to complete the plans for FY18 and beyond. GBE has a dedicated HR Business Partner and recruiter to support the team in hiring of these resources, and a resource plan has been developed which includes sufficient lead time to hire resources as they are needed. This is amber to acknowledge the significant ramp up in resources required, although appropriate sourcing plans are in place.
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1.16 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

1.17 List References

N/A

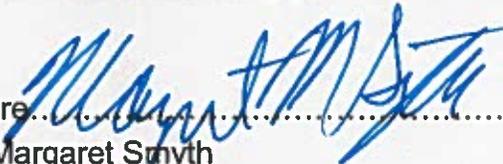


US Sanction Paper

2 Decisions

The Senior Executive Sanctioning Committee (SESC) at a meeting held on May 30, 2017.

- (a) APPROVED the investment of \$84.5M and a tolerance of 10% for the purposes of Gas Business Enablement in FY18.
- (b) APPROVED the potential RTB impact of \$17.676M in FY22 (per annum) for an estimated 5 years. RTB impact begins in FY19 at \$7.105M and increases through FY22 to \$17.676M.
- (c) APPROVED the potential investment of \$478.284M and a tolerance of 13% contingent upon submittal and approval of Project Sanctions for each stage following continued successful delivery of the previous stage.
- (d) NOTED that Johnny Johnston 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:	Gas Business Enablement	Sanction Paper #:	USSC-17-222
Project #:	INVP 4572	Sanction Type:	Partial Sanction
Operating Company:	National Grid Svc Company	Date of Request:	May 30, 2017
Author:	Wayne S. Watkins / Kenneth C. Healy	Sponsor:	Johnny Johnston-SVP Gas Business Enablement
Utility Service:	Gas	Project Manager:	Kenneth C. Healy

3.1 Background

The US Gas Business is facing significant challenges. These include improving gas safety performance, continuing to successfully deliver the growing capital program, meeting the demand for customer connections, supporting evolving customer and regulatory expectations, and running the business more effectively. These challenges are amplified by the complexity created by disparate legacy processes and systems currently in use across the business. This is particularly acute with regards to information systems, most of which are nearing end of life, and are beginning to create unacceptable risks to core operations and future growth.

The proposed solution, the GBE program, is expected to span five years. It is focused on standardizing and simplifying operational processes into new asset, work management, and mobility systems (the core backbone). Enhanced capabilities focused on the customer experience, asset and work management, and data supplement the core backbone. A refined operating model and value framework will embed and sustain a culture of accountability and compliance. Industry standard solutions, an innovative release strategy, modern delivery methods, and robust governance will support the successful delivery of the desired business outcomes.

GBE has been collaboratively developed with the US Gas Business, Information Services, Procurement, Human Resources, and other departments to meet these challenges. Its objectives are to reduce risk, deliver a step change in business performance, and enable future growth.

US Sanction Paper

3.2 Drivers

The growing list of aging information systems which support core operations is beginning to create unacceptable risks to the gas business. Within two years, 94% of the gas business front office systems will be at “end of life”, up from 79% today. The average age of these systems is 14 years, and it is increasingly difficult to make changes to these systems to meet the expectations of our customers, our regulators, and our business operations. System “down time” is also growing.

A step change in our business performance is required. We must drive continuous improvement in gas safety performance. We continue to be heavily reliant on paper-based processes and paper records, which impedes our ability to streamline systems, and jeopardizes the integrity of our records. In short, our current systems no longer support the way the gas business needs to work, manage performance, and empower our employees to serve our customers.

Over recent years, the capital program has tripled to over \$2 billion per year, largely in response to customer and regulatory requirements. This has strained the legacy approach and the supply chain. Modern supported solutions with integrated supply chain are necessary to allow National Grid to deliver in this significant growth area.

3.3 Project Description

The program team was mobilized in June 2016, with the support of the gas business and information services to ensure that the program had the right capabilities and experience from the outset. National Grid has engaged two of the top system integrators in the US, conducted a number of visits to other companies, implemented pilots to test new concepts, and heavily engaged the gas business to assist in the develop of the roadmap and solution.

The proposed solution is focused on standardizing and simplifying operational processes into new asset, work management, and mobility systems (the core backbone). Enhanced capabilities focused on the customer experience, asset and work management, and data supplement the core backbone. A refined operating model and value framework will embed and sustain a culture of accountability and compliance. Industry standard solutions, an innovative release strategy, modern delivery methods, and robust governance will support the successful delivery of the desired business outcomes.

The roadmap for the program is phased and prioritized over five years to reduce operational risk while balancing deliverability and accelerating value creation

US Sanction Paper

where possible. The core backbone and enhanced capabilities will produce a solid framework for the business to adapt to future needs and dramatically improve the customer experience. The technical solution will also provide a strong base for expansion to the electric business.

The GBE program includes three key elements to address its current challenges.

- Integration, standardization, and simplification of our core processes and systems into a modern platform (19 best of breed solutions from the current 99), including asset management, work management, geospatial information, and records administration.
- Development of a flexible, digital interaction platform on top of our core systems that allows our customers, call center representatives, and field employees to operate on the same platform.
- Creation of a performance-focused organization, with emphasis on end-to-end process desired outcomes, and defined accountabilities designed to create the behavioral change necessary to achieve the desired business outcomes.

The initiatives and high level roadmap can be seen in Appendix 4.2 and 4.3 respectively.

What is the approach to implementing GBE?

This is a large program that will take multiple years to complete. The roadmap leverages modern approaches to minimize risk and maximize the likelihood that the desired business outcomes are successfully delivered. This includes:

- **Developing a core backbone solution and building incremental enhanced capabilities.** The core includes implementing asset management, work management and mapping solutions over the first four years, focusing on risk reduction. The core solution uses tried and tested utility solutions that will be implemented with minimal customization and standardized business processes across the enterprise. The enhanced capabilities build on the core and are focused on adding incremental value to National Grid's customers throughout the five-year program.
- **Phasing implementation.** The approach avoids a "big bang" implementation by breaking down the program based on work types and geography and prioritizing work types to accelerate delivery and manage risks. For geography, Rhode Island has been identified as the optimal test bed given its significant reliance today on paper-based operations and its manageable scale.
- **Leveraging agile development techniques.** Traditionally, projects like this would be developed using waterfall techniques with long cycle time between business requirements and a solution. In agile development, the

US Sanction Paper

business and IS teams work more collaboratively in short-cycle scrums to prioritize functionality and get to a minimum viable product (MVP). This is the simplest solution that can be implemented, with future enhancements continuously prioritized by value and added as the team learns with the solution. Agile development offers many benefits including earlier release of initial functionality, continuously reprioritized enhancements based on learning, and higher success rates. Agile is a well-established approach utilized by a growing number of utilities.

- **Taking a 'cloud first' approach.** Putting as much of the solution into the cloud as appropriate will provide several benefits, including faster implementation and enhancement adoption, fewer upgrades to legacy infrastructure, reduced risk of obsolescence, and the opportunity to enhance security.

Lessons from previous programs have been built into GBE from the start. National Grid's Critical Success Factors have also been embedded into the GBE program from the beginning. In addition, National Grid is planning to engage a value assurance partner to provide an independent assessment of program delivery.

3.4 Benefits Summary

The primary benefit of the GBE is reduced operational risk through the replacement of the aging information systems and processes across the organization. GBE is, therefore, primarily an asset replacement investment. This asset replacement, however, will lay the foundation for enhanced capabilities which will drive a broader range of benefits and performance improvements. Below is a partial list of those additional benefits.

- Enhanced pipeline safety and compliance performance.
- Improved customer experience and satisfaction through improved information and the creation of a customer engagement platform.
- Enhanced employee enablement with modern field devices.
- Advanced work and asset analytics capabilities.
- Data management capabilities.
- Improved employee technical training and skills.

National Grid estimates that there will also be a total of approximately \$40 million in quantifiable annual benefits beginning after the enhanced capabilities are fully embedded in FY24. A portion of these benefits will result in cost savings to customers. Further details can be seen in Appendix 4.4.



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\$M	Prior Yrs	Current Planning Horizon						Total
		Yr 1 18/19	Yr 2 19/20	Yr 3 20/21	Yr 4 21/22	Yr 5 22/23	Yr 6+ 23/24	
Benefits	0	1.020	7.772	24.198	30.675	36.394	39.615	139.674
	0	1.020	7.772	24.198	30.675	36.394	39.615	139.674

3.5 Business and Customer Issues

None other than stated elsewhere in this paper.

3.6 Alternatives

Alternative 1: Stabilize the legacy information systems, with no functional enhancements or additional integration. This option was rejected since it was only a temporary measure that offered no significant immediate business benefits and did not position the gas business for the future, and the replacement investment would still be required in the near future.

Alternative 2: Technical replacement of the legacy systems with industry standard asset and work management solutions without focus on customer or business improvement. This option, which was rejected, offered some level of risk mitigation, but had a higher likelihood of failure as it didn't address the people aspects of the change, nor did it deliver significant improvement in how our customers are served, and ultimately did not position the business for the future.

Alternative 3: Value Scope implemented as a "big bang" approach to minimize implementation time. This option was rejected due to the significant risk associated with implementation across the gas business regions at the same time.

Alternative 4: Implementing a similar scope to the recommended scope but rather than doing enterprise wide, doing operating company by operating company to directly align costs to each company. This was rejected as the total costs were significantly higher and would take longer to implement due to the complexity.

3.7 Safety, Environmental and Project Planning Issues

N/A

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	Mis-alignment / lack of integration and coordination between programs	3	3	3	9	9	Avoid	Agile Delivery Methodology to be leveraged is structured to provide key checkpoints on a frequent cadence through Agile Program Increments Sessions. Additionally, the GBE Program will leverage independent third party expertise to provide insight into methodology and delivery effectiveness	Low	Agile approaches help identify most relevant solutions. Program will retain independent expertise to provide proactive feedback on the effectiveness of program integration activities
2	Delays in the SI procurement process will delay the start of critical Phase 2 projects and programs	3	2	3	6	9	Avoid	Robust commercial process to find partners with desired capability at the right price is underway and on schedule, with the goal of downselecting an SI partner that will be onboarded by July 1st. Program is executing pre-mobilization plan to reduce SI mobilization timelines	None	
3	A large group of people will be impacted by new devices and tools. Learning curve could be steep, especially in regions that are currently only using basic system tools to complete their work. This could impact operations and slow the realization of construction work	4	3	3	12	12	Mitigate	Leverage Pilots - to build learning early; Phased implementations to manage risk and manage change; Agile development approaches to engage employees more actively in design of new practices and processes; Alignment of operating model attributes to drive accountability for desired behaviors and outcomes.	Low	Change office and ongoing organizational health metrics to diagnose organizational state
4	GBE will not be able to staff the program to peak levels with the necessary SMEs given current scope and schedule	3	3	3	9	9	Mitigate	Developing realistic resource plan for recruitment of program full-time resources and engaging HR early, Engaging business leadership on a weekly basis to provide visibility into part time SME resource requirements, Robust commercial process to find partners with the ability to provide appropriate expertise as a short-term measure to fill gaps	Low	Continue proactively engaging with Business leadership to provide transparency in resource planning.



US Sanction Paper

3.9 Permitting

N/A

3.10 Investment Recovery

N/A

3.10.1 Investment Recovery and Regulatory Implications

National Grid will seek recovery of program costs through rate cases or other additional regulatory filings as appropriate.

3.10.2 Customer Impact

Noted elsewhere in this 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 +	
4572	Gas Business Enablement	+/- 13%	CapEx	0.000	56.504	104.639	73.693	47.613	10.332	0.815	293.596
			OpEx	20.142	27.972	64.102	41.339	21.317	9.087	0.729	184.688
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	20.142	84.476	168.741	115.032	68.930	19.419	1.544	478.284
Total Project Sanction			CapEx	0.000	56.504	104.639	73.693	47.613	10.332	0.815	293.596
			OpEx	20.142	27.972	64.102	41.339	21.317	9.087	0.729	184.688
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	20.142	84.476	168.741	115.032	68.930	19.419	1.544	478.284



US Sanction Paper

3.11.2 Project Budget Summary Table

\$M	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	
CapEx	0.000	56.504	0.000	0.000	0.000	0.000	0.000	56.504
OpEx	25.400	27.972	0.000	0.000	0.000	0.000	0.000	53.372
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	25.400	84.476	0.000	0.000	0.000	0.000	0.000	109.876

Project Costs Per Business Plan

Variance (Business Plan-Project Estimate)

\$M	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	
CapEx	0.000	0.000	(104.639)	(73.693)	(47.613)	(10.332)	(0.815)	(237.092)
OpEx	5.258	0.000	(64.102)	(41.339)	(21.317)	(9.087)	(0.729)	(131.316)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	5.258	0.000	(168.741)	(115.032)	(68.930)	(19.419)	(1.544)	(368.408)

3.11.3 Cost Assumptions

Costs were developed using proprietary tools from an experienced consulting partner, and further validated by the National Grid program team and an experienced design assurance partner.

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



US Sanction Paper

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.

Role	Individual's Name
Head of PDM	Deb Rollins
Relationship Manager	Rick Sheer
Program Delivery Manager	Sally Seltzer
IS Finance Management	Chip Benson
IS Regulatory	Dan DeMauro
DR&S	Muks Ravipaty
Service Delivery	Brian Detota
Enterprise Architecture	Joe Clinchot

3.12.2 Reviewers

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

Function	Individual	Area
Regulatory	Zschokke, Peter	All
Jurisdictional Delegate(s)	Currie, John	Gas - NE
	Brown, Laurie	Gas - NY
	Easterly, Patricia	Rhode Island
	Collinson, Mark	Massachusetts
	McNeill, Brian	New York
	Morris, Bernadette	New York
Procurement	Curran, Art	All



US Sanction Paper

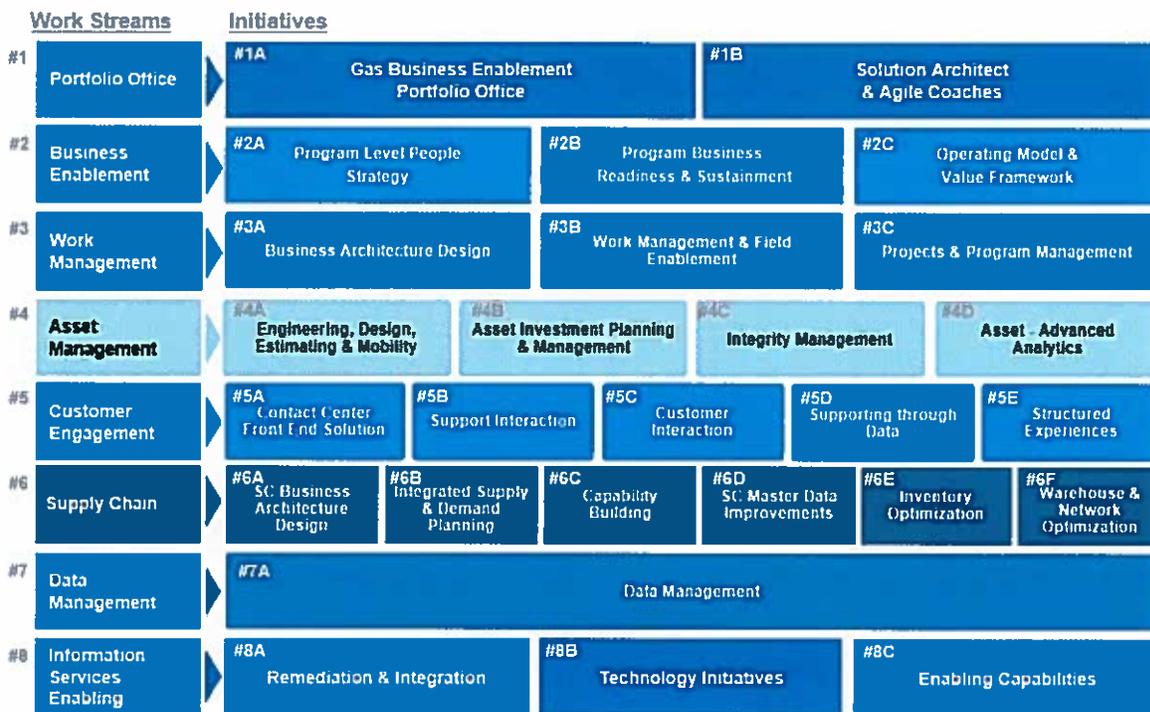
4 Appendices

4.1 Sanction Request Breakdown by Project

\$M	4572	Proj Num	Total							
CapEx	56.504									56.504
OpEx	27.972									27.972
Removal										0.000
Total	84.476	0.000	84.476							

4.2 Initiatives List

The program work streams and the initiatives within each work stream.



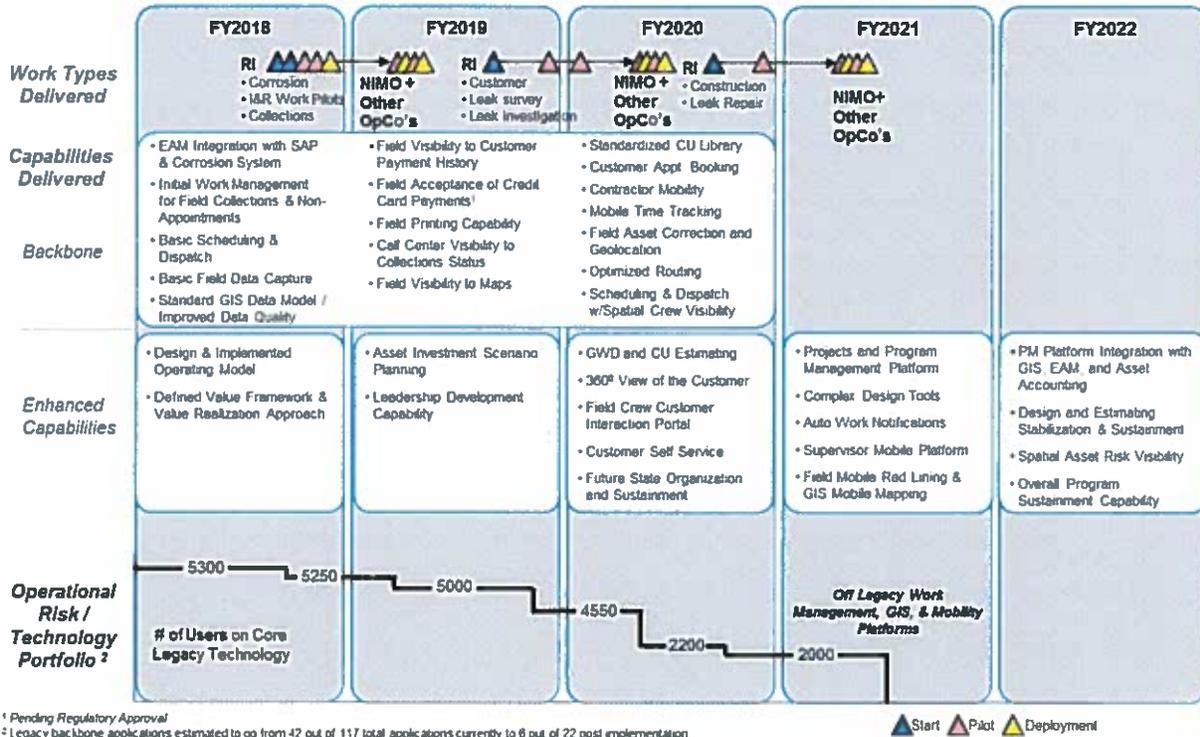


US Sanction Paper

4.3 High Level Roadmap of Capabilities to be delivered over five years

The backbone capabilities will be delivered in just under four full years while the enhanced capabilities will be delivered over the full five-year timeframe. The bottom portion of the depiction highlights the number of users on legacy EAM, Scheduling, Mobility and GIS platforms that will transition to the new platforms over time illustrating the reduction in technology risk.

Backbone and Enhanced Capabilities Delivered by FY





US Sanction Paper

4.4 Benefits Detail

Breakdown of the \$40M of annual capex and opex benefits by category, Type 1 (direct savings) and Type 2 (measurable KPI improvements) and benefits over time:

<u>Enhanced Capabilities</u>	<u>Value Drivers</u>	<u>Example Metrics ¹</u>	<u>Aspirational Ann. Benefit (Ms)</u>
			Enterprise
Strategic Change, Talent, & Operating Model	<ul style="list-style-type: none"> Process efficiency Improved performance mgmt. Performance culture 	<ul style="list-style-type: none"> Supervisor time in the field Quality of coaching conversations 	N/A ²
Customer Experience & Interactions	<ul style="list-style-type: none"> Self-service New service growth Increased customer satisfaction 	<ul style="list-style-type: none"> Services initiated via self-service Move requests completed via self-service Status updates received via self-service Service quality penalties Contact center call volume Average time per contact center call 	\$2.4
Asset Management	<ul style="list-style-type: none"> Reduced material spend Reduced opex spend reduction Capex effectiveness 	<ul style="list-style-type: none"> Estimating accuracy Mapping cycle time Opex spend Risk reduced / \$ spent 	\$2.8
EAM / Work Management Platform	<ul style="list-style-type: none"> Appointments met / kept Increase Supervisor time in field Route optimization Reduced overtime Reduced contractor spend Back office productivity Improved operational data 	<ul style="list-style-type: none"> Unable to complete rate Schedule adherence Jobs scheduled / dispatched automatically # / rate of jobs bundled Travel time Available / idle time Pre-requisite fulfillment rate Summonses / other penalties 	\$18.4
Supply Chain	<ul style="list-style-type: none"> Reduced capex project delays Reduced material spend Reduced inventory carrying costs 	<ul style="list-style-type: none"> Material stock-outs Rate of jobs requiring expedite Inventory turnover Inventory carrying cost 	\$2.5
Field Technical Training	<ul style="list-style-type: none"> Reduced compliance violations Reduced compliance penalties 	<ul style="list-style-type: none"> # / type compliance violations Penalties incurred 	\$13.5
			\$39.6

¹ Performance metrics to be defined as part of value framework in Q1 2017

² Capabilities increase likelihood of program success and enhance the probability of delivering program benefits. Benefits includes capex and opex benefits, Type 1 & Type 11



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Detailed benefits breakdown:

Initiative Description	Benefit Description	Benefit Type	12-Months	12-Months	12-Months	12-Months	12-Months	12-Months	12-Months	12-Months	12-Months
			Ending	Ending	Ending	Ending	Ending	Ending	Ending	Ending	Ending
			March 31,	March 31,	March 31,	March 31,	March 31,	March 31,	March 31,	March 31,	March 31,
			2019	2020	2021	2022	2023	2024	2025	2026	2027
Asset - Advanced Analytics	Reduction / Redirection in Opex via AIPM	Type I	\$0	\$0	\$13,750	\$1,223,750	\$1,980,000	\$1,980,000	\$1,980,000	\$1,980,000	\$1,980,000
Engineering, Design, Estimating & Mobility	Reduction in Damages due to Data Quality Errors	Type I	\$143,315	\$573,259	\$573,259	\$573,259	\$573,259	\$573,259	\$573,259	\$573,259	\$573,259
Work Management & Field Enablement	Clerical / Back Office Productivity Improvement	Type I	\$0	\$29,603	\$1,835,367	\$2,131,393	\$2,131,393	\$2,131,393	\$2,131,393	\$2,131,393	\$2,131,393
Work Management & Field Enablement	Damage Prevention - Reduced Travel Mileage	Type I	\$0	\$37,275	\$49,700	\$49,700	\$49,700	\$49,700	\$49,700	\$49,700	\$49,700
Work Management & Field Enablement	M&C Productivity Improvements - Base	Type I	\$0	\$1,024,595	\$7,274,626	\$7,377,085	\$7,377,085	\$7,377,085	\$7,377,085	\$7,377,085	\$7,377,085
Customer Interaction	Reduce Move Call Volume through Self-Service	Type II	\$0	\$0	\$0	\$0	\$642,130	\$906,536	\$906,536	\$906,536	\$906,536
Customer Interaction	Reduce Non-Move Call Volume through Self-Service	Type II	\$0	\$0	\$61,278	\$502,480	\$588,270	\$588,270	\$588,270	\$588,270	\$588,270
Data Management	Reduction in Data Cleansing / Scrubbing Effort - Analysts	Type II	\$0	\$105,749	\$750,821	\$761,396	\$761,396	\$761,396	\$761,396	\$761,396	\$761,396
Engineering, Design, Estimating & Mobility	Complex Jobs - Engineering Productivity Improvement	Type II	\$0	\$0	\$4,886	\$302,941	\$351,803	\$351,803	\$351,803	\$351,803	\$351,803
Engineering, Design, Estimating & Mobility	Complex Jobs - Estimating Accuracy Fine Avoidance	Type II	\$0	\$0	\$0	\$45,833	\$550,000	\$550,000	\$550,000	\$550,000	\$550,000
Engineering, Design, Estimating & Mobility	Reduction in Mappers via Field Data Entry	Type II	\$0	\$8,934	\$553,899	\$643,238	\$643,238	\$643,238	\$643,238	\$643,238	\$643,238
Integrated Supply & Demand Planning	Improved Project Delivery - Construction	Type II	\$0	\$35,278	\$2,187,222	\$2,540,000	\$2,540,000	\$2,540,000	\$2,540,000	\$2,540,000	\$2,540,000
Customer Interaction	Reduction in Service Quality Penalties	Type II	\$0	\$0	\$0	\$0	\$629,809	\$889,142	\$889,142	\$889,142	\$889,142
Regulatory/ Compliance	Reduced Compliance and Gas Safety Penalties	Type II	\$876,348	\$5,070,300	\$9,577,233	\$13,207,819	\$13,520,800	\$13,520,800	\$13,520,800	\$13,520,800	\$13,520,800
Work Management & Field Enablement	CMS Collections Jobs - Reduction in Mileage	Type II	\$0	\$0	\$0	\$0	\$117,384	\$165,718	\$165,718	\$165,718	\$165,718
Work Management & Field Enablement	CMS Collections Jobs - Reduction in Travel Time	Type II	\$0	\$0	\$0	\$0	\$561,142	\$792,200	\$792,200	\$792,200	\$792,200
Work Management & Field Enablement	CMS Planned Jobs - Reduction in Available Time via Autodispatch	Type II	\$0	\$202,349	\$269,798	\$269,798	\$269,798	\$269,798	\$269,798	\$269,798	\$269,798
Work Management & Field Enablement	CMS Planned Jobs - Reduction in Mileage	Type II	\$0	\$83,430	\$111,240	\$111,240	\$111,240	\$111,240	\$111,240	\$111,240	\$111,240
Work Management & Field Enablement	CMS Planned Jobs - Reduction in Travel Time	Type II	\$0	\$252,363	\$336,484	\$336,484	\$336,484	\$336,484	\$336,484	\$336,484	\$336,484
Work Management & Field Enablement	CMS Planned Jobs - Reduction in UTCs	Type II	\$0	\$38,760	\$51,680	\$51,680	\$51,680	\$51,680	\$51,680	\$51,680	\$51,680
Work Management & Field Enablement	Damage Prevention - Reduced Travel Time	Type II	\$0	\$90,007	\$120,009	\$120,009	\$120,009	\$120,009	\$120,009	\$120,009	\$120,009
Work Management & Field Enablement	Inspections - Reduced Travel Mileage	Type II	\$0	\$0	\$0	\$0	\$3,718	\$5,249	\$5,249	\$5,249	\$5,249
Work Management & Field Enablement	Inspections - Reduced Travel Time	Type II	\$0	\$0	\$0	\$0	\$19,064	\$26,914	\$26,914	\$26,914	\$26,914
Work Management & Field Enablement	M&C and CMS Jobs - Reduced Summonses	Type II	\$0	\$0	\$0	\$0	\$2,037,959	\$4,446,457	\$4,446,457	\$4,446,457	\$4,446,457
Work Management & Field Enablement	Reduction in Field Tech Communications	Type II	\$0	\$99,566	\$265,511	\$265,511	\$265,511	\$265,511	\$265,511	\$265,511	\$265,511
Work Management & Field Enablement	Reduction in Meter Verification Jobs	Type II	\$0	\$121,024	\$161,365	\$161,365	\$161,365	\$161,365	\$161,365	\$161,365	\$161,365
Total Benefits Forecasted as a result			\$1,019,663	\$7,772,492	\$24,198,128	\$30,674,982	\$36,394,237	\$39,615,248	\$39,615,248	\$39,615,248	\$39,615,248



US Sanction Paper

4.5 Operating Company Allocation

Allocations Based on Number of Gas Retail Customers (C-210) and Number of Electric Retail Customers (C-198)

Dollars in millions

Total Expenditure

Operating Company	FY18	FY19	FY20	FY21	FY22	FY23	Total
Niagara Mohawk Power Corp. - Gas	\$ 13.9	\$ 27.5	\$ 18.3	\$ 11.6	\$ 3.3	\$ 0.3	\$ 74.8
KeySpan Energy Delivery New York	\$ 28.8	\$ 56.7	\$ 37.7	\$ 24.0	\$ 6.8	\$ 0.5	\$ 154.5
KeySpan Energy Delivery Long Island	\$ 13.4	\$ 26.4	\$ 17.6	\$ 11.2	\$ 3.2	\$ 0.3	\$ 72.1
Boston Gas Company	\$ 15.7	\$ 30.9	\$ 20.6	\$ 13.1	\$ 3.7	\$ 0.3	\$ 84.3
Colonial Gas Company	\$ 4.6	\$ 9.1	\$ 6.0	\$ 3.8	\$ 1.1	\$ 0.1	\$ 24.7
Narragansett Gas Company	\$ 6.1	\$ 12.0	\$ 8.0	\$ 5.1	\$ 1.4	\$ 0.1	\$ 32.7
Niagara Mohawk Power Corp.- Electric Distr.	\$ 1.0	\$ 3.0	\$ 3.2	\$ -	\$ -	\$ -	\$ 7.2
Massachusetts Electric Company	\$ 0.8	\$ 2.3	\$ 2.6	\$ -	\$ -	\$ -	\$ 5.7
Nantucket Electric Company	\$ 0.0	\$ 0.0	\$ 0.0	\$ -	\$ -	\$ -	\$ 0.1
Narragansett Electric Company	\$ 0.3	\$ 0.9	\$ 1.0	\$ -	\$ -	\$ -	\$ 2.1
Total	\$ 84.5	\$ 168.7	\$ 115.0	\$ 68.9	\$ 19.4	\$ 1.5	\$ 458.1

Operational Expenditure

Operating Company	FY18	FY19	FY20	FY21	FY22	FY23	Total
Niagara Mohawk Power Corp. - Gas	\$ 4.7	\$ 10.7	\$ 6.9	\$ 3.6	\$ 1.5	\$ 0.1	\$ 27.6
KeySpan Energy Delivery New York	\$ 9.7	\$ 22.2	\$ 14.2	\$ 7.4	\$ 3.2	\$ 0.3	\$ 57.0
KeySpan Energy Delivery Long Island	\$ 4.5	\$ 10.4	\$ 6.6	\$ 3.5	\$ 1.5	\$ 0.1	\$ 26.6
Boston Gas Company	\$ 5.3	\$ 12.1	\$ 7.7	\$ 4.1	\$ 1.7	\$ 0.1	\$ 31.1
Colonial Gas Company	\$ 1.6	\$ 3.6	\$ 2.3	\$ 1.2	\$ 0.5	\$ 0.0	\$ 9.1
Narragansett Gas Company	\$ 2.1	\$ 4.7	\$ 3.0	\$ 1.6	\$ 0.7	\$ 0.1	\$ 12.0
Niagara Mohawk Power Corp.- Electric Distr.	\$ 0.0	\$ 0.2	\$ 0.3	\$ -	\$ -	\$ -	\$ 0.6
Massachusetts Electric Company	\$ 0.0	\$ 0.2	\$ 0.2	\$ -	\$ -	\$ -	\$ 0.4
Nantucket Electric Company	\$ 0.0	\$ 0.0	\$ 0.0	\$ -	\$ -	\$ -	\$ 0.0
Narragansett Electric Company	\$ 0.0	\$ 0.1	\$ 0.1	\$ -	\$ -	\$ -	\$ 0.2
Total	\$ 28.0	\$ 64.1	\$ 41.3	\$ 21.3	\$ 9.1	\$ 0.7	\$ 164.5

Capital Expenditure

Operating Company	FY18	FY19	FY20	FY21	FY22	FY23	Total
Niagara Mohawk Power Corp. - Gas	\$ 9.2	\$ 16.7	\$ 11.4	\$ 8.0	\$ 1.7	\$ 0.1	\$ 47.3
KeySpan Energy Delivery New York	\$ 19.0	\$ 34.5	\$ 23.5	\$ 16.6	\$ 3.6	\$ 0.3	\$ 97.6
KeySpan Energy Delivery Long Island	\$ 8.9	\$ 16.1	\$ 11.0	\$ 7.7	\$ 1.7	\$ 0.1	\$ 45.5
Boston Gas Company	\$ 10.4	\$ 18.8	\$ 12.8	\$ 9.1	\$ 2.0	\$ 0.2	\$ 53.2
Colonial Gas Company	\$ 3.0	\$ 5.5	\$ 3.8	\$ 2.7	\$ 0.6	\$ 0.0	\$ 15.6
Narragansett Gas Company	\$ 4.0	\$ 7.3	\$ 5.0	\$ 3.5	\$ 0.8	\$ 0.1	\$ 20.6
Niagara Mohawk Power Corp.- Electric Distr.	\$ 0.9	\$ 2.7	\$ 2.9	\$ -	\$ -	\$ -	\$ 6.6
Massachusetts Electric Company	\$ 0.7	\$ 2.2	\$ 2.3	\$ -	\$ -	\$ -	\$ 5.2
Nantucket Electric Company	\$ 0.0	\$ 0.0	\$ 0.0	\$ -	\$ -	\$ -	\$ 0.1
Narragansett Electric Company	\$ 0.3	\$ 0.8	\$ 0.9	\$ -	\$ -	\$ -	\$ 2.0
Total	\$ 56.5	\$ 104.6	\$ 73.7	\$ 47.6	\$ 10.3	\$ 0.8	\$ 293.6

4.6 NPV Summary

N/A

4.7 Customer Outreach Plan

N/A



US Sanction Paper

Line	Investment Name	Program/Release Description	Segment	NMPC Calculated Return (Rent Expense)	
				12-Months Ending	12-Months Ending
				March 31, 2022	March 31, 2023
1	GBE-Asset Management	Risk Management (Tx Mains & Dx Mains)	Gas	\$49.2	\$47.1
2	GBE-Asset Management	AM Program Leadership - 1	Gas	\$6.5	\$6.3
3	GBE-Asset Management	Enhancements	Gas	\$64.8	\$62.2
4	GBE-Asset Management	Additional IM Modules	Gas	\$17.6	\$16.9
5	GBE-Asset Management	AM Program Leadership - 2	Gas	\$9.8	\$9.4
6	GBE-Asset Management	Data Remediation, GIS Upgrade/ Migration & GIS Mobility	Gas	\$278.9	\$267.6
7	GBE-Asset Management	EAM-FIN Integration	Gas	\$44.9	\$42.5
8	GBE-Asset Management	Integrity Management Integrations	Gas	\$27.8	\$26.4
9	GBE-Asset Management	AM Program Leadership - 3	Gas	\$10.7	\$10.1
10	GBE-Asset Management	Design (GWD), Estimating (CU), & Mobility	Gas	\$283.7	\$254.2
11	GBE-Asset Management	Asset Analytics Integration	Gas	\$51.3	\$46.0
12	GBE-Asset Management	GIS (GWD/CU) - PPM Integration	Gas	\$24.5	\$22.0
13	GBE-Asset Management	GIS-EAM Integration	Gas	\$132.1	\$132.1
14	GBE-Asset Management	AM Program Leadership - 4	Gas	\$3.0	\$2.7
15	GBE-Asset Management	Use Case No.1 - Asset Risk	Gas	\$108.5	\$97.4
16	GBE-Asset Management	Complex Design (CAD) & Estimating (ESW)	Gas	\$72.9	\$65.5
17	GBE-Business Enablement	Program Learning Management - 1	Gas	\$2.8	\$2.7
18	GBE-Business Enablement	Program Transformational Change Office - 1	Gas	\$16.3	\$15.6
19	GBE-Business Enablement	Program Business Sustainment - 1	Gas	\$1.7	\$1.6
20	GBE-Business Enablement	Program Learning Management - 2	Gas	\$3.2	\$3.1
21	GBE-Business Enablement	Program Transformational Change Office - 2	Gas	\$37.4	\$35.9
22	GBE-Business Enablement	Program Learning Management - 3	Gas	\$4.6	\$4.3
23	GBE-Business Enablement	Program Transformational Change Office - 3	Gas	\$9.7	\$9.1
24	GBE-Business Enablement	Program Business Sustainment - 2	Gas	\$6.5	\$5.8
25	GBE-Business Enablement	Program Learning Management - 4	Gas	\$5.7	\$5.1
26	GBE-Business Enablement	Program Transformational Change Office - 4	Gas	\$5.0	\$4.5
27	GBE-Business Enablement	Program Business Sustainment - 3	Gas	\$2.6	\$8.9
28	GBE-Business Enablement	Program Learning Management - 5	Gas	\$0.5	\$1.7
29	GBE-Business Enablement	Program Transformational Change Office - 5	Gas	\$1.0	\$3.5
30	GBE-Business Enablement	Program Business Sustainment - 4	Gas	\$0.0	\$0.7
31	GBE-Business Enablement	Program Learning Management - 6	Gas	\$0.0	\$0.2
32	GBE-Business Enablement	Program Transformational Change Office - 6	Gas	\$0.0	\$0.2
33	GBE-Customer Engagement	Customer Experience Program Leadership - 1	Gas	\$6.4	\$6.2
34	GBE-Customer Engagement	CxT Portal & Channel Management	Gas	\$299.9	\$283.9
35	GBE-Customer Engagement	Customer Interaction - First Release	Gas	\$122.8	\$116.3
36	GBE-Customer Engagement	Employee Support Interaction - First Release	Gas	\$203.6	\$192.8
37	GBE-Customer Engagement	Customer Experience Program Leadership - 2	Gas	\$7.0	\$6.6
38	GBE-Customer Engagement	CRM / Contact Center	Gas	\$542.5	\$485.6
39	GBE-Customer Engagement	Large Commercial & Landlord Interaction	Gas	\$46.6	\$41.7
40	GBE-Customer Engagement	Employee Support Interaction - Second Release	Gas	\$8.4	\$7.5
41	GBE-Customer Engagement	Customer Interaction - Second Release	Gas	\$69.0	\$61.9
42	GBE-Customer Engagement	Customer Experience Program Leadership - 3	Gas	\$6.0	\$5.3
43	GBE-Data Management	Data Management Implementation (Quality & Cleansing)	Gas	\$258.7	\$247.6
44	GBE-Data Management	Data Management & Governance Program Leadership - 1	Gas	\$1.4	\$1.3
45	GBE-Data Management	Enable the Data Archive Process	Gas	\$53.7	\$51.6
46	GBE-Data Management	Data Management & Governance Program Leadership - 2	Gas	\$2.2	\$2.1

Niagara Mohawk Power Corporation
d/b/a National Grid
Case 17-E-0238 and 17-G-0239
Attachment 19 to DPS-276 IS-5
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Line	Investment Name	Program/Release Description	Segment	NMPC Calculated Return (Rent Expense)	
				12-Months Ending	12-Months Ending
				March 31, 2022	March 31, 2023
47	GBE-Data Management	Data Management & Governance Program Leadership - 3	Gas	\$2.4	\$2.2
48	GBE-Information Services Enabling	PowerPlan Architecture Enhancements	Gas	\$141.2	\$135.1
49	GBE-Information Services Enabling	Comprehensive Integration Services (Enhancements)	Gas	\$1.8	\$1.8
50	GBE-Information Services Enabling	Application (Environment) Infrastructure	Gas	\$50.7	\$48.5
51	GBE-Information Services Enabling	Development Operations & BPA Enablement - 1	Gas	\$68.6	\$65.7
52	GBE-Information Services Enabling	SAP and Application Integration Development- Release 1-1	Gas	\$112.5	\$107.7
53	GBE-Information Services Enabling	Mobility CoE & End-User Computing - 1	Gas	\$14.3	\$13.7
54	GBE-Information Services Enabling	Operations/System Monitoring	Gas	\$25.4	\$24.4
55	GBE-Information Services Enabling	Development Operations & BPA Enablement - 2	Gas	\$63.2	\$60.6
56	GBE-Information Services Enabling	SAP and Application Integration Development- Release 1-2	Gas	\$112.2	\$107.6
57	GBE-Information Services Enabling	SAP and Application Integration Development- Release 2-1	Gas	\$124.7	\$119.6
58	GBE-Information Services Enabling	Mobility CoE & End-User Computing - 2	Gas	\$22.7	\$21.8
59	GBE-Information Services Enabling	Development Operations & BPA Enablement - 3	Gas	\$56.9	\$53.7
60	GBE-Information Services Enabling	SAP and Application Integration Development- Release 1-3	Gas	\$15.8	\$14.9
61	GBE-Information Services Enabling	SAP and Application Integration Development- Release 2-2	Gas	\$115.7	\$109.1
62	GBE-Information Services Enabling	SAP and Application Integration Development- Release 3-1	Gas	\$2.3	\$2.1
63	GBE-Information Services Enabling	Mobility CoE & End-User Computing - 3	Gas	\$27.1	\$25.6
64	GBE-Information Services Enabling	Test Automation Implementation	Gas	\$74.9	\$67.2
65	GBE-Information Services Enabling	Development Operations & BPA Enablement - 4	Gas	\$63.8	\$57.3
66	GBE-Information Services Enabling	SAP and Application Integration Development- Release 1-4	Gas	\$17.6	\$15.8
67	GBE-Information Services Enabling	SAP and Application Integration Development- Release 3-2	Gas	\$68.2	\$61.2
68	GBE-Information Services Enabling	Mobility CoE & End-User Computing - 4	Gas	\$27.9	\$25.1
69	GBE-Information Services Enabling	Development Operations & BPA Enablement - 5	Gas	\$11.8	\$40.1
70	GBE-Information Services Enabling	SAP and Application Integration Development- Release 3-3	Gas	\$5.9	\$20.1
71	GBE-Information Services Enabling	Mobility CoE & End-User Computing - 5	Gas	\$1.3	\$4.5
72	GBE-Information Services Enabling	Development Operations & BPA Enablement - 6	Gas	\$0.0	\$6.0
73	GBE-Portfolio Office	Portfolio Management Leadership - 1	Gas	\$38.9	\$37.2
74	GBE-Portfolio Office	Solution Architects & Agile Coaches - 1	Gas	\$46.2	\$44.3
75	GBE-Portfolio Office	Portfolio Management Leadership - 2	Gas	\$52.9	\$50.7
76	GBE-Portfolio Office	Solution Architects & Agile Coaches - 2	Gas	\$97.8	\$93.8
77	GBE-Portfolio Office	Portfolio Management Leadership - 3	Gas	\$56.9	\$53.6
78	GBE-Portfolio Office	Solution Architects & Agile Coaches - 3	Gas	\$74.3	\$70.1
79	GBE-Portfolio Office	Portfolio Management Leadership - 4	Gas	\$54.4	\$48.8
80	GBE-Portfolio Office	Portfolio Management Leadership - 5	Gas	\$3.5	\$12.0
81	GBE-Regulatory and Compliance	Regulatory/ Compliance	Gas	\$76.5	\$72.5
82	GBE-Supply Chain	Supply Chain Program Leadership - 1	Gas	\$13.9	\$13.4
83	GBE-Supply Chain	Supply Chain Program Leadership - 2	Gas	\$6.2	\$5.8
84	GBE-Work Management	Business Architecture Design	Gas	\$70.0	\$67.0
85	GBE-Work Management	WMFE Program Leadership - 1	Gas	\$5.5	\$5.3
86	GBE-Work Management	Corrosion and I&R Work	Gas	\$634.0	\$607.5
87	GBE-Work Management	CU Governance & Library - process	Gas	\$40.3	\$38.6
88	GBE-Work Management	WMFE Program Leadership - 2	Gas	\$13.9	\$13.3
89	GBE-Work Management	Company Driven Work: Collections and non-Appointment Offs - ELECTRIC	Electric	\$206.7	\$195.8
90	GBE-Work Management	Company Driven Work: Collections and non-Appointment Offs - GAS	Gas	\$135.9	\$128.7
91	GBE-Work Management	Customer, Leak Investigation & Inspections - ELECTRIC	Electric	\$793.1	\$751.3
92	GBE-Work Management	Customer, Leak Investigation & Inspections - GAS	Gas	\$521.4	\$493.9
93	GBE-Work Management	WMFE Program Leadership - 3	Gas	\$15.7	\$14.8
94	GBE-Work Management	PowerPlan Integration & Enhancements	Gas	\$55.6	\$49.8
95	GBE-Work Management	Construction Work & Leak Repair	Gas	\$597.3	\$535.2
96	GBE-Work Management	WMFE Program Leadership - 4	Gas	\$4.5	\$4.1
97	GBE-Work Management	Work Forecasting & Planning - solution	Gas	\$43.1	\$55.1
98	GBE-Work Management	Core Projects & Program Management	Gas	\$89.5	\$122.2
99	GBE-Work Management	WMFE Optimization	Gas	\$63.9	\$217.4

Niagara Mohawk Power Corporation

d/b/a National Grid

Case 17-E-0238 and 17-G-0239

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<u>Line</u>	<u>Investment Name</u>	<u>Program/Release Description</u>	<u>Segment</u>	NMPC Calculated Return (Rent Expense)	
				<u>12-Months Ending</u> <u>March 31, 2022</u>	<u>12-Months Ending</u> <u>March 31, 2023</u>
100		Total Fiscal Year CAPEX Return for Gas Business Enablement		\$7,952.1	\$7,735.2
101					

Niagara Mohawk Power Corporation d/b/a National Grid
Gas Business Enablement
Operating Expenses
DPS-276

Investment	Program / Release Description	Segment	12-Months Ending March		Total OPEX Spend
			31, 2022	31, 2023	
Asset Management	Use Case No.1 - Asset Risk	Gas	\$ 5.9	\$ -	\$ 5.9
Asset Management	Complex Design (CAD) & Estimating (ESW)	Gas	\$ 11.1	\$ -	\$ 11.1
Asset Management	Design & Estimating Process Stabilization	Gas	\$ 714.2	\$ -	\$ 714.2
Business Enablement	Program Business Readiness	Gas	\$ 473.9	\$ 160.3	\$ 634.2
Business Enablement	Program Business Sustainment - 3	Gas	\$ 908.2	\$ -	\$ 908.2
Business Enablement	Program Business Sustainment - 4	Gas	\$ -	\$ 231.5	\$ 231.5
Business Enablement	Labor Contract Strategy & Implementation Support	Gas	\$ 82.8	\$ -	\$ 82.8
Business Enablement	Program Learning Management - 5	Gas	\$ 177.7	\$ -	\$ 177.7
Business Enablement	Program Learning Management - 6	Gas	\$ -	\$ 60.1	\$ 60.1
Business Enablement	Program Transformational Change Office - 5	Gas	\$ 402.8	\$ -	\$ 402.8
Business Enablement	Program Transformational Change Office - 6	Gas	\$ -	\$ 102.2	\$ 102.2
Business Enablement	Workforce Strategy Planning & Implementation Support	Gas	\$ 60.1	\$ -	\$ 60.1
Customer Engagement	Customer Interaction - Second Release	Gas	\$ 18.9	\$ -	\$ 18.9
Customer Engagement	Large Commercial & Landlord Interaction	Gas	\$ 9.4	\$ -	\$ 9.4
Data Management	Data Management Implementation (Quality & Cleansing)	Gas	\$ 3,657.6	\$ -	\$ 3,657.6
Information Services Enabling	Development Operations & BPA Enablement - 5	Gas	\$ 342.2	\$ -	\$ 342.2
Information Services Enabling	Development Operations & BPA Enablement - 6	Gas	\$ -	\$ 174.9	\$ 174.9
Information Services Enabling	IS Operating Model (Delivery / Support, Run)	Gas	\$ 274.4	\$ -	\$ 274.4
Portfolio Office	Portfolio Management Leadership - 5	Gas	\$ 1,228.2	\$ -	\$ 1,228.2
Work Management	Core Projects & Program Management	Gas	\$ 127.4	\$ -	\$ 127.4
Work Management	Construction Work & Leak Repair	Gas	\$ 113.5	\$ -	\$ 113.5
Work Management	WMFE Optimization	Gas	\$ 454.1	\$ -	\$ 454.1
Work Management	Work Forecasting & Planning - solution	Gas	\$ 25.1	\$ -	\$ 25.1
Total Fiscal Year Spend for Gas Business Enablement			\$ 9,087.5	\$ 729.0	\$ 9,816.5
Less: To remove Base Labor and overheads included in Labor & Benefits			\$ 5,496.4	\$ 412.8	\$ 5,909.2
Adjusted Total Fiscal Year O&M Spend for Gas Business Enablement			\$ 3,591.0	\$ 316.2	\$ 3,907.3

		FY22	FY23	Total
Total Gas Operating Expenses	\$	3,591.0	316.2	3,907.3

Company Description	% of Retail Customers (C-210)					
Niagara Mohawk Power Corp. - Gas	16.89%	\$	606.5	\$	53.4	\$ 659.9
KeySpan Energy Delivery New York	34.87%	\$	1,252.2	\$	110.3	\$ 1,362.5
KeySpan Energy Delivery Long Island	16.27%	\$	584.3	\$	51.4	\$ 635.7
Boston Gas Company	19.02%	\$	683.0	\$	60.1	\$ 743.2
Colonial Gas Company	5.58%	\$	200.4	\$	17.6	\$ 218.0
Narragansett Gas Company	7.37%	\$	264.7	\$	23.3	\$ 288.0
Estimated total that would be allocated to NMPC		\$	606.5	\$	53.4	\$ 659.9

Date of Request: June 7, 2017
Due Date: June 19, 2017

Request No. DPS-276 IS-5
NMPC Req. No. NM-739

NIAGARA MOHAWK POWER CORPORATION d/b/a NATIONAL GRID
Case No. 17-E-0238 and 17-G-0239 –
Niagara Mohawk Power Corporation d/b/a National Grid – Electric and Gas Rates

Request for Information

FROM: DPS Staff, Andy Timbrook
TO: National Grid, Information Services Panel
SUBJECT: **IS PROGRAM PROJECT COSTS**

Request:

In this interrogatory, all requests for data, workpapers or supporting calculations should be construed as requesting any Word, Excel, or other computer spreadsheet models in original electronic format with all formulae intact.

Provide the following information for each proposed project listed in Exhibit__(ISP-3):

1. Budgets and actual expenditures by fiscal year (FY) from the inception of the project to date.
2. Applicable contracts or agreements with vendors.
3. If applicable, an estimate of projected spending for FY 2022 and FY 2023, broken down by total capital spend and incremental operations and maintenance (O&M) expense.

Response:

1. Please see Attachment 1 for the budget and capital actual expenditures from inception to date for each project listed on Exhibit_(ISP-3).
2. Pursuant to discussion with Staff, the Company is providing the contracts for the top 50 dollar value capital projects with forecast spend through the end of fiscal year 2018 listed in Exhibit ___ (ISP-3). For projects delivered by a Framework Partner or under an Enterprise Agreement, the Company noted the vendor that was delivering the service. Each of these vendors were selected as a result of a competitive bidding process and were awarded a Framework or Enterprise agreement with agreed rates and terms under which projects could be direct assigned (single sourced) or competitively tendered among other Framework Partners. The table below is the attachment reference for each contract or the Framework

Partner that is delivering the project. As noted below, for some projects, the contract has not been executed yet or the project has not started.

Investment Name	Attachments - Contracts
INVP 3614D1 Ent Network Security	Attachment 2 to DPS-276 IS-5 CONFIDENTIAL
INVP 3614B7 CNI Network Security	Attachment 2 to DPS-276 IS-5 CONFIDENTIAL
IT/OT Discovery and Implementation Phase 1	Project not started
Big Data Security Analytics Phase 1	Project not started
Enhanced DLP Gateway and Endpoint	Project not started
INVP 3932 Customer Contact Center	No signed contracts
INVP 3737 US CNI GMS SCADA Upgrade & US CNI-EMS Lifecycle Hardware and Software Upgrade	Attachment 3 to DPS-276 IS-5 CONFIDENTIAL Attachment 4 to DPS-276 IS-5
INVP 4307 US Win 7 Refresh Ph 3	Attachment 5 to DPS-276 IS-5 CONFIDENTIAL and Attachment 5 to DPS-276 IS-5 REDACTED
INVP 4398 Storms/ISched Upgrade	Attachment 6 to DPS-276 IS-5
Acquisition of Remote Sensing Data - NY	Attachment 7 to DPS-276 IS-5 CONFIDENTIAL
S005242 M112 Systemic Improvement	Master Service Agreements - Deloitte & Touche, KPMG, and SAP
US Mobile Device Refresh	Framework Partner - CSC
US SAP: Infrastructure Landscape	Attachment 8 - DPS-276 IS-5 CONFIDENTIAL
Mobile Device Refresh - FY17	Framework Partner - CSC
INVP 4464 Data Visualization	Attachment 9 to DPS-276 IS-5
Acquisition of Remote Sensing Data - Mass	MA. Project - No Allocations to NY
INVP 4170 Time Transformation	Framework Partner - Wipro
INVP 4408 Doc Mgmt Systems Replacement Delivery	Attachment 10 to DPS-276 IS-5 CONFIDENTIAL and Attachment 10 to DPS-276 IS-5 REDACTED
HANA License Costs	Attachment 11 to DPS-276 IS-5 CONFIDENTIAL and Attachment 11 to DPS-276 IS-5 REDACTED
Informatica Upgrade/Microstrategy Replacement Program	Attachment 12 to DPS-276 IS-5 CONFIDENTIAL and Attachment 12 to DPS-276 IS-5 REDACTED
INVP 4364 Wireless Network	Attachment 13 to DPS-276 IS-5 CONFIDENTIAL and Attachment 13 to DPS-276 IS-5 REDACTED
Zscaler	Attachment 14 to DPS-276 IS-5 CONFIDENTIAL and Attachment 14 to DPS-276 IS-5 REDACTED
INVP 2577C ArcFM Software Upgrade	Framework Partner - Wipro
INVP 4280 US VSTIG Bandwidth Ph2	Attachment 15 to DPS-276 IS-5 CONFIDENTIAL and Attachment 15 to DPS-276 IS-5 REDACTED
Data Remediation, GIS Upgrade/ Migration & GIS Mobility	No signed contracts
Risk Management (Tx Mains & Dx Mains) Enhancements	No signed contracts
Data Management Implementation (Quality & Cleansing)	No signed contracts
Powerplan Remediation	No signed contracts
SAP and Application Integration Development- Release 1-1	No signed contracts
Development Operations & BPA Enablement-1	No signed contracts
Application (Environment) Infrastructure	No signed contracts
Corrosion and I&R Work	No signed contracts

Business Architecture Design	No signed contracts
Company Driven Work: Collections and non-Appointment Offs - Gas	No signed contracts
DRMS for C&I Demand Response	No signed contracts
Regulatory Mandates - FY18	Framework Partner - IBM
US Control-Gas Electronic Bulletin Board (EBB) Upgrade	Project not started
INVP 3839A NY Retail Access Ph2	Framework Partner - IBM
INVP 4124 Auto Remote Net Meter	Framework Partner - IBM
INVP 4411AB Distributed Generation Portal	Attachment 16 to DPS-276 IS-5 CONFIDENTIAL
INVP 4448 Low Income Order CSS	Framework Partner - IBM
INVP 4448 Low Income Order CRIS	Framework Partner - IBM
CPE Buyback	Attachment 17 to DPS-276 IS-5 CONFIDENTIAL and Attachment 17 to DPS-276 IS-5 REDACTED
Business Innovation Projects 1	Project not started
ICE Replacement	Attachment 18 to DPS-276 IS-5 CONFIDENTIAL and Attachment 18 to DPS-276 IS-5 REDACTED
US Network Programme	Project not started
US VSTIG Programme	Project not started
1327 Interfaces - 523 FTS, 340 RDX, 245 MQSI, 253 JCAPS, 44 PM4D, 7 VB	Project not started
Data Centre Consolidation efforts	Project not started

Please note that portions of Attachments 5, 10-15, 17 and 18 have been redacted to remove confidential information. In addition, all of Attachments 2-3, 7-8, and 16 are confidential. Unredacted, confidential versions of the attachments have been provided separately. As discussed at the recent procedural conference, the Company anticipates that a protective order governing the handling of confidential material will be issued by the Administrative Law Judges shortly. Please protect the information from public disclosure.

3. Please see Attachments 19 and 20 for the projected capital and O&M costs for FY22 and FY23 for the Gas Enablement Program. The forecast spend for the remainder of the IS Portfolio for that time period has not yet been completed.

Name of Respondent:
Thomas F. Gill

Date of Reply:
June 19, 2017

Niagara Mohawk Power Corporation d/b/a National Grid
ISP-3 Information Services (IS) Capital Projects

In-flight projects

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
INVP 3614D1 Ent Network Security	Cyber Security	3614D1	G020	6/30/17	9,478,590	All projects are impacted by the benefits and protections of the Cyber Security program. Enterprise Network Security (ENS) project is part of the overall program of Cyber Security improvements to enhance NGrid's (and its energy networks), ability to detect security threats and determine the nature of incidents as, or potentially before, they occur, allowing improvement in response to detected threats and the production of internal intelligence. Each project within the program will have its own sanction paper to establish individual approaches. Managing this work as a portfolio of projects, rather than as a series of independent smaller projects, will allow DR&S to manage the spending in a coordinated and strategic way and give greater overall value for the investment. A program of investments will provide a single point of governance, a coordinated delivery plan, efficient allocation of resources, a quicker response to changing threat priorities and a clear view of progress to the business.
INVP 3614B7 CNI Network Security	Cyber Security	3614B7	G020	12/31/17	4,829,586	All CNI projects and systems are dependent on the protections provided by the CNI Network Security project. Critical Network Infrastructure network security will reinforce and strengthen capabilities of current US CNI environments to mitigate internal and external threats to CNI operations.
INVP 3614E4 US CNI Security I&E	Cyber Security	3614E4	G020	12/31/17	1,207,045	This investment will complete the Development phase for Security Information and Event Management capabilities to support the detection, investigation and remediation of Cyber Security threats impacting US CNI environments. This investment enhances existing cyber security systems by providing the capability for holistic analysis of the National Grid US CNI networks and infrastructure for the US Cyber Security Operations Center and associated teams, supporting direction of resources to tackle the most pertinent areas of risk. Key Business Benefits: * Risk mitigation: The major business benefits of the projects are Reliability (High), Responsiveness (Immediate) and Reputational (Protected).
INVP 4045 Double Pole Mgmt DB	FY18 Plan	4045	G198	2/18/17	482,153	This project has been completed. The number and location of "Double Poles" being tracked is limited by existing paper based business process. This investment will provide automated interfaces between the National Grid "SmallWorld Geographic Information System (GIS)", STORMS (work management application), and In-Quest Technologies "SmartApp.com" Double Pole Tracking applications to electronically record new Double Pole tickets and to accurately track job status. By automating these interfaces and removing the paper forms process, error rates will be greatly reduced resulting in improved management and tracking of Double Poles in National Grid service territory.
INVP 4373 Contingent Labor Admin Replacement	FY18 Plan	4373	G020	2/20/17	250,692	This project is complete. This project was a strategic solution to improve the Contingent Labor Management process by moving towards a global Master Service Provider (MSP) through Pontoon and the externally hosted SAP Fieldglass to meet National Grid requirements. A single provider has enabled National Grid to build a strategic global partnership that will maximize the spend by leveraging the supply base and provide the best value and to allow a singular unified approach to managing the contingent workforce across National Grid globally. This has enabled National Grid to strengthen its talent pipeline, gain further support in its Strategic Workforce Planning.
INVP 3955 EJ Ward Upgrade	FY18 Plan	3955	G235	2/28/17	646,004	This project affects and is allocated solely to the Downstate NY Operating Companies. No costs are allocated to NMPC

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
INVP 4188 Aging System Stabilize	FY18 Plan	4188	G148	3/31/17	782,710	Most of these are standalone system upgrades/stabilization efforts. This program will upgrade, replatform and enhance existing operations applications which have components which are falling out of support and are no longer maintainable. This includes upgrading to the currently supported operating system, moving to supportable servers, upgrading the databases to the current support levels and replacing older components to bring the system into a fully reliable state. This project will also enhance or replace critical network components which are failing, going out of support or exceeding capacity.
INVP 4280 US VSTIG Bandwidth Ph2	FY18 Plan	4280	G020	3/31/17	1,998,645	The purpose of the Verizon Secured Telecommunications Gateway (VSTIG) network services is to connect National Grid securely to the internet and other external business partners. Due to the growth of these services, and other demands within the VSTIG environment, an upgrade is now required. If not addressed, this will lead to poor network performance, impact key business processes, and result in the potential loss of gateway services (such as internet access, cloud services and guest wireless internet access). This project will be an enabler for other projects that are dependent upon the capacity increase, such as legacy De-Militarized Zone (DMZ) migration, Wide Area Network (WAN) and cloud services.
INVP 4307 US Win 7 Refresh Ph 3	FY18 Plan	4307	G020	3/31/17	11,562,999	Downstream dependency on INVP 3857 XP Remediation. To ensure the end user device estate continues to be reliable, remains secure and is able to meet new business demands, it is important that the operating system is capable of current performance and supported by the software vendor. The current standard operating system at National Grid is Windows 7. However, the US is still reliant on XP due to legacy applications (approximately 6000 users currently rely upon XP operating system). XP is no longer in support and Microsoft has stopped producing security patches for it. Many new applications are not XP compatible and existing applications operating on XP may require remediation to work on Windows 7. Continued use of XP also poses potential reliability and security risks.
INVP 4364 Wireless Network	FY18 Plan	4364	G020	3/31/17	2,303,959	This is one of many projects to address improvements to the wireless network (see Tech Modernization Wireless Program) This will replace end of life equipment, decommission legacy wireless networks, and install or expand the current coverage and capacity of the Wireless Local Area Network (WLAN) at various National Grid sites that have been identified as a priority. The project will also strengthen the stability of the wireless network by providing current supported equipment with additional capacity. In addition this project will renew the outdoor (Yard) wireless network for these prioritize sites by replacing out of support access points at field locations to ensure Wi-Fi vehicle communications remain supportable.
S005242 M112 Systemic Improvement	FY18 Plan	N/A	G020	3/31/17	8,000,000	This project is complete. The FERC on HANA solution will result in the decommissioning of our existing FERC module within the SAP ECC system and relocate it to a new HANA architecture, allowing for real time FERC reporting abilities.
INVP 4289 US Network Improvement	FY18 Plan	4289	G020	3/31/17	978,717	This is one of many projects to address improvements to the US Network (see Tech Modernization US Network Program) This policy driven project will migrate 4 of the existing legacy network sites onto the new Verizon service. This will provide business users on-site with a supportable, more reliable service with greater availability and lower outage times. The legacy services are using unsupported network infrastructure and are unable to offer the functionality and reliability required by the business or utilize new technologies such as IP Telephony (Internet Protocol Telephony or IPT), video conferencing, and Transformed Wireless Local Area Network (WLAN).
INVP 2577C ArcFM Software Upgrade	FY18 Plan	2577C	G112	4/7/17	2,087,188	This is a project that benefits MA Gas companies and utilizes the G112 Allocation code to allocate costs to Boston and Colonial Gas only. (No NMPC allocation of costs)

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
INVP 4631 Box Enablement	FY18 Plan	4631	G020	4/30/17	254,000	This project is complete and had project dependencies that included VSTIG Upgrades and the availability of Verizon Secure Cloud Interconnect service. National Grid needs a reliable method of securely sharing documents to enable collaboration with external stakeholders. The current tool of SharePoint is unable to be accessed by our external stakeholders due to firewalls in place, which is unable to be changed, due to compliance with Digital Risk and Security policies. The company has made an investment in Office 365, and to maximize the effectiveness of this investment, a new document sharing tool was required.
INVP 4170 Time Transformation	FY18 Plan	4170	G020	5/1/17	3,917,000	This project is complete. The goal of this project was to transform the end-to-end timekeeping process across the entire U.S. organization by optimizing time capture, enhancing data quality through validation at the point of time entry, optimizing manager review and approval through logic-based warnings.
INVP 4420 US CNI OMSFocalPoint Infrastructure Upgrade	FY18 Plan	4420	G198	5/1/17	1,366,563	This project is completed. This project addressed the need for high performing servers for National Grid's outage reporting efforts via the FocalPoint Outage Data Warehouse application. The current infrastructure for the application is insufficient to support the additional processing capacity required during a storm event
INVP 4274 VSTIG Hardware Refresh	FY18 Plan	4274	G020	5/31/17	608,000	Project dependencies - This is a foundational investment to de-risk the business. Within the VSTIG (Verizon Secure Telecommunications Gateway) solution, the Reverse Proxy (Bluecoat) servers have reached end of life and will no longer be supported by Verizon as of 28 February 2017. From that point, any support provided would be on a best endeavors basis only meaning contractual service level agreements (SLAs) cannot be guaranteed. This project will procure, install and transition the replacement BlueCoat reverse proxy servers which will be fully supported for five years and provide an increase in bandwidth to the existing servers as of February 28th, 2017. These reverse proxies perform a number of vital security functions including acting as an application firewall protecting against DoS (Denial of Service) or DDoS (Distributed Denial of Service) attacks, which mitigates against attacks and removes malware. National Grid also employs reverse proxies to perform a load balancing function to distribute the incoming load from incoming requests across different servers. Due to the critical functions performed by these servers, it is important that they be replaced and that appropriate support agreements are in place; thus ensuring service levels are met.
INVP 4464 Data Visualization	FY18 Plan	4464	G020	7/31/17	4,440,000	There are no project dependencies on INVP 4464. Project Summary - This project will establish Tableau and Altrex software solutions in a cloud environment to enable self-service reporting and data visualization capabilities for the organization. The proposed solution will provide 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.
INVP 4461 Unix51 Interface Migration	FY18 Plan	4461	G020	9/1/17	1,386,701	Project dependency on INVP 3492 - Comprehensive Integration Services Project Summary - This project is required to migrate interfaces from UNIX 51 File Transfer Service (FTS) legacy services to strategic services. There are over 200 individual files and over 70 third parties receiving and sending critical data to National Grid via this service. UNIX 51 is running on aged technology and infrastructure without any support. The FTS service was developed almost 20 years ago and is running on an unsupported platform. Initial analysis and tactical work to migrate business critical interfaces is currently in progress. In addition to the tactical work this investment will establish a long term strategic framework and approach to migrate all the interfaces.

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
INVP 4287 Active Directory Upgrade	FY18 Plan	4287	G020	9/30/17	804,825	Project Dependencies: There is a dependency on YouConnect and Service Now projects to agree data requirements for Identity. Key Business Benefits: This is a key service which supports core authentication from all computer and servers onto the corporate network and therefore provides access to all IS systems. Ensuring the service is reliable and supports changing requirements for security and internet based services is critical. There are an increasing number of operational challenges with the current service, the root cause of which have been identified as the age and complexity of AD infrastructure and data. In addition there are an increasing number of Software as a Service (SAAS) Services which are driving the need for more capability within current AD structure is not able to support this - moving to a new structure will support this demand going forward. .
INVP 4408 Doc Mgmt Systems Replacement Delivery	FY18 Plan	4408	G149	11/1/17	3,617,542	IS project: 3985 - Document Management System Replacement has Downstream dependency on IS Project; 3857 - XP Remediation (US Only). Project Description: The document management systems used to store, retrieve, and update engineering drawings and documents in the Network Strategy and Power Plant Operations organizations are beyond their useful lifespan and are creating an unacceptable level of risk to National Grid. These systems have not been upgraded since their deployment roughly 12 years ago and are now unsupported due to a shortage of available parts and software updates. Failure in NG's ability to retrieve accurate information will adversely affect the safety of employees, contractors, and the public, up to and including the potential for loss of life. Failure of the DMS, including an inability to retrieve detail gas system drawings, will prevent NG from keeping its regulatory and legal obligations. Over time, the business has adopted different strategies to manage document storage, including the use of TeamCenter, Documentum, and 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 does not provide version control, and documents are at risk of being inaccurate or deleted altogether.
INVP 3486 US MDS-Itron Enterprise Edition (IEE)	FY18 Plan	3486	G186	3/31/18	670,943	Project Dependencies: Business touch-point initiatives could include SmartGrid, GridMod, NYRev or others in effect at time of project, and they may become dependencies based on corporate strategy. Project Summary - This project will deliver a consistent meter reading platform utilizing the Itron Enterprise Edition (IEE) version 8.1 cloud based solution. This solution will support the migration of meter groups in work streams. Initially targeted are approximately 3,000 MV90 interval collection system New York electric meters that need to be upgraded from 2G to 4G, as the 2G technology is being retired by the communication vendor, and 4G is the current standard wireless communication technology. This project is necessary to do now, as all known carriers are retiring the 2G technology and moving to 4G.
INVP 4390 Plastic Fusion II	FY18 Plan	4390	G207	3/31/18	506,000	Project Dependencies: Successful implementation of "INVP 2577C: Esri/ArcFM GIS Software Upgrade and System Enhancements" in order to roll out Portal for ArcGIS to tablet computers within National Grid. Successful completion of a Fortis upgrade, or the implementation of a Document Management system that can properly display the Gas Service Cards, in order to roll out a Portal or application to the field units. Project Summary - The project will transfer Gas standards and policies from an existing intranet solution to a mobile friendly, web based solution. The key capabilities include but are not limited to selecting an application that contains an auto sync feature along with a download feature to access in offline mode. The application will also need to send notification of a change to field workers directly as opposed to the supervisor responsibility for notification. Lastly, the applications need to track usage information to ensure appropriate oversight on the use of procedures to meet standards and safety goals.

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
INVP 4397 Ariba TLS and CI Update	FY18 Plan	4397	G020	3/31/18	1,462,000	Project Dependencies: SAP Asset Health Program. This project can share the existing resources which will allow significant synergies (no need to create individual T-system environment) as well as share the testing (within the program of work). Project Summary - The project will address the upgrade of two Systems Applications Processing (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 to connect to Ariba's supplier collaboration and housing catalogs, and network activities, such as sending and receiving purchase orders. The Ariba Cloud Integration (CI) component will need to be upgraded to the most current supported version at the point of implementation. As of May 2016, National Grid's system landscape is operating on an unsupported version (CI-4) and not able to make service requests to resolve production issues.
Call Center Customer Contact Center/SDC Technology Upgrade Implement Solution	FY18 Plan	3932	C175	8/31/18	27,724,719	Project Dependencies: This project is contingent upon the completion of INVP 2204F - Customer Contact Center Technology Analysis and the completion of INVP 4172 - Cross Company Customer Sys Enhancements. INVP4139 - Customer Interaction Channels : need to work in conjunction with the Customer Interaction layer analysis, being driven by this project, to ensure that we leverage an enterprise wide solution and avoid potential re-work or additional work downstream. Project Summary - The U.S. Customer Contact Centers and Service Delivery Center (SDC) are currently operating on core technologies that are no longer supported by their respective vendor. TNG also has multiple vendors supporting the technology and is seeking to consolidate support to one vendor with this project. This project will facilitate the replacement and consolidation of these critical systems to support the reliability of key communication channels between National Grid, our customers, and our employees. Upgrading the following technologies will enable the company to minimize the risk of outages and allows the opportunity for more customers to access the system through the automated system. These technologies include: Automatic Call Distribution system (ACD), Interactive Voice Response (IVR), * Computer Telephony Integration (CTI), Call Center Workforce Management (WFM), Call Recording/ Quality Monitoring
INVP 4398 Storms/ISched Upgrade	FY18 Plan	4398	G160	12/15/18	9,955,867	Project Dependencies: There is a relationship with Gas Enablement. There is a parallel dependency on INVP 4045 - Double Pole Management Database and INVP 4411 - Distributed Generation Program (INVP 4411A Distributed Generation Application Tracking NY, INVP 4411B Distributed Generation Application Tracking NE, INVP 4411C New Electric connections, INVP 4411D New Gas connections). Project Summary - As the primary Work Management and Scheduling tools for the legacy National Grid service territories, 'STORMS' and 'IScheduler' are critical applications in support of both Electric and Gas Operations. The applications have become increasingly unstable, experiencing multiple outages over the past several years. The vendor is no longer in a position to support the applications without upgrades that will bring the applications onto current technology. The project will upgrade the work management system (STORMS) to the latest version of technology including: server hardware, system software and database software, along with bringing both standard and custom application code to the latest version of the technology. The investment will also replace the aged middleware components with new, supported components. As part of the project, the work management scheduling tool (IScheduler) will be replaced with the vendor's latest scheduling tool and integrated with the STORMS product.

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
INVP 3737 US CNI GMS SCADA Upgrade &	FY18 Plan	3737	C210	3/31/20	25,930,291	Project Summary - This project is the final step in the strategic evolution of the Critical National Infrastructure (CNI) Gas Management Systems (GMS) SCADA system, supporting the new consolidated control rooms and upgrades to the hardware and operating systems which are considered to be end of life. Further the current version of the SCADA application will require an upgrade due to incompatibility with the new operating systems. Outcome of the project will ensure continuity in service while meeting the National Grid Gas Control strategic initiative for GMS longevity and up-time performance. Additionally, this effort will provide compliance to the National Grid IS DR&S policies.
INVP 3882 NYS Pipeline Safety CMS	Other Mandates	3882	G207	3/17/17	1,308,000	Regulatory mandates are not discretionary investments and are based on orders, laws and agreements promulgated by Federal, State or Municipal government agencies.
INVP 3851 Consolidated Voice Recorder for US Electric Control Rooms	Other Mandates	3851	G181	3/31/17	1,234,000	Regulatory mandates are not discretionary investments and are based on orders, laws and agreements promulgated by Federal, State or Municipal government agencies.
Physical Security Replacements - FY17	Physical Security	N/A	G020	3/31/17	906,050	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Physical Security Program
Physical Security Replacements - FY18	Physical Security	N/A	G020	3/31/18	950,000	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Physical Security Program
All NIMO Physical Security Replacements - FY18	Physical Security	N/A	G114	3/31/18	490,000	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Physical Security Program
Physical Security Replacements - FY19	Physical Security	N/A	G020	3/31/19	825,000	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Physical Security Program
All NIMO Physical Security Replacements - FY19	Physical Security	N/A	G114	3/31/19	275,000	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Physical Security Program
Physical Security Replacements - FY20	Physical Security	N/A	G020	3/31/20	835,000	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Physical Security Program

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
All NIMO Physical Security Replacements - FY20	Physical Security	N/A	G114	3/31/20	282,000	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Physical Security Program
Physical Security Replacements - FY21	Physical Security	N/A	G020	3/31/21	860,000	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Physical Security Program
All NIMO Physical Security Replacements - FY21	Physical Security	N/A	G114	3/31/21	290,000	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Physical Security Program
INVP 4451 Gas Transportation System Phase II	PSC Mandate	4451	G225	5/31/17	1,629,117	Regulatory mandates are not discretionary investments and are based on orders, laws and agreements promulgated by Federal, State or Municipal government agencies.
INVP 4347 NYC Leave on for Landlord Program	PSC Mandate	4347	5220G	7/31/17	870,095	Regulatory mandates are not discretionary investments and are based on orders, laws and agreements promulgated by Federal, State or Municipal government agencies.
INVP 4124 Auto Remote Net Meter	PSC Mandate	4124	C198	8/31/17	3,584,165	Regulatory mandates are not discretionary investments and are based on orders, laws and agreements promulgated by Federal, State or Municipal government agencies.
INVP 3839A NY Retail Access Ph2	PSC Mandate	3839A	C170	10/31/17	5,356,231	Regulatory mandates are not discretionary investments and are based on orders, laws and agreements promulgated by Federal, State or Municipal government agencies.
INVP 4411AB Distributed Generation Portal	PSC Mandate	4411A+B	C198	11/30/17	3,347,611	Regulatory mandates are not discretionary investments and are based on orders, laws and agreements promulgated by Federal, State or Municipal government agencies.
INVP 4383 NY Community Choice Aggregation	PSC Mandate	4383	C170	12/31/17	551,447	Regulatory mandates are not discretionary investments and are based on orders, laws and agreements promulgated by Federal, State or Municipal government agencies.
INVP 4448 Low Income Order CRIS	PSC Mandate	4448	5220G	12/31/17	2,207,590	Regulatory mandates are not discretionary investments and are based on orders, laws and agreements promulgated by Federal, State or Municipal government agencies.
INVP 4448 Low Income Order CSS	PSC Mandate	4448	C195	12/31/17	2,489,410	Regulatory mandates are not discretionary investments and are based on orders, laws and agreements promulgated by Federal, State or Municipal government agencies.

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INVP 4411C New Electric Connections	PSC Mandate	4411C	C198	4/30/18	698,000	Regulatory mandates are not discretionary investments and are based on orders, laws and agreements promulgated by Federal, State or Municipal government agencies.
INVP 4411D New Gas Connections	PSC Mandate	4411D	C210	10/31/18	896,000	Regulatory mandates are not discretionary investments and are based on orders, laws and agreements promulgated by Federal, State or Municipal government agencies.

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Planned Projects						
Cloud Security	Cyber Security	3683	G020	5/1/17	\$1,460,000	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
Risk Based Authentication - 2FA token alternative	Cyber Security	3683	G020	6/1/17	\$235,080	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
Threat Behavior Modeling	Cyber Security	3683	G020	8/1/17	\$800,000	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
Enhanced Phishing Protection	Cyber Security	3683	G020	8/1/17	\$0	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
Identity & Access Management :Role Base Access Management (RBAC)	Cyber Security	3683	G020	10/1/17	\$1,650,000	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
Situation Intelligence & Cyber Intelligence: Phase 1	Cyber Security	3683	G020	11/1/17	\$0	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
Enhanced DLP Gateway and Endpoint	Cyber Security	3683	G020	12/1/17	\$2,238,480	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
US CNI Intrusion Detection/Prevention Phase 1	Cyber Security	3683	G020	3/31/18	\$550,000	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
Identity & Access Management: Fine Grain Access Management	Cyber Security	3683	G020	3/31/18	\$1,650,000	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
vStig Scaling Upgrades	Cyber Security	3683	G020	8/1/18	\$1,000,000	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
IT/OT Discovery and Implementation Phase 1	Cyber Security	3683	G020	10/1/18	\$5,500,000	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
Security Research Lab	Cyber Security	3683	G020	10/1/18	\$325,000	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
US CNI Security Enhancements Phase 1	Cyber Security	3683	G020	11/1/18	\$1,650,000	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
Identity & Access Management: Privileged Access Management	Cyber Security	3683	G020	3/31/19	\$1,740,000	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
Domain Based Security Phase 1	Cyber Security	3683	G020	3/31/19	\$800,000	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
Security Incident Event Management Phase 4	Cyber Security	3683	G020	5/1/19	\$1,266,300	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
Big Data Security Analytics Phase 1	Cyber Security	3683	G020	5/1/19	\$4,621,552	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
Situation Intelligence & Cyber Intelligence: Phase 2	Cyber Security	3683	G020	11/1/19	\$0	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
US CNI Intrusion Detection/Prevention Phase 2	Cyber Security	3683	G020	3/31/20	\$800,000	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
Identity & Access Management: Shared Area Access Management	Cyber Security	3683	G020	3/31/20	\$1,740,000	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
Security Incident Event Management Phase 5	Cyber Security	3683	G020	5/1/20	\$733,150	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
Domain Based Security Phase 2	Cyber Security	3683	G020	3/31/21	\$6,000,000	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
Security Incident Event Management (SIEM) 6	Cyber Security	3683	G020	5/1/21	\$733,150	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
Big Data Security Analytics - Phase 2	Cyber Security	3683	G020	5/1/21	\$5,776,940	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
IT/OT Discovery and Implementation: Phase 2	Cyber Security	3683	G020	10/1/21	\$7,000,000	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
US CNI Security Enhancements - Phase 2	Cyber Security	3683	G020	11/1/21	\$3,960,000	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program
Data Visualization	Cyber Security	3683	G020	12/1/21	\$1,000,000	All of the projects listed on ISP-3 depend on the protections related to the Cyber Security Program

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
HANA License Costs	FY18 Plan	4649	G020	3/31/17	\$3,500,000	This project is completed. Project Summary - The goal of this purchase is to acquire additional licenses for the SAP High-performance Analytic Appliance (HANA) system of reporting, a critical part of National Grid's SAP footprint.
Microsoft ELA Renewal	FY18 Plan	4642	G020	3/31/17	\$1,900,000	This project investment has been completed. Project Summary - This project will purchase perpetual licenses of Microsoft Office 2016 for 13,900 users in the US. This is part of a purchase of perpetual licenses as part of a Microsoft enterprise agreement renewal that will license our requirements for Microsoft services.
Mobile Device Refresh - FY17	FY18 Plan	4671	G020	3/31/17	\$4,546,000	This project investment has been completed. Project Summary - This policy-driven project will secure 750 mobile devices, docks, modems, and antennas. An additional 150 modems are being purchased for distribution. These devices will be deployed in FY18 under a separate project. These devices will replace existing old mobile devices in the US that are no longer supported by manufacturing vendor or are more than 5 years old. A majority of old devices in the field impact day to day productivity. These old devices break down frequently and can't be easily repaired due to unavailability of parts and accessories (in some cases manufactures have stopped supporting the devices). The replacement units will allow field technicians to have the reliable equipment and data required to perform their work in a safe and efficient manner. The implementation will standardize National Grid infrastructure by rolling out Windows 7 or virtualize applications that run only on Windows XP, such that they run on Windows 7 devices.
ZScaler	FY18 Plan	4681	G020	3/31/17	\$2,100,000	Project Description - This project is part of the Technology Improvement program (TIP) under INVP 4663 Enhance and Enable End user Capabilities. zScaler is an internet based proxy service that could replace our existing blue coat forward proxies. As part of the service, zScaler provides internet security, web security, next generation firewalls, antivirus, vulnerability management and granular control of user activity.
US Video Conferencing upgrade for RW	FY18 Plan	4632	G020	6/1/17	\$1,330,000	Project Description - This project is part of the Technology Improvement program (TIP) under INVP 4663 Enhance and Enable End user Capabilities. The current video conferencing units at Reservoir Woods are on old technology and they are not able to integrate with the rest of the Video conferencing estate and do not provide a consistent user interface for users. Given the age of the units they are not compatible with the Cisco Call Manager (strategic platform) This means they do not have access to some of the Call Manager benefits which include access to the call manager directory, ability to function as a conference room phone, and direct dial to Webex/CMR when that becomes the standard VC bridging service.
Hix D/C Improvement Server Refresh	FY18 Plan	4676	G020	7/1/17	\$1,000,000	Project Dependencies: Outcome of evaluation of Data Center clearance - to know which services are staying in the Data Center and therefore need to be migrated onto the new storage controllers. Project Description: Replacement of legacy aging storage controllers which are in legacy data centers. Project Rationale: Hicksville/Melville Storage controllers have passed or are approaching asset lifecycle (5-8 yr) and has high probability of failure as seen by recent double drive failure. Although these are in the legacy data centers - there are critical applications that are still in the legacy data centers running on these aged assets. In addition the expectation is that there will be some services retained in these data centers using the aged infrastructure. Current estimates from the Data Centre Clearance project are that the assets in the data centre will fall into the following proportions. - 40% to be decommissioned - 40% to be part of an application migration - 20% to be retained in legacy data center's In addition it is envisaged that some of the 40% to be migrated will be complex migrations that could take up to 18 months to complete or may fail to migrate and have to also be retained. Therefore this investment is to provision for new storage controllers to provide a stable, reliable environment within the retained data center's to support these retained services.

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Mobility - (MDM) Mobile Device	FY18 Plan	3430	G020	7/31/17	\$1,162,000	Project Dependencies: The following Investments will require the services being provision by this Investment: - Mobile Application Development Platform (MADP) Project Summary - This project will implement an Enterprise Mobility Management (EMM) service that will allow National Grid to secure and manage mobile apps and content across a variety of mobile devices. National Grid has over 4000 corporate owned mobile devices that are used by the workforce to store information and gain access to network applications, such as email. In addition, Time Transformation project (Time entry system) will be integrated between mobile devices and our backend systems (i.e. iphones, ipads, making external and internal apps available to NG via NG site - push and pull) to enable our workforce to work in a more flexible and efficient manner. Due to the growing use of mobile devices, it is more critical than ever that we have a way to manage these devices so that we can comply with Internal corporate policy, distribute applications, and secure the data on these devices through a central EMM platform.
Changes to ACIS for PMCC Civil Vendor Billing	FY18 Plan	4487	G186	8/2/17	\$382,000	Project Dependencies: Dependent on existing ACIS application (Forestry and Distribution Line) shared table information. Also dependent on completion of Minor Works SIR 19306 adding UG vendors to Distribution Line ACIS application. Project Description: This investment will provide an instance of ACIS to allow the automated billing of Project Management & Complex Construction (PMCC) civil vendors thereby removing the manual operation currently in process today. Electric business will benefit in NY, MA, RI, and FERC jurisdictions, transmission and distribution. Project Rationale: Automated billing of the civil vendors will provide benefits including: Reduction of errors introduced by manual processes; Increased throughput / reduced cycle time for the billing process; Increased efficiency / accuracy in the accrual process; Addresses anticipated required management actions as a result of potential audit concerns;
US Control-Gas System Operating Procedure (SOP) Upgrade	FY18 Plan	4480	G210	10/2/17	\$542,000	Project Dependencies: INVP 3737-US CNI GMS-SCADA Upgrade has little to no dependency. INVP 4479-US Control-Gas Electronic Bulletin Board (EBB) Upgrade. US Mobile Device Management and Gas Enablement are possible initiatives that could touch the SOP system, although unclear at this stage impact. Project Description: Gas System Operating Procedure (SOP) is the software system used to manage all construction work in the gas system. The legacy system is internally developed, and reaching end-of-life, making updates difficult. The system does not support mobile platforms, and also requires functionality to support Corporate Safety and Regulatory needs. SOP supports National Grid's Gas Transmission and Distribution systems in New England and New York. The objective of the project is to update the existing version of SOP, and upgrade it for new functionality requirements and with a sustainable, and resilient infrastructure.
Enterprise Labs	FY18 Plan	4693	G020	10/30/17	\$668,000	Project Summary - The project is an initiative within IS to construct and equip an Enterprise Laboratory, which will be available as a Proving Ground or Forum to accelerate the speed of innovation and new technology integration into the Enterprise. The E-Lab will be used to perform trials, tests, and showcase technologies for our customers. The Project Team will manage both the procurement and the suppliers' execution of the design, delivery and implementation of the construction and the technological aspects (hardware and software) that is required. The E-Lab will be located at Reservoir Woods on the second floor in the former High Density File (HDF) room W2-873. Future technology enhancements would have a dependency on the construction of the lab in order to improve speed from concept to implementation. Benefits Summary - Proof of concepts of future-state technologies within our enterprise's existing architecture, will be able to be proven by the business with out jeopardy or risk to the enterprise.

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Cascade Electric Application Upgrade Project	FY18 Plan	3986	G198	10/31/17	\$375,000	Project Description: Cascade is the technical asset management tool used for predictive maintenance and compliance tracking which allows us to minimize the risk of failures and maximize equipment lifetimes. This investment will deliver upgrades to the "Cascade Electric Application", the asset and maintenance management system for Electric Substations, HVDC, Relay & Telecomm Assets. The current version of Cascade is unsupported by the vendor. The vendor has indicated there are changes needed to remain compliant with regulatory reporting requirements. This functionality will be delivered through product upgrade. Regulatory compliance tracking was added to the latest release satisfying the utility's reporting requirements; Improved field data collection that has the potential to increase data reliability and overall system reliability, thusly reducing risk of potential fines, Increased system reliability by running current/ supported version of software. Cascade tracks and reports on compliance of maintenance activities required by Regulatory agencies. Failure to complete mandated maintenance activities will require self-reporting. Non-compliance may result in monetary penalties. Improvements to the Transformer Oil Analysis (TOA) interface, which tracks oil analysis data, allow for improved syncing and reporting on key gases that are not part of the current structure. This is our number one tool used to track asset health on transformers and regulators. Other improvements include enhanced triggering and graphical maintenance tracking
WiFi for Fleet Services Diagnostic Laptops	FY18 Plan	3956	G352	11/1/17	\$838,000	There are no other project dependencies. Project Summary - This project will introduce WiFi into each of the Fleet Service garages to allow for its use during vehicle diagnostic testing. Currently the majority of the Fleet garages do not have WiFi making it difficult and hazardous to perform this testing. In some cases the vehicles need to be sent out to other facilities due to the lack of connectivity in the Fleet Service garage to perform the diagnostics. Project Rationale - Many of the new vehicles in use at National Grid have complex systems which require network connectivity to the vehicle manufacturer's site to perform diagnosis of issues. Currently, the majority of the Fleet garages do not have WiFi making it difficult and hazardous to perform this testing. Network cables are run along the floor or strung through the air of the service bay to allow for the connection. In other cases the vehicles need to be sent to other facilities to perform the diagnostics due to the lack of connectivity in the Fleet Service garage. This investment will allow the fleet garages the capability to safely diagnose and resolve issues with the vehicles.
Gas Service Database - UNY	FY18 Plan	3949	5210G	12/1/17	\$325,000	Project Dependencies: Availability of CSS resources to make CSS data available in Oracle format. •INVP 3948 DNY will need to be completed in parallel to or after this one is complete. Project Rationale: National Grid is required by the Federal and State Code, to cut off inactive plastic or cathodically unprotected metallic services at the main, if they have been inactive for more than 10 years. A similar rule applies to all cathodically unprotected metallic gas services if they have been inactive for more than 5 years. This project addresses the inefficiencies in the Inactive Service Inspection Process and the amount of time and manual research required annually to match up customer records to service records in Fortis. This project simplifies and optimizes the identification of inactive gas services that are required to be cut off, by implementing an interface between Fortis and the Customer System(s). This project has huge safety and compliance benefits for National Grid. Ramifications of Not Funding Project in FY18: •Customer system data will not be in sync with the service records database •Risk to soft-off process and inactive service program in NY
Gas Service Database - DNY (LI and NYC)	FY18 Plan	3948	G225	12/4/17	\$300,000	This project pertains to KEDNY and KEDLI and does not affect NMPC nor is it allocated to NMPC.

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Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Substation Monitoring-DobleARMS	FY 18 Plan	3982	G381	1/1/18	\$622,000	Project Description: National Grid is preparing to incorporate substation online monitoring solutions at substations within the electric system. The monitoring equipment requires data passage from the substation, through the NG corporate network, ultimately fed to a 3rd party application suite for exclusive NG viewing and analysis. Project Scope: The scope of the project is to setup proper network infrastructure and security requirements for the data flow from the substations through the corporate network to the Doble Asset Risk Management System (DobleARMS) by working with Doble and Verizon. Scope of IS investment: Networking to 3 substations including any required port configuration, routers, firewalls, etc. Deployment of "Maxi-DEG Doble Enterprise Gateway" in corporate network; Security testing for deployed devices; Networking (IPSEC) and security for communication to DobleARMS cloud service; Interfaces to Cascade Electric (No version dependency) and PI applications
Gas Capital Investment Planning Tool	FY 18 Plan	4466	G210	1/17/18	\$572,000	Project Description: The purpose of this project is to implement a Capital Investment Planning tool with risk scoring and prioritization methodology to optimize the portfolio. This will aid in the completion of highest valued projects and assist in decision making with minimal impact on safety, reliability, and regulatory compliance for the Gas organization. Project Rationale: The U.S. 5 year Gas capital plan for FY17-21 (~\$1.6 billion for 7 Gas companies) is being built using multiple spreadsheets. Given the size of the portfolio, it is cumbersome to develop and optimize the plan. This limits our ability to see the whole portfolio, mitigate risk and prioritize work. Key Business Benefits: The business benefits include: <ul style="list-style-type: none"> - Ability to optimize the gas capital investment plan valued at 1.6 billion dollars; - Ability to process complex risk scores for improved project selection; - Improved decision making capabilities. - One common process for all business performing capital planning.
Computapole Enhancements to Support Inspection Types	FY 18 Plan	4462	G186	3/1/18	\$450,000	No other project dependencies. Project Description: The Computapole application is used to schedule, track and record the results of Transmission and Distribution line inspections. The inspections can be done by Foot Patrols, Overhead Fights, in addition to newer technology such as Drone/automated inspection. The current system does not allow the inspections to be recorded by type inspection, which causes an over write of the information if multiple types of inspections are done on the same lines. Project Rationale: These enhancements will eliminate the possible of overwrite and allow for multiple inspection types. Ramifications of Not Funding Project in FY18 - Corruption of data and rework on clean-up/correction.
Travel & Expense Management (T&E) and Global Master Service Provider (MSP) Strategy	FY18 Plan	4578	G020	3/1/18	\$1,232,000	There are no other identified project dependencies. Project Description: This program of work will support the work lead by Global Procurement to develop the category strategy for Global Travel programs which is currently supported by Travel Leaders in US and Capita in UK. In parallel, this program will support process design and tool selection and implementation for Travel & Expense Management and other card programs (i.e. Procurement Card reconciliation & approvals).

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Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Ageing System Stabilization/Upgrades - FY18	FY18 Plan	4389	G148	3/15/18	\$1,500,000	<p>Project Dependencies: Most of these are standalone system upgrades/stabilization efforts. Project Description: The purpose of this investment is to provide a funding source for various system stabilization/upgrade efforts that are discovered over the course of a year. These are items that neither the business nor IS has funds for, but are imperative initiatives to keep critical systems running, and providing the level of service that the business expects. Some of the known initiatives at this point are:</p> <ul style="list-style-type: none"> •Migrating application servers remaining in NG Datacenters to CSC Datacenters. These are servers that are either out-of-scope for the data center consolidation project for various reasons •Short-Term stabilization of key systems until Gas Enablement implementation •Upgrades for critical systems that are out of scope for Gas Enablement: -MDSI (ABB has stated that no system changes can be made after 31-Dec-2015) -Maximo -MWork -CWQ -Forestry Systems, etc •Any FY17 INVP4188 Aging Systems Stabilization candidate systems not addressed in that program due to time or budget constraints •Fortis upgrade to a iOS compatible version
US Mobile Device Refresh	FY18 Plan	4395	G020	3/31/18	\$5,000,000	<p>There is an upstream dependency on INVP 4671 - Mobile Device Refresh FY17. Project Description: This tactical project will replace many of the oldest mobile field devices in the US that are in dire need of an update/replacement over the next fiscal year. This implementation will virtualize applications that run only on Windows XP, such that they run on Windows 7 devices. Embedded in this project is deployment of 750 units, in order create sustainable infrastructure by replacing a big portion of older mobile devices. The devices will be deployed in iterative manner leveraging practices and release strategies build in Gas Enablement Results Accelerator for Mobile devices. The project should continue with replacing the oldest mobile field devices that are needed in order to support other IS project initiatives for FY18 prior to the Gas Enablement deployment. The need to look into other temporary replacements, or segways into the needs for Gas Enablement in the future should be looked at when deploying the business critical devices for specific INVP IS projects for FY18.</p>
US SAP: Infrastructure Landscape	FY18 Plan	4348	G020	3/31/18	\$4,603,000	<p>All initiatives within US SAP portfolio are dependent on this investment. Project Description: This project is to create a permanent set of project environments to support all of the other initiatives in the portfolio. This project will also provide the capability to do monthly (or periodic) refreshes of QA systems within the Production Support landscape. By having a permanent set of environments, we can begin project analysis and development more quickly and reliably. In addition to providing a permanent set of project environments, this project will also provide us with the capability to do periodic refreshes of the testing systems within our Production Support landscape. Today, our QA systems are seldom refreshed on a limited basis. This poses challenges to the Business Process Support and Application Management organizations as they try to resolve system issues or deliver change requests.</p>

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
US CNI Tech Services-Network Equipment Lifecycle Replacements	FY18 Plan	4570	G186	3/31/18	\$250,000	Project Summary - Forward looking organizations like Amazon are setting new standard in customer care which in turn are significantly raising the expectations of our customers. The customer interaction space is not static and is in a constant state of change. These external drivers mean that our processes and technology components need to be flexible enough to adapt to changes within our environment. This program will set the foundation to put in place the processes and technology changes needed to drive step improvements to our customer's experience. Operational efficiencies will be realized through both the migration of our 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. This program will replace out of support platforms to mitigate existing risks to our customer self-serve billing, payments and other communications portals. . Although a number of system and infrastructure consolidations have taken place, we essentially have two legacy infrastructures for Billing/Customer Information Systems and the digital channels (web & IVR) that enable self-serve functions for our customers on those respective infrastructures. National Grid is seeking to re-engineer the customer digital experience and supporting processes while mitigating risks associated with using out of support legacy customer self-service platforms.
US CNI-EMS Lifecycle Hardware and Software Upgrade	FY18 Plan	4568	U186	3/31/18	\$13,348,000	Project Dependencies: INVP4570-US CNI Tech Services-Network Equipment Lifecycle Replacement is a proposed FY18 investment as the new EMS equipment will be stood-up on that network equipment. Project Summary - The server and workstation hardware for the Energy Management System (EMS) replacement project was purchased in 2010. The hardware is now near peak operating capacity and may constrain the capacity of the associated databases in EMS. The application vendor ASEA Brown Boveri (ABB), is recommending a hardware refresh for the EMS environments in order to increase the capacity of the databases to accommodate future growth. This Policy-driven investment will procure the equipment needed for the project stages for the hardware and software refresh of the current ABB EMS. Benefits Summary - As the business continues to commission new devices, particularly distributed generation, the required database sizing increases. Current hardware will not support the database expansion or the existing mature EMS ABB software release. Project will ensure compliance for business growth, and provide avoidance of risk around unsupported hardware.
Network Transformation Completion - CEMS	FY18 Plan	4647	G020	3/31/18	\$250,000	Project Description: Replacement of End of Life infrastructure on networks for CEMS, make it part of the transformed network, bringing the new equipment into support of Verizon contract. Project Rationale: Legacy equipment is aged or End of Life and at greater risk of failure. As these legacy services are using out of support and out of date infrastructure and are not able to offer the reliability required by the business these now need to be upgraded and brought into vendor support. Key Business Benefits: Provision of a fully supported reliable network - Removes reliance on aged infrastructure that doesn't meet specifications and is no longer supported - ensuring that the network continues to be reliable and fit for purpose.
Application monitoring, Network/IDS, Operations monitoring	FY18 Plan	4677	G020	3/31/18	\$750,000	Project Dependencies: May require servers, storage and internet bandwidth. Eco-partners willing to accept tight integration of expertise into their delivery model. Project Rationale: Project Athena has identified the requirement for reporting on application performance from an end user perspective. This will enable IS Service Owners to leverage empirical data instead of relying on anecdotal evidence. The diagnosis of performance issues requires a level of instrumentation not currently available. APM tools will provide end to end (full stack) analysis to quickly diagnose these issues. Development and testing can be accelerated through the use of APM tools. Reduces the time taken for developers to identify and fix performance issues during development and testing.
Aged Printer refresh	FY18 Plan	4689	G020	3/31/18	\$50,000	There are no identified project dependencies. Project Description: Replacement of printers that no longer meet current specifications.

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RSA Token refresh	FY18 Plan	4683	G020	3/31/18	\$200,000	This project investment is completed. Purchase of tokens for RSA service. Purchase of tokens that will expire in FY18 and purchase of leased tokens that expire post FY18.
Acquisition of Remote Sensing Data - Mass	FY18 Plan	4670	C310	3/31/18	\$4,112,000	This project does not pertain to NMPC. The project will build an inventory of high resolution, Light Detection and Ranging (LIDAR), and Hyperspectral image data with respect to the building stock of our customers and above ground company assets. This will benefit MA Gas companies and allocation code C310 only allocates costs to those companies
INVP4449 - EPA File	FY18 Plan	4449	C170	3/31/18	\$700,000	There are no identified project dependencies. Project Summary - The project will develop a service that enables the automated sharing of aggregated building energy consumption data with the U.S. Environmental Protection Agency's ("EPA") free online tool, ENERGY STAR Portfolio Manager, ("Portfolio Manager"). The use of EPA Portfolio Manager by large property owners in New York City is mandated by the New York City Council in order to perform building environmental benchmarking. Portfolio Manager is also used in RI and MA. Regulators require owners of certain types of buildings to use EPA PM benchmarking and environmental reporting. Utilities are obligated to support this requirement by providing aggregated consumption data for the buildings owned by their customers. Developing and promoting this service to commercial accounts will allow National Grid to strengthen our relationship with our key commercial, industrial, municipal customers and state agencies.
Informatica Upgrade/Microstrategy Replacement Program	FY18 Plan	4469	G020	5/1/18	\$3,516,000	Project Dependencies: The INVP 4469 has an Upstream dependency on FY17 INVP 4464 (US IS Data Visualization Tool) project. The INVP 4469 investment will perform Microstrategy migration to the strategic Data Visualization solution platform delivered by the FY17 INVP 4464 project. The INVP 4469 has a Parallel dependency on the INVP 4479 (US Control-Gas Electronic Bulletin Board (EBB) Upgrade) investment. The INVP 4469 has a Parallel dependency on the INVP 4001 (Data Centre Decommission D&I). The INVP 4469 may have a Parallel dependency on the INVP 4377 (Data Centre Clearance (Melville)) - Project Description: This investment is to perform Informatica upgrade to the latest supported version and Microstrategy migration to the strategic Data Visualization solution platform.

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
US MDS-Energy Accounting System (EAS) migration to Wholesale Settlement Application (WSA)	FY18 Plan	4481	G186	10/1/18	\$2,160,000	Project Description: This project will upgrade and the NE Wholesale Settlement Application (WSA) for use in New York wholesale settlement with the NYISO. The present wholesale processing tool called the Energy Accounting System (EAS) is outdated and requires increased resources to maintain an alignment of the application records with settlement market changes. EAS is currently at risk of non-recovery should a critical application fault occur. EAS is used by several groups including Meter Data Services (MDS), electric Transmission Control, Wholesale Energy Procurement, and Advanced Data and Analytics. The existing commercially supported version of WSA needs to be upgraded to enable Meter Data Services Settlement (ISO-MDS) to consistently provide high quality, and dependable meter data settlement reporting to the NYISO and ISO-NE. The upgraded WSA will provide for a centralized environment for other present users of EAS, including the electric control rooms to complete their daily work tasks.
General Ledger Interface CRIS SAP	FY18 Plan	4486	C343	3/1/19	\$1,200,000	This project does not involve or impact NMPC. Project Summary - This project will build an interface between CRIS, Customer Revenue Billing System and the SAP General Ledger for Account Revenue Adjustments. Currently this process is done manually by mapping CRIS codes to SAP accounting codes via Microsoft Excel spreadsheets and is then manually entered into SAP.
STORMS Capital Cost Estimates	FY18 Plan	4467	G148	3/1/19	\$776,000	Project Dependencies: Other STORMS & Power Plan Related initiatives: <ul style="list-style-type: none"> •Power Plan Upgrade •Blanket Work Orders •Crew Headquarter Estimate Factor •STORMS Support/ Infrastructure Upgrade •Potential impact from Gas Enablement Project Description: This investment will make enhancements to STORMS to for the calculation and processing of capital overheads to be aligned with current accounting methodologies.
CRIS Data Archival	FY18 Plan	4485	C343	3/31/19	\$1,300,000	This project does not impact NMPC nor are any costs allocated to NMPC
US CNI Tech Services-Network Equipment Lifecycle Replacements	FY18 Plan	4570	G186	3/31/19	\$250,000	Project Summary - Forward looking organizations like Amazon are setting new standard in customer care which in turn are significantly raising the expectations of our customers. The customer interaction space is not static and is in a constant state of change. These external drivers mean that our processes and technology components need to be flexible enough to adapt to changes within our environment. 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. This program will replace out of support platforms to mitigate existing risks to our customer self-serve billing, payments and other communications portals. . Although a number of system and infrastructure consolidations have taken place, we essentially have two legacy infrastructures for Billing/Customer Information Systems and the digital channels (web & IVR) that enable self-serve functions for our customers on those respective infrastructures. National Grid is seeking to re-engineer the customer digital experience and supporting processes while mitigating risks associated with using out of support legacy customer self-service platforms.
Inventory Management Handheld Devices	FY18 Plan		G020	3/31/19	\$75,000	There are no project dependencies. This investment represents Barcoding equipment used to track inventory across all companies
Customer Bill Redesign	FY18 Plan	4704Q	H173	3/31/19	\$2,108,147	Project Description: The last major bill redesign at National Grid concluded in 2007. The newer "blue bar" bill has several variants and supports many special programs and billing requirements including Standard and Summary, and Streetlight / Traffic Signal formats including Budget billing, demand and time-of-use, payment plans, net metering, and marketer supply.
Cisco Prime	FY18 Plan	4679	G020	3/31/21	\$648,000	Project Description: Cisco Prime is a management and analytics toolset that supports the management and analytics/reporting of the call manager and connected devices including hard phones, soft phones and video conferencing units. Project Rationale: The primary driver for this toolset is to provide proactive and reactive reporting for Video Conferencing to improve services and customer satisfaction.

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Contractor Management Modernization	FY18 Plan	4151	G327	10/15/21	\$5,910,000	Project Dependencies: This project will require an alignment with the Gas Enablement project. Project Rationale: Currently, National Grid uses a suite of home-grown unconnected systems to facilitate each contract management process. These systems were created on an as-needed basis, resulting in a patchwork of silo applications loosely connected through a manual process of printing and uploading documents. Information does not transfer from system to system requiring large scale data entry by the contractors and manual processing by National Grid. Our systems also do not support a fundamental fact that the vast majority of the work is completed by field based individuals. Under the current way of doing things, everything is printed, given to the field forces, they then write down what they do, and hand it off to someone in the office to input into a system. Our contractors and Construction Supervisors have the tools (mobile devices) to improve these interactions but they lack the software (an app) to facilitate the process. This software will allow to streamline the process to have construction supervisors complete their tasks in the field without the need to visit office.
Risk Management (Tx Mains & Dx Mains)	GBE- Asset Management	4572	G210	12/1/17	\$2,110,800	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
AM Program Leadership-1	GBE- Asset Management	4572	G210	3/1/18	\$277,124	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Enhancements	GBE- Asset Management	4572	G210	12/1/18	\$2,660,875	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Additional IM Modules	GBE- Asset Management	4572	G210	2/1/19	\$716,840	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
AM Program Leadership-2	GBE- Asset Management	4572	G210	3/1/19	\$398,676	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Data Remediation, GIS Upgrade/ Migration & GIS Mobility	GBE- Asset Management	4572	G210	3/1/19	\$11,311,759	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
EAM-FIN Integration	GBE- Asset Management	4572	G210	6/1/19	\$1,778,102	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Integrity Management Integrations	GBE- Asset Management	4572	G210	10/1/19	\$1,088,112	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
AM Program Leadership-3	GBE- Asset Management	4572	G210	3/1/20	\$408,336	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Design (GWD), Estimating (CU), & Mobility	GBE- Asset Management	4572	G210	9/1/20	\$9,851,109	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Asset Analytics Integration	GBE- Asset Management	4572	G210	12/1/20	\$1,764,202	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
GIS (GWD/CU) - PPM Integration	GBE- Asset Management	4572	G210	12/1/20	\$844,849	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
GIS-EAM Integration	GBE- Asset Management	4572	G210	12/2/20	\$7,818,756	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
AM Program Leadership-4	GBE- Asset Management	4572	G210	3/1/21	\$103,929	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Use Case No.1 - Asset Risk	GBE- Asset Management	4572	G210	3/1/21	\$3,591,031	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Complex Design (CAD) & Estimating (ESW)	GBE- Asset Management	4572	G210	3/1/21	\$2,389,087	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Program Learning Management-1	GBE- Business Enablement	4572	G210	3/1/18	\$117,297	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Program Transformational Change Office-1	GBE- Business Enablement	4572	G210	3/1/18	\$689,043	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Program Business Sustainment-1	GBE- Business Enablement	4572	G210	3/1/19	\$69,617	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Program Learning Management-2	GBE- Business Enablement	4572	G210	3/1/19	\$130,211	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Program Transformational Change Office -2	GBE- Business Enablement	4572	G210	3/1/19	\$1,516,310	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Program Learning Management-3	GBE- Business Enablement	4572	G210	3/1/20	\$173,060	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Program Transformational Change Office-3	GBE- Business Enablement	4572	G210	3/1/20	\$368,704	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Program Business Sustainment-2	GBE- Business Enablement	4572	G210	3/1/21	\$221,771	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Program Learning Management-4	GBE- Business Enablement	4572	G210	3/1/21	\$195,721	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Program Transformational Change Office-4	GBE- Business Enablement	4572	G210	3/1/21	\$169,648	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Customer Experience Program Leadership-1	GBE- Customer Engagement	4572	G210	3/1/19	\$260,229	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
CxT Portal & Channel Management	GBE- Customer Engagement	4572	G210	6/1/19	\$11,875,000	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Customer Interaction - First Release	GBE- Customer Engagement	4572	G210	10/1/19	\$4,796,546	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Employee Support Interaction - First Release	GBE- Customer Engagement	4572	G210	10/1/19	\$7,954,131	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Customer Experience Program Leadership-2	GBE- Customer Engagement	4572	G210	3/1/20	\$266,277	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
CRM / Contact Center	GBE- Customer Engagement	4572	G210	6/1/20	\$19,000,000	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Large Commercial & Landlord Interaction	GBE- Customer Engagement	4572	G210	7/1/20	\$1,446,508	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Employee Support Interaction - Second Release	GBE- Customer Engagement	4572	G210	7/1/20	\$292,791	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Customer Interaction - Second Release	GBE- Customer Engagement	4572	G210	1/1/21	\$2,010,254	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Customer Experience Program Leadership-3	GBE- Customer Engagement	4572	G210	3/1/21	\$203,177	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Data Management Implementation (Quality & Cleansing)	GBE- Data Management	4572	G210	12/1/17	\$11,100,000	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Data Management & Governance Program Leadership-1	GBE- Data Management	4572	G210	3/1/18	\$58,890	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Enable the Data Archive Process	GBE- Data Management	4572	G210	3/1/19	\$2,179,480	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Data Management & Governance Program Leadership-2	GBE- Data Management	4572	G210	3/1/19	\$87,954	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Data Management & Governance Program Leadership-3	GBE- Data Management	4572	G210	3/1/20	\$89,713	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Powerplan Remediation	GBE- Information Services Enabling	4572	G210	11/1/17	\$6,080,111	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Comprehensive Integration Services (Enhancements)	GBE- Information Services Enabling	4572	G210	12/1/17	\$78,624	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Application (Environment) Infrastructure	GBE- Information Services Enabling	4572	G210	12/1/17	\$2,174,410	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Development Operations & BPA Enablement-1	GBE- Information Services Enabling	4572	G210	3/1/18	\$2,903,920	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
SAP and Application Integration Development- Release 1	GBE- Information Services Enabling	4572	G210	3/1/18	\$4,765,187	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Mobility CoE & End-User Computing-1	GBE- Information Services Enabling	4572	G210	3/1/18	\$604,790	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Operations/System Monitoring	GBE- Information Services Enabling	4572	G210	8/1/18	\$1,057,768	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Development Operations & BPA Enablement-2	GBE- Information Services Enabling	4572	G210	3/1/19	\$2,562,011	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
SAP and Application Integration Development- Release 1-2	GBE- Information Services Enabling	4572	G210	3/1/19	\$4,548,168	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
SAP and Application Integration Development- Release 2-1	GBE- Information Services Enabling	4572	G210	3/1/19	\$5,055,712	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Mobility CoE & End-User Computing-2	GBE- Information Services Enabling	4572	G210	3/1/19	\$920,536	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Development Operations & BPA Enablement-3	GBE- Information Services Enabling	4572	G210	3/1/20	\$2,164,144	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
SAP and Application Integration Development- Release 1-3	GBE- Information Services Enabling	4572	G210	3/1/20	\$600,000	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade

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Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
SAP and Application Integration Development- Release 2 2	GBE- Information Services Enabling	4572	G210	3/1/20	\$4,397,065	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
SAP and Application Integration Development- Release 3-1	GBE- Information Services Enabling	4572	G210	3/1/20	\$85,915	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Mobility CoE & End-User Computing-3	GBE- Information Services Enabling	4572	G210	3/1/20	\$1,031,843	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Test Automation Implementation	GBE- Information Services Enabling	4572	G210	12/1/20	\$2,577,052	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Development Operations & BPA Enablement-4	GBE- Information Services Enabling	4572	G210	3/1/21	\$2,176,436	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
SAP and Application Integration Development- Release 1-4	GBE- Information Services Enabling	4572	G210	3/1/21	\$600,000	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
SAP and Application Integration Development- Release 3-2	GBE- Information Services Enabling	4572	G210	3/1/21	\$2,326,606	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Mobility CoE & End-User Computing-4	GBE- Information Services Enabling	4572	G210	3/1/21	\$952,793	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Portfolio Management Leadership-1	GBE- Portfolio Office	4572	G210	3/1/18	\$1,645,919	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Solution Architects & Agile Coaches-1	GBE- Portfolio Office	4572	G210	3/1/18	\$1,958,277	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Portfolio Management Leadership-2	GBE- Portfolio Office	4572	G210	3/1/19	\$2,144,482	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Solution Architects & Agile Coaches-2	GBE- Portfolio Office	4572	G210	3/1/19	\$3,964,632	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Portfolio Management Leadership-3	GBE- Portfolio Office	4572	G210	3/1/20	\$2,161,221	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Solution Architects & Agile Coaches-3	GBE- Portfolio Office	4572	G210	3/1/20	\$2,824,290	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Portfolio Management Leadership-4	GBE- Portfolio Office	4572	G210	3/1/21	\$1,855,901	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Regulatory/ Compliance	GBE- Regulatory and Compliance	4572	G210	9/1/19	\$3,000,000	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Supply Chain Program Leadership	GBE- Supply Chain	4572	G210	3/1/19	\$565,045	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Supply Chain Program Leadership	GBE- Supply Chain	4572	G210	3/1/20	\$235,258	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Business Architecture Design	GBE- Work Management	4572	G210	12/1/17	\$3,004,085	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
WMFE Program Leadership-1	GBE- Work Management	4572	G210	3/1/18	\$234,013	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Corrosion and I&R Work	GBE- Work Management	4572	G210	7/1/18	\$26,479,653	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
CU Governance & Library - process	GBE- Work Management	4572	G210	11/1/18	\$1,658,439	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
WMFE Program Leadership-2	GBE- Work Management	4572	G210	3/1/19	\$563,692	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Company Driven Work: Collections and non-Appointment Offs - Gas	GBE- Work Management	4572	G210	10/1/19	\$5,310,645	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Company Driven Work: Collections and non-Appointment Offs - Electric	GBE- Work Management	4572	G198	10/1/19	\$2,859,577	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Customer, Leak Investigation & Inspections - Gas	GBE- Work Management	4572	G210	10/1/19	\$20,374,438	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/IScheduler Upgrade
Customer, Leak Investigation & Inspections - Electric	GBE- Work Management	4572	G198	10/1/19	\$10,970,850	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/IScheduler Upgrade
WMFE Program Leadership-3	GBE- Work Management	4572	G210	3/1/20	\$595,004	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/IScheduler Upgrade
PowerPlan Integration & Enhancements	GBE- Work Management	4572	G210	6/1/20	\$1,946,867	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/IScheduler Upgrade
Construction Work & Leak Repair	GBE- Work Management	4572	G210	9/1/20	\$19,718,534	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/IScheduler Upgrade
WMFE Program Leadership-4	GBE- Work Management	4572	G210	3/1/21	\$155,062	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/IScheduler Upgrade
Work Forecasting & Planning - solution	GBE- Work Management	4572	G210	5/1/21	\$1,708,505	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/IScheduler Upgrade
Core Projects & Program Management	GBE- Work Management	4572	G210	6/1/21	\$3,134,061	There are no other projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/IScheduler Upgrade

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
WMFE Optimization	GBE- Work Management	4572	G210	3/1/22	\$3,331,402	There are no other projects listed in Exhibit (ISP-3) that are specifically dependent upon the Gas Business Enablement Program ("GBE"). Certain projects included in Exhibit (ISP-3) are planned to provide stopgap measures and mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade
Customer Experience Transformation-Communication Preference Management	Growth Play Book-CXT	4426	C175	3/31/19	\$2,000,000	Project Dependencies: Successful implementation of INVP 3932 Customer Contact Center / SDC Technology Upgrade Implement Solution. Project Description: This project is an element of Customer Experience Transformation (CXT) program to fundamentally change how we interact, serve and communicate with customers. This Communications Preference Management project will deliver customer authentication, authorization and communication preference management capability that is critical for implementation of a Business to Consumer portal servicing the customer from move in, billing/customer care through move out. Customer identity will be managed as a single entity across multiple communication channel (Web, Mobile, IVR, messaging) in a single user profile. Implement self-service capability allowing customers to define and manage access profile, and to choose communication channel preferences based on messaging type (billing issues, connect/disconnect, outage notifications, service messages). Communications Preference Management solution should serve both CSS and CRIS customers, available 24/7 and has to be de-coupled from legacy customer information system (CSS.CRIS, Siebel) availability. The solution needs to be designed with built in flexibility to add/remove/modify communication channels choice in the future and to configure communication types available to customer. Preference choices selected by customer have to be available to all existing and future customer facing channels including, but not limited to Web, Mobile, text messaging.
Customer Experience Transformation-MyAccount Portal	Growth Play Book-CXT	4427	C175	6/1/19	\$8,500,000	Project Dependencies: Successful implementation of INVP 3932 Customer Contact Center / SDC Technology Upgrade Implement Solution. Successful implementation of INVP 4426 Customer Experience Transformation - Communications Preference Management. Project Description: This project is an element of Customer Experience Transformation (CXT) program to fundamentally change how we interact, serve and communicate with customers. Customer Experience Transformation program consists of series of customer driven process and technology projects 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. This project will deliver unified, high availability Business-to-Customer (B2C) Retail Web Portal that will replace the two existing web front ends to our CIS's for Customer Self-serve functions from move in, billing/customer care through move out.
Governance Risk & Compliance (GRC) Optimization/Upgrade	Growth Play Book-Finance	4222	G020	3/1/19	\$1,540,000	Project Summary - This project updates the Governance, Risk and Compliance (GRC) module of US SAP to the vendor supported version. In addition, the project will update the GRC environments from Service Pack 4 to the latest version, Service Pack 17. These updates will ensure the module, which provides control / roles segregation and Sarbanes-Oxley Act (SOX) guidelines, will be stable and all fixes are applied. It will also integrate the newest features and improvements released by SAP. The SAP Governance, Risk and Compliance (GRC) module enables National Grid to manage user access and controls compliance, reduce risk in managing its back office operations, improve fraud prevention in business processes, and improve risk and audit management activities. The US SAP GRC module was audited by National Grid's external auditor Deloitte, with advisory that this business critical functionality should not function without vendor support.

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
US SAP: Business Planning	Growth Play Book-Finance	4217	G020	3/31/19	\$4,643,000	<p>Project Summary - This project will enhance performance by upgrading the SAP Business Planning and Consolidation (BPC) platform from version 7.5 to 10.1. The upgrade will support increased accessibility to both Consolidations and Planning capabilities in the system and improved forecasting capabilities. The project will enable accelerated real-time insights for financial variances. During the monthly consolidation process, Real time variance analysis will allow for improved decision making and the ability to adjust course in a timely manner. In addition, the upgrade will provide:</p> <ol style="list-style-type: none"> 1. Simplified Disclosure Compliance 2. Enhanced Journal Management 3. Improved Reporting 4. Streamlined, Unified, and Harmonized User Experience 5. Enhanced Manageability 6. Improved System Performance, Integrity and Maintenance 7. Expanded Mobile Delivery Options 8. Simplified Hierarchy Maintenance 9. Specific Industry or Line of Business Packaged Solutions
US SAP: FERC on Hana (FOH)	Growth Play Book-Finance	4563	G020	3/31/19	\$1,315,000	<p>Project Description: This project provides funding structure to support FERC on HANA (FOH) upgrade. Electric and gas utilities of all sizes must comply with the Uniform System of Accounts from the Federal Energy Regulatory Commission (FERC) or the National Association of Utility Regulatory Commissioners (NARUC). This version upgrade is required to leverage latest SAP corrections and notes that have been released in the past year.</p>
DRMS for C&I Demand Response	NY REV/grid modernization		5210E	5/1/17	\$3,429,633	<p>A DRMS will be purchased to streamline the registration, use, and evaluation of demand response assets. This will give our vendors and customers a better experience and position us well for increased DER integration.</p>
Load and DER Forecasting (Acquisition of Remote Sensing Data - NY)	NY REV/grid modernization	4729	C113	3/31/18	\$8,632,000	<p>Project Summary - The project will build an inventory of high resolution, and Light Detection and Ranging (LIDAR) data with respect to the building stock of our customers. The building of this inventory will be conducted by performing flyovers of our 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.</p> <p>LIDAR data will measure the height of various above ground structures, and will be used to help characterize current building stock on the territory for the purposes of understanding energy consumption and roof characteristics. All of this data will be maintained by Advanced Data & Analytics in its cloud environment. Detailed data on building stock provides an opportunity to enable a better understanding of Distributed Energy Resources and how they will be used by our customers, improving existing data on our customers, and overall improving the operation and management of the business through enhancing the business insight that advanced analytics can bring to the operation. SANalyses like these offer the opportunity to improve our operations and enhance our ability to manage the distribution grid.</p>

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Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Plant Information Historian	NY REV/grid modernization	4704K	G198	9/30/18	\$11,427,818	Project Dependencies: INVP 4704N – NY REV Cyber Security Initiatives. Project Description: Plant Information (PI) is a real-time data historian application with a highly efficient time-series database. This application can efficiently record data from process control systems (ex. Distributed Control System - DCS, Programmable PLC) into a compressed time series database. This supports requirements for the Distributed Generation (DG) Planning Portal, DG IOAP Phase 2 screening as well as other modelling needs such as hosting capacity analysis. In addition this project will provide planning engineers and analysts with additional software tools to better serve our customers and stakeholders. Project Rationale: In addition to the needs associated with expediting access to required information to support increased DG workload and analysis – the proposed project will support the deployment of a new DSCADA; created in part by splitting the existing SCADA/EMS (Energy Management System) into a TSCADA and DSCADA.

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
E-Commerce Marketplace	NY REV/grid modernization	4704D	C113	3/31/19	\$915,837	Project Dependencies: INVP 4704N – NY REV Cyber Security Initiatives. Project Description: E-Commerce Marketplace is a platform that supports consumers by offering energy-saving household products and services with instant rebates. Its goal is to empower customers to reduce energy consumption and make informed purchasing decisions by delivering individualized energy-saving tips and recommendations. National Grid will integrate and maintain a marketplace on the Company website that offers customers choices and instant rebates for energy efficient and smart products. In addition, it will provide personalized and relevant connections to other products and services of customer interest (solar, EV, etc.). This Marketplace will build off of the established customer energy management platform. Project Rationale: An intuitive, visual, and interactive online assessment will be implemented which will target residential and small and medium business customers. Customers complete the online assessment which provides a detailed personalized report on potential savings and streamlining business operations from an energy perspective. Customers are directed from the online report to take action on these recommendations via an e-commerce website. The online assessment is a cost-effective way to reach residential and small & medium business customers which leads to increased customer satisfaction. The online assessment will provide leads to this program, which can provide customers with prescriptive measure and custom measures, including direct install for deeper energy savings.
AMI - Telecoms	NY REV/grid modernization	4704I	5210E	3/31/19	\$1,580,151	Project Dependencies: INVP 4704N – NY REV Cyber Security Initiatives. Project Description: In preparation to align with REV objectives, the National Grid is enhancing several of its capabilities e.g. Advanced Metering Functionality, Advanced Distribution Management System, and substation automation among others. All of these enhancements will require National Grid's network to install new backhaul and enhance its existing bandwidth to support transfer of the new data. Project Rationale: There are four sub-projects within the Telecom project that address the backhaul and bandwidth needs: 1.Substation Remote Terminal Unit (RTU) Expansion – Install backhaul from the public carrier network to RTU substations to bring back substation/field information to the back office for additional analysis 2. Corporate Backbone Expansion – Increase backhaul bandwidth of the corporate data center to support data lake and analytics engine 3. Information Technology/Operational Technology (IT/OT) Backbone Expansion – Increase the backhaul bandwidth and install a wireless gateway to bring back meter data to the data center 4. RTU upgrade for Distribution Supervisory Control and Data Acquisition (D-SCADA) – Reconfigure RTUs at the substations to send information to D-SCADA
DG IOAP Tactical (Phase 2)	NY REV/grid modernization	4704P	5210E	3/31/19	\$1,764,000	Project Dependencies: INVP 4704N – NY REV Cyber Security Initiatives, INVP 4411A - Distributed Generation NY. Project Description: 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, for example, 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), automate Standardized Interconnection Requirements (SIR) technical screenings (Phase 2), and fully automation all processes (Phase 3). This project covers REV Phase 2, automation of SIR technical screenings, tactical implementation.

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Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
AMI - CSS Enhancements	NY REV/grid modernization	4704A	C113	3/31/20	\$8,075,538	Project Dependencies: INVP 4704J – NY Customer AMI Data Visibility Enhancements (aka Enterprise Service Bus & API Integration - AMF Functions), INVP 4704N – NY REV Cyber Security Initiatives. Project Description: The Customer Service System (CSS) is a set of applications used to manage customer-facing activities. CSS pulls meter data to administer orders, billing and payment processing, collections, and rates and usage programs. Having such a prominent role in customer interaction with National Grid, an effective CSS with appropriate capabilities is critical to maintaining customer satisfaction. Moreover as Distributed Energy Resources (DER) penetration increases throughout Upstate New York, CSS must be adaptable to changing with the dynamic energy environment. Project Rationale: CSS will be modified and configured to accept data formatted for more frequent intervals to make the most of usage programs such as Time-of-Use (TOU) and Critical Peak Pricing (CPP). CSS also includes capabilities intended to foster a relationship with customers and assist in customer retention through personalized service. The system pulls from various back office IT/IS sources to create personal profiles on customers to facilitate customer engagement. For instance, CSS can be linked with Interactive Voice Response (IVR) to send an automated notification to customers when the system receives a power-off notification from smart meters.
Green Button Connect	NY REV/grid modernization	4704C	C113	3/31/20	\$3,072,759	Project Dependencies: INVP 4704J – NY Customer AMI Data Visibility Enhancements (aka Enterprise Service Bus & API Integration - AMF Functions), INVP 4704M – Cloud Computing for Data Management Optimization (aka Cloud Computing and Data Lake), INVP 4704N – NY REV Cyber Security Initiatives. Project Description: The Green Button initiative will provide utility customers with easy and secure access to their energy usage information. National Grid is looking to implement Green Button Connect My Data as part of the AMF deployment program. Project Rationale: In addition to National Grid’s existing Green Button Download My Data functionality, new capabilities associated with Green Button Connect My Data further enables the customer experience by allowing utility customers to authorize third party providers access to their usage details. Green Button Connect My Data customers can securely authorize both National Grid and designated third parties to send and receive data on the customer’s behalf. Upon authorization, energy usage data can be transferred as required as it only occurs if a customer has granted explicit permission. Providing customers access to their data through Green Button Connect is expected to result in increased Energy Efficiency and higher participation in Demand Response (DR) and Distributed Generation (DG) programs offered by National Grid as well as third party providers.

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
AMI - Telecoms	NY REV/grid modernization	4704I	5210E	3/31/20	\$1,409,719	<p>Project Dependencies: INVP 4704N – NY REV Cyber Security Initiatives. Project Description: In preparation to align with REV objectives, the National Grid is enhancing several of its capabilities e.g. Advanced Metering Functionality, Advanced Distribution Management System, and substation automation among others. All of these enhancements will require National Grid’s network to install new backhaul and enhance its existing bandwidth to support transfer of the new data. Project Rationale: There are four sub-projects within the Telecom project that address the backhaul and bandwidth needs:</p> <ol style="list-style-type: none"> 1.Substation Remote Terminal Unit (RTU) Expansion – Install backhaul from the public carrier network to RTU substations to bring back substation/field information to the back office for additional analysis 2.Corporate Backbone Expansion – Increase backhaul bandwidth of the corporate data center to support data lake and analytics engine 3.Information Technology/Operational Technology (IT/OT) Backbone Expansion – Increase the backhaul bandwidth and install a wireless gateway to bring back meter data to the data center 4.RTU upgrade for Distribution Supervisory Control and Data Acquisition (D-SCADA) – Reconfigure RTUs at the substations to send information to D-SCADA
Outdoor Lighting Inventory Portal	NY REV/grid modernization	4704O	5210E	3/31/20	\$1,600,000	<p>Project Dependencies: INVP 4704N – NY REV Cyber Security Initiatives. Project Rationale: National Grid is proposing to enhance its existing outdoor lighting information system (CSS-OL) which manages its asset/billing repository. The first proposed application change is a user accessible, secure portal to monitor outdoor light inventory and operational status. This portal will provide both map-based imagery of existing lighting locations and interactive retrieval of location specific asset descriptive and billing information. Additionally, a modification will provide a means to query and report current street lighting operational issues or submit requests for certain transactional business functions which include, but are not limited to installations, removals, relocations, conversions or various discontinuance applications. This functionality will also include a level of positive, recordable communication with the customer to establish confirmation of requests and/or field completion work for tariff compliance. The second enhancement will provide greater administrative capabilities to track ongoing inventory changes, define exception conditions and perform other general business reporting functions. This administrative reporting functionality is best supported by a data warehouse in which all customer, account, billing, inventory, work orders and actionable history information can be simultaneously queried to support business requirements. The Company’s recent inquiries of other investor-owned and municipal utilities’ use of advanced technologies and leading edge business practices identifies this proposed initiative as a cost effective approach to enhance billing accuracy and significantly increase customer satisfaction through an integrated customer interaction approach, especially when employing the use</p>
DRMS for C&I Demand Response (Renewal)	NY REV/grid modernization		5210E	5/1/20	\$1,200,000	<p>A DRMS will be purchased to streamline the registration, use, and evaluation of demand response assets. This will give our vendors and customers a better experience and position us well for increased DER integration.</p>

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
DSP - DG IOAP	NY REV/grid modernization	4704F	5210E	9/30/20	\$14,835,271	Project Dependencies: INVP 4704N – NY REV Cyber Security Initiatives. Project Description: 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, for example, 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. Project Rationale: National Grid is required to implement an IOAP that allows for online application submittal along with automated management and screening. This includes any necessary impact studies – such as load flow or fault level – based on DG penetration levels, requiring GIS and SCADA data exchange. Moreover, the online portal and its integrated processes are expected to furnish customers with greater transparency about the overarching interconnection process as well as accelerate National Grid’s feedback on their applications. New capabilities for customer self-service will provide a streamlined and intuitive customer experience. This online system will enable customers and third parties to apply for interconnection and track their inquiries.
Grid MOD - ABB/ADMS & D-SCADA	NY REV/grid modernization	4704G	5210E	3/31/21	\$29,229,298	Project Dependencies: INVP 4704K – NY REV Enterprise License and Platform Deployment (PI Historian), INVP 4704H – GIS Data Enhancements, INVP 4704I – NY Substation Network Improvements (aka Telecoms), INVP 4704J – AMF Data Integration Platform (aka Enterprise Service Bus – API) Project Description: This investment is to develop requirements for the hardware and software refresh of the current ABB Outage Management System (OMS) and the deployment of a Distribution Management System (DMS), Distribution Supervisory Control and Data Acquisition (D-SCADA) and DMS applications). The Distribution Management System (DMS) applications are a foundational platform that will aid Control Center Operations in managing Distributed Energy Resources (DERs) and advanced Distribution Automation (DA) as discussed in the NY Distributed System Implementation Plan (DSIP). Specifically, as these programs evolve and mature, the Operators ability to monitor and control the system will become more challenging. The DMS system will help provide visibility to operate the system in a more safe and reliable manner and will maintain or improve efficiencies. The DMS is also foundational to the Distributed Energy Resource Management System (DERMS) which will be fundamental in dispatching DERs at the distribution level to facilitate wholesale and retail markets.
AMI - Telecoms	NY REV/grid modernization	4704I	5210E	3/31/21	\$1,962,336	Project Dependencies: INVP 4704N – NY REV Cyber Security Initiatives. Project Description: In preparation to align with REV objectives, the National Grid is enhancing several of its capabilities e.g. Advanced Metering Functionality, Advanced Distribution Management System, and substation automation among others. All of these enhancements will require National Grid’s network to install new backhaul and enhance its existing bandwidth to support transfer of the new data. Project Rationale: There are four sub-projects within the Telecom project that address the backhaul and bandwidth needs: 1.Substation Remote Terminal Unit (RTU) Expansion – Install backhaul from the public carrier network to RTU substations to bring back substation/field information to the back office for additional analysis 2.Corporate Backbone Expansion – Increase backhaul bandwidth of the corporate data center to support data lake and analytics engine 3.Information Technology/Operational Technology (IT/OT) Backbone Expansion – Increase the backhaul bandwidth and install a wireless gateway to bring back meter data to the data center 4.RTU upgrade for Distribution Supervisory Control and Data Acquisition (D-SCADA) – Reconfigure RTUs at the substations to send information to D-SCADA

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
AMI - Enterprise Service Bus & API Integration	NY REV/grid modernization	4704J	C113	3/31/21	\$4,946,371	Project Dependencies: INVP 4704N – NY REV Cyber Security Initiatives. Project Description: As part of the efforts to advance the objectives of NY REV, there are numerous systems that are being deployed or enhanced. For required data exchanges to occur, two main enabling components need to be implemented: a new Distribution Enterprise Service Bus (ESB) and configuration of various integrations. Project Rationale: National Grid will implement a dedicated Distribution Enterprise Service Bus (ESB) required to move data between distribution systems, automate and manage business processes, transfer files between entities and enable real-time and batch integration. ESB delivers a standards-based integration where performance, scalability and reliability are critical requirements. Additionally, to implement several of the Advanced Metering Functionality (AMF) and Advanced Distribution Management System (ADMS) use cases, systems in the new distribution ESB will need to communicate with legacy systems that currently use a corporate ESB. Project Scope: Distribution ESB Database and Real Application Cluster (RAC), Distribution ESB Middleware, Distribution ESB initial software (SE) and Middleware (MW) Installation, Comprehensive Integration Services (CIS)
AMI - Enterprise Service Bus & API Integration	NY REV/grid modernization	4704J	5210E	3/31/21	\$11,009,664	Project Dependencies: INVP 4704N – NY REV Cyber Security Initiatives. Project Description: As part of the efforts to advance the objectives of NY REV, there are numerous systems that are being deployed or enhanced. To encourage greater synergies, data is exchanged between these systems for enhanced insight. For these data exchanges to occur, two main enabling components need to be implemented: a new Distribution Enterprise Service Bus (ESB) and configuration of various integrations. Project Rationale: National Grid will implement a dedicated Distribution Enterprise Service Bus (ESB) required to move data between distribution systems, automate and manage business processes, transfer files between entities and enable real-time and batch integration. ESB delivers a standards-based integration where performance, scalability and reliability are critical requirements. Additionally, to implement several of the Advanced Metering Functionality (AMF) and Advanced Distribution Management System (ADMS) use cases, systems in the new distribution ESB will need to communicate with legacy systems that currently use a corporate ESB. Project Scope: Distribution ESB Database and Real Application Cluster (RAC), Distribution ESB Middleware, Distribution ESB initial software (SE) and Middleware (MW) Installation, Comprehensive Integration Services (CIS)
AMI - Info Mgt & Advanced Analytics	NY REV/grid modernization	4704L	C113	3/31/21	\$3,378,822	Project Dependencies: INVP 4704M – Cloud Computing for Data Management Optimization (aka Cloud Computing and Data Lake) INVP 4704N – NY REV Cyber Security Initiatives. Project Description: Significant data from multiple sources is required to effectively plan a Transmission and Distribution (T & D) system. System planners have been responsible to get the data needed, scrub the data to insure quality inputs to various models, and research the context in which the data was recorded to ensure its appropriateness for use in the scenarios being modeled in the planning process. These manual data management processes have been acceptable when the users of the data are intimately familiar with the Company's systems and processes and only had to plan the system for peak-hour capabilities. A shift towards more integrated system planning with high levels of Distributed Energy Resources (DER) penetration will require enhancements in both the data available and the tools and processes for its use.

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
AMI - Info Mg & Advanced Analytics	NY REV/grid modernization	4704L	5210E	3/31/21	\$16,496,601	Project Dependencies: INVP 4704M – Cloud Computing for Data Management Optimization (aka Cloud Computing and Data Lake) INVP 4704N – NY REV Cyber Security Initiatives. Project Description: Significant data from multiple sources is required to effectively plan a Transmission and Distribution (T & D) system. System planners have been responsible to get the data needed, scrub the data to insure quality inputs to various models, and research the context in which the data was recorded to ensure its appropriateness for use in the scenarios being modeled in the planning process. These manual data management processes have been acceptable when the users of the data are intimately familiar with the Company’s systems and processes and only had to plan the system for peak-hour capabilities. A shift towards more integrated system planning with high levels of Distributed Energy Resources (DER) penetration will require enhancements in both the data available and the tools and processes for its use.
IS-Cloud Computing & Data Lake	NY REV/grid modernization	4704M	C113	3/31/21	\$1,178,236	Project Dependencies: INVP 4704K – NY REV Enterprise License and Platform Deployment (aka Plant Information Historian), INVP 4704N – NY REV Cyber Security Initiatives Project Description - Advancements in load and Distributed Energy Resources (DER) forecasting are necessary in order to enhance load and DER forecasting both temporally and geographically. System load forecasting in the future will be a very detailed and data-intensive integration of economic modeling, weather normalization, modeling of customer response to numerous market offerings, and Transmission and Distribution (T&D) system computing capabilities. An analytics platform and a number of new tools, models and intensive cloud computing capabilities will need to be utilized in the development of new forecasting processes. Project Rationale - Various data management capabilities will be leveraged by the overall grid modernization program. A data lake repository will be established with a scalable enterprise data warehouse of all National Grid data. This will include not only internal data such as necessary asset and meter data, but external data including Remote Sensing, Land Development, Weather, and Real Estate data. The data lake will empower employees with capabilities to analyze data, create a 360 customer view, and enable customers and external parties to access the data.
IS-Cloud Computing & Data Lake	NY REV/grid modernization	4704M	5210E	3/31/21	\$5,752,565	Project Dependencies: INVP 4704K – NY REV Enterprise License and Platform Deployment (aka Plant Information Historian), INVP 4704N – NY REV Cyber Security Initiatives Project Description - Advancements in load and Distributed Energy Resources (DER) forecasting are necessary in order to enhance load and DER forecasting both temporally and geographically. System load forecasting in the future will be a very detailed and data-intensive integration of economic modeling, weather normalization, modeling of customer response to numerous market offerings, and Transmission and Distribution (T&D) system computing capabilities. An analytics platform and a number of new tools, models and intensive cloud computing capabilities will need to be utilized in the development of new forecasting processes. Project Rationale - Various data management capabilities will be leveraged by the overall grid modernization program. A data lake repository will be established with a scalable enterprise data warehouse of all National Grid data. This will include not only internal data such as necessary asset and meter data, but external data including Remote Sensing, Land Development, Weather, and Real Estate data. The data lake will empower employees with capabilities to analyze data, create a 360 customer view, and enable customers and external parties to access the data.

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Cyber Security	NY REV/grid modernization	4704N	C113	3/31/21	\$11,541,052	All of the NY REV program projects are dependent on the protections provided by the Cyber Security Program
Cyber Security	NY REV/grid modernization	4704N	5210E	3/31/21	\$17,311,579	All of the NY REV program projects are dependent on the protections provided by the Cyber Security Program
Annual HR & Payroll Mandatory Service Pack Upgrade (HRSP) - FY18	Other Mandates	4400	G020	12/31/17	\$1,126,000	Regulatory mandates are not discretionary investments and are based on orders, laws and agreements promulgated by Federal, State or Municipal government agencies.
Regulatory Mandates - FY18	Other Mandates		G020	3/31/18	\$5,071,622	Regulatory mandates are not discretionary investments and are based on orders, laws and agreements promulgated by Federal, State or Municipal government agencies.
US Control-Gas Electronic Bulletin Board (EBB) Upgrade	Other Mandates	4479	G210	5/1/18	\$3,000,000	Regulatory mandates are not discretionary investments and are based on orders, laws and agreements promulgated by Federal, State or Municipal government agencies.
Regulatory Mandates - FY19	Other Mandates		G020	3/31/19	\$18,595,000	Regulatory mandates are not discretionary investments and are based on orders, laws and agreements promulgated by Federal, State or Municipal government agencies.
Regulatory Mandates - FY20	Other Mandates		G020	3/31/20	\$20,000,000	Regulatory mandates are not discretionary investments and are based on orders, laws and agreements promulgated by Federal, State or Municipal government agencies.

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Regulatory Mandates - FY21	Other Mandates		G020	3/31/21	\$20,000,000	Regulatory mandates are not discretionary investments and are based on orders, laws and agreements promulgated by Federal, State or Municipal government agencies.

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
CPE Buyback	Tech. Modernization	4684	G020	3/31/17	\$5,140,000	This investment has already been made and there are no other project dependencies. Project description and benefit: National Grid currently leases Cisco equipment that is used by Verizon to deliver the managed telecom services. Purchasing this equipment will allow the company to negotiate better pricing, have better visibility to the deployed equipment and improve long term asset management and planning.
Active Directory Improvements	Tech. Modernization	4489	G020	11/30/17	\$275,000	Further work is expected on Active Directory in FY18 - however scope is not known until INVP 4286 F&A phase is complete. Active Directory is a key service which supports core authentication from all computer and servers onto the corporate network and therefore provides access to all IS systems. Ensuring the service is reliable and supports changing requirements for security and internet based services is critical. Curtailment of benefits and increased risk if not funded: The impacts of this project on the Customer are based on a number of areas: <ul style="list-style-type: none"> •Improves reliability and productivity •Helps support Jurisdictional and business function initiatives •Enables a better Customer Experience In addition there are an increasing number of Software as a Service (SAAS) Services which are driving the need for more capability within AD.
Application Performance Management (APM)	Tech. Modernization	4490	G020	1/31/18	\$375,000	APM (Application Performance Management) tool and expertise - Select, procure, integrate, and support a dedicated APM tool with a provision for expert level support. Project dependencies may require servers, storage and internet bandwidth and Eco-partners willing to accept tight integration of expertise into their delivery model. Curtailment of benefits and increased risk if not funded: The impacts of this project on the Customer are based on a number of areas: <ul style="list-style-type: none"> •Improves reliability and productivity •Better support for Jurisdictional and business function initiatives •Enables a better Customer Experience In addition, enables proactive APM, which itself: Provides empirical reporting of performance against regulated activities, Provides empirical reporting of end user experience to business customers, reducing reliance on unreliable anecdotal evidence, Provides empirical reporting of end user experience to IS Service Owners, enabling them to more tightly manage delivery, Reduces the time taken for support teams and incident managers to diagnose incidents, Reduces the time taken for developers to identify and fix performance issues during development and testing, Enables identification of over-provision and potential cost savings
RAS/VPN Re-Platform/Mobile	Tech. Modernization	4269	G020	3/16/18	\$600,000	Project dependency on the NAC portion of the current DR&S project (INVP 3614 D1) which will have final versions of ISE and Any Connect identified. Dependent on EMM project (INVP 3430) to push out Any Connect client for mobile users. Project Description: Replace the existing RAS VPN solution with a more modern platform that has improved mobile VPN capability and improved integration with National Grid technologies. The original Juniper Remote Access SSL VPN (RAS) deployed by Verizon is now 5 years old and doesn't support the latest mobile capabilities or integrate easily with other technologies that have been implemented (Cisco ICE). Vendor support of the current solution end September 2018. Curtailment of benefits and increased risk if not funded: The current product will be at end of support life in September 2018 so a replacement is needed to be implemented before that time. National Grid needs Mobile VPN capability to support deployment and use of mobile applications, improved user experience (transparent Any Connect access) with additional VPN connection modes and integration with the other desktop and infrastructure element of the estate. This project enables functionality that will be leveraged in projects such as GBE and REV (Mobility)

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
US Network Programme	Tech. Modernization	4496	G020	3/31/18	\$3,025,000	<p>Project Dependencies: customers are demanding new services (i.e. REV, GBE, Customer Contact Centers EMS/OMS), without these Network Improvements in our underlying technology infrastructure, we cannot deliver these new strategic programs. Curtailment of benefits and increased risk if not funded - The impacts of this program on the Customer are based on a number of areas:</p> <ul style="list-style-type: none"> •Improves reliability and productivity •Better support for Jurisdictional and business function initiatives •Enables a better Customer Experience <p>These Network Improvements will better help employees to use applications with more functionality in a more intuitive manner. The Jurisdiction and business function will be able to utilize a more reliable and resilient application, that will help to provide customers with more options when interacting with the Company. Legacy network infrastructure no longer meets the functional requirements of business users, Provision of a fully supported reliable network - Removes reliance on aged infrastructure that doesn't meet specifications and is no longer supported - ensuring that the network continues to be reliable and fit for purpose.</p>
US VSTIG Programme	Tech. Modernization	4498	G020	3/31/18	\$2,700,000	<p>The US VSTIG Programme consists of the following projects:</p> <ul style="list-style-type: none"> • US DMZ Risk Avoidance •INVP 4274 VSTIG Hardware Refresh • VSTIG Infrastructure Refresh • VSTIG Inter-Regional Load Balance • VSTIG Log Logic Refresh • VSTIG Upgrade Future Phases <p>Curtailment of benefits and increased risk if not funded: The projects within this programme are to upgrade the network infrastructure and bandwidth of the Internet gateway (VSTIG – Verizon Telecommunications Secure Internet Gateway). This will mitigate the existing risk associated with the amount of bandwidth already in use today and provide room for growth for new services and future projects such as GBE and REV which have a requirement to use additional bandwidth which cannot be provided due to current network hardware limitations and bandwidth utilization in the existing VSTIG.</p>
US Wireless Programme	Tech. Modernization	4499	G020	3/31/18	\$1,950,000	<p>The US Wireless Programme consists of the following projects:</p> <ul style="list-style-type: none"> •NG-M Implementation •Wireless Bridge Replacements •Wireless LAN Expansion •Wireless LAN Management Tools •Wireless Network Expansion <p>Curtailment of benefits and increased risk if not funded: Impactful to GBE, REV Data & Contact Center, etc. projects and operations - This program will expand the current coverage and capacity of the Wireless Local Area Network (WLAN) at various National Grid sites that have been identified as a priority. In addition, this implementation will strengthen the resilience of the WLAN by providing additional corporate and guest network Data Center infrastructure.</p> <p>National Grid Yards have become dependent on the use of WLANs for communications to their vehicles, and many of these WLAN access points are no longer supported and at risk of failure.</p>

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Monitoring and Alerting	Tech. Modernization	4493	G020	3/31/18	\$450,000	<p>Project Dependencies: This project would have an impact on all existing applications and systems. May require servers, storage and internet bandwidth and Eco-partners willing to accept tight integration of expertise into their delivery model.</p> <p>Curtailment of benefits and increased risk if not funded: Build a centralized (NG owned) APM platform to collect, present and store data from on end user experience. This will drive a Step-change reduction in incident MTTR (Mean Time To Recover):</p> <ul style="list-style-type: none"> •Earlier detection of performance issues •Fewer false alarms (P1/P2) by having empirical evidence of scale of problem (#users impacted, impact of slowdowns) •Faster identification of fault domain (server/citrix/network etc.) •Faster diagnosis of faults •Strong opportunity to improve IS reputation: •Real-time dashboards shared with customer will build transparency show good performance, and true scale of slowdowns/outages •Ability to trace individual user performance history will allow validation of anecdotes
RSA Re-platform	Tech. Modernization	4270	G020	3/31/18	\$280,000	<p>There are no dependencies required before this project can start.</p> <p>Curtailment of benefits and increased risk if not funded: The existing Managed One Time Password service (MOTP) (RSA Tokens) has been sunsetted by Verizon and NG is one of the last customers on the service. The two available options provide the benefit of having a smartphone app which can significantly reduce the overhead of physical token distribution. RSA token distribution and support is expensive and slow. Verizon's sunsetting of the MOTP converging with an upcoming renewal of the majority of our RSA tokens has created an opportunity for NG to move to a more modern and flexible platform that allows us to eliminate the hard token in favor of other alternatives as well as implement additional capabilities in this area. [how does this align iwth the RSA token buyback]</p>
Cloud Broker - Hybrid Enablement	Tech. Modernization	3899	G020	3/31/18	\$250,000	<p>Project Dependency - This project requires the use of Verizons Secure Cloud Interconnect (SCI). Curtailment of benefits and increased risk if not funded: This work is to improve cloud hosting available by adding new contracts with alternative suppliers. The provisioning of Strategic Cloud provider(s) will reduce the number of cloud-hosting environment that will need integration, reducing the overall network, security and service management costs. The resulting solution will reduce time to market, cost and complexity for Enterprise Services such as the Strategic Analytics Platform, Mobile Application Development Environment, etc. - Reduce the time to market for business solutions requiring IaaS and PaaS-based services</p>
Office 2010 Upgrade	Tech. Modernization	4265	G020	3/31/18	\$800,000	<p>There are no dependencies required before this project can start.</p> <p>Curtailment of benefits and increased risk if not funded: The current productivity tool is Office 2010 which has entered extended support from Microsoft and is now "n-2" versions old. Upgrade of the software will bring improved features, improved security, and support for real time collaboration of documents as well as better cloud integration. Project scope - Any users of the Microsoft Office suite of tools (i.e. Excel, Word, Powerpoint, etc.)</p> <p>Project rationale - To help support foundational programs that will enable or support the Utility of the Future. Supports National Grid in fulfilling its reporting and data retention regulatory obligations.</p>
Citrix Infrastructure Upgrade (Xenapp and NetScaler)	Tech. Modernization	4279	G020	3/31/18	\$500,000	<p>There are no dependencies required for this project to start.</p> <p>Project scope - The Scope is to review the US citrix estate and propose recommended work to rationalize and upgrade all of the estate to be within support. Project rationale - Citrix is a product that National Grid uses to virtualize a number of key business applications such as ArcGis, Cascade, Small World GIS, and Maximo. Citrix is also a key method of remote access for National Grid users, Eco system partners and other outside contractors via our Secure gateway solutions. Curtailment of benefits and increased risk if not funded: A good portion of our current Citrix environment is running on unsupported Operating systems (Windows 2000 and 2003) and unsupported Citrix versions (Metaframe XP 1.0 and Presentation 4.0). This not only introduces instability but exposes National Grid to vulnerabilities.</p>

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Business Innovation Projects 1	Tech. Modernization	4707	G020	3/31/18	\$3,368,613	<p>Project Dependencies - Several strategic initiatives are dependent on this project in order to progress and succeed including: NY REV, Advanced Analytics, Finance Controls, Gas Enablement, Customer Experience Transformation, Mobility COE, App Rationalization, and Process and Workflow Automation with Robotics. Benefits: Increased bandwidth and resilience - Delivery of software defined Wide Area Network technology will allow IS to deliver high bandwidth business class service. The tangible benefits are faster PC start up times, fast file transfers, more responsive applications, and access to bandwidth intensive Internet and cloud based services. Access Anywhere from Any Device - Delivery of pervasive Wireless Networks with the capacity to support many devices to support a flexible and mobile field worker or customer agent. (e. g. iPads, specialized tablets, sensors, equipment controllers). Unified Communications - Use of a consistent set of easy to use tools that provide voice, video, and text between parties both within and outside the company. These tools will relay real-time data in the form of pictures, Videos, and telemetry to staff and systems that can process the information and provide informed feedback to the remote staff. Virtual Desktop - The current architecture is not a sustainable service, presents a single point of failure and high risk from internal attacks. Cloud - The business will be limited to existing infrastructure options which lack current-state capabilities, are costly and take a long time to provision relative to hyper scale offerings. Agile project approaches will simply not work. Applications - Employees and customers will be able to use applications with more functionality in a more intuitive manner through multiple devices. Application upgrades will enable CFT</p>
Data Security	Tech. Modernization	4710	G020	3/31/18	\$1,575,000	<p>Project rationale and dependencies- This projects will provide new services and future projects to build a foundation that will enable or support the Utility of the Future. As customers demand new services, such as smart metering and distributed generation, an investment in our underlying technology infrastructure is needed in order to deliver these strategic programs. Project dependencies will be developed as the individual projects start up.</p> <p>Project description - This Data Security project is based on a move to protect data through information rights management and advanced cyber protection both for our end points but also our cloud services. This would be delivered using Microsoft Secure Productive Enterprise Plan E5. Another SAAS based subscription product.</p> <p>Project scope - As we move to any device working in the cloud our focus will change from end points and applications to data and the need to protect the data regardless of where it resides. Here are the related projects:</p> <ul style="list-style-type: none"> • Data Security / Information Rights Management (SPE) • Advanced Threat Analytics (SPE) • Cloud App Security (SPE) • Windows Advanced Threat Protection (SPE) • Advance Compliance Services (SPE)
Orchestration and Self Service	Tech. Modernization	4726	G020	3/31/18	\$750,000	<p>Project dependency - A cloud environment is needs to be in place prior to starting this project. Project description - The provisioning of Strategic Cloud provider(s) will reduce the number of cloud-hosting environment that will need integration, reducing the overall network, security and service management costs. The resulting solution will reduce time to market, cost and complexity for Enterprise Services such as the Strategic Analytics Platform, Mobile Application Development Environment, etc.</p> <p>Curtaiment of benefits and increased risk if not funded: The business may lose competitive advantages as they will be limited to existing infrastructure options which lack current-state capabilities, are costly and take a long time to provision relative to hyper scale offerings. While not solely a financial advantage at first, there will be economies at scale. Developer productivity will be constrained in the current environment; agile project approaches will simply not work. IS will be silently encouraging shadow IT start ups via lack of an internal offering and current speed to deliver, which has compliance and other risks.</p>

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Virtual Desktop - DaaS	Tech. Modernization	4727	G020	3/31/18	\$550,000	<p>Project Dependency - INVP 3901 Virtual desktop has to be completed before implementation can start. Project rationale and impact if project is curtailed: National Grid has implemented a Virtual Desktop environment (VMware Horizon Air) to replace Legacy Stop gap solutions for IBM offshore applications support users. This solution is built on a cloud platform and provides true scalability and predictable costs - and is able to be leveraged for other use cases where appropriate. Virtual Desktop allows a user's desktop environment (icons, wallpaper, windows, folders, toolbars, widgets, etc.) to be stored remotely on a server, rather than on a local PC or other client computing device. Therefore can replace the traditional model of providing a device to each user. Deploying virtual desktop in place of using local nationalgrid provided laptops/desktops will provide the following benefits over the current solution:</p> <ul style="list-style-type: none"> •PC availability is a challenge due to PC Hardware problems •PC allocation and installing applications reduced productivity and increases support cost •Operating system upgrades, applying security patch for every PC is time consuming •Specific users with unique application requirements and application installations will consume additional time for deployment and installations •Moving operating systems and applications inside the data center can create network issues and performance problems •Enterprise should scale-up network bandwidth or deploy WAN Optimization devices to combat latency and performance issues to end users
SCI connections	Tech. Modernization	4495	G020	3/31/18	\$100,000	<p>Software as a service applications that will have a high volume of traffic currently have to install their own dedicated network links to support the services which come at a cost to install and fixed price to support. Verizon now offer a service to provide dedicated links to services, without the need to install our own infrastructure. This new service is charged on the basis of volume of data meaning that National Grid only pays for the bigger volumes when we use it. To use this new service we must maintain required security services on SCI as we would with any dedicated network link. To that end, SCI can utilize most of the existing services in the VSTIG, but may require some additional infrastructure and/or configuration to use the service. This project is to identify and implement any infrastructure and establish configurations to support the deployment of future SCI services. In addition implement service wrap.</p> <p>Curtailed of benefits and increased risk if not funded: If the SCI service was not deployed, the alternative options of Internet VPN or dedicated MPLS network would need to be deployed. A dedicated MPLS network is most similar in functionality but carries a higher cost and longer lead time to implement.</p>
US SAP: Dynamic Storage Tiering	Tech. Modernization	4560	G020	7/5/18	\$1,355,000	<p>Project Dependency - INVP3924 - US SAP Hosting Strategy Project Benefits: Optimizing the storage use, Increase usage of HANA platform for Business Analytics and Reporting, Performance improvement, Allowing non-SAP data storage in HANA for cross-functional reporting. This investment is to implement dynamic tiering, which would allow HANA to scale so that it can handle the increasingly growing data volumes from ECC, Powerplan and other source systems. This project will provide options for storing data based on access, frequency of use and cost. Support the growth and exploit usage of HANA for real time data access and analytics</p>
ICE Replacement	Tech. Modernization	4491	G020	10/31/18	\$3,316,000	<p>Project Dependency - Customers are demanding new services such as REV, GBE, Contact Center etc., without this investment in our underlying technology infrastructure, we cannot deliver these new strategic programs. This investment will replace the Instant Messaging, Collaboration, and Email (ICE) service with Office 365.</p> <p>Project Rationale and Benefits: 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. The EMC hardware storage supporting the current service is at end of operational life support from the manufacturer. It cannot be used to integrate with various Cloud services in an efficient manner. For example, Integrations with Salesforce, Enterprise File Sync and Share (EFSS), success factors, etc.</p>

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
US Network Programme	Tech. Modernization	4496	G020	3/31/19	\$2,075,000	<p>Project Dependencies: customers are demanding new services (i.e. REV, GBE, Customer Contact Centers EMS/OMS), without these Network Improvements in our underlying technology infrastructure, we cannot deliver these new strategic programs. Curtailment of benefits and increased risk if not funded - The impacts of this program on the Customer are based on a number of areas:</p> <ul style="list-style-type: none"> •Improves reliability and productivity •Better support for Jurisdictional and business function initiatives •Enables a better Customer Experience <p>These Network Improvements will better help employees to use applications with more functionality in a more intuitive manner. The Jurisdiction and business function will be able to utilize a more reliable and resilient application, that will help to provide customers with more options when interacting with the Company. Additional benefits are: Legacy network infrastructure no longer meets the functional requirements of business users, Provision of a fully supported reliable network - Removes reliance on aged infrastructure that doesn't meet specifications and is no longer supported - ensuring that the network continues to be reliable and fit for purpose.</p>
US VSTIG Programme	Tech. Modernization	4498	G020	3/31/19	\$1,700,000	<p>The US VSTIG Programme consists of the following projects:</p> <ul style="list-style-type: none"> • US DMZ Risk Avoidance •INVP 4274 VSTIG Hardware Refresh • VSTIG Infrastructure Refresh • VSTIG Inter-Regional Load Balance • VSTIG Log Logic Refresh • VSTIG Upgrade Future Phases <p>Curtailment of benefits and increased risk if not funded: The projects within this programme are to upgrade the network infrastructure and bandwidth of the Internet gateway (VSTIG – Verizon Telecommunications Secure Internet Gateway). This will mitigate the existing risk associated with the amount of bandwidth already in use today and provide room for growth for new services and future projects such as GBE and REV which have a requirement to use additional bandwidth which cannot be provided due to current network hardware limitations and bandwidth utilization in the existing VSTIG.</p>
US Wireless Programme	Tech. Modernization	4499	G020	3/31/19	\$1,500,000	<p>The US Wireless Programme consists of the following projects:</p> <ul style="list-style-type: none"> •NG-M Implementation •Wireless Bridge Replacements •Wireless LAN Expansion •Wireless LAN Management Tools •Wireless Network Expansion <p>Curtailment of benefits and increased risk if not funded: Impactful to GBE, REV Data & Contact Center, etc. projects and operations - This program will expand the current coverage and capacity of the Wireless Local Area Network (WLAN) at various National Grid sites that have been identified as a priority. In addition, this implementation will strengthen the resilience of the WLAN by providing additional corporate and guest network Data Center infrastructure.</p>

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Data Visualisation Expansion	Tech. Modernization	4606	G020	3/31/19	\$2,800,000	There are no dependencies required for this project to start. Project Description - Tableau software platform/interface – enables the capability to visualize behaviors and investigate anomalies in real time. Provides representation of data flows across the business network (real-time and historically), internally and externally, between all machines and users. Visually represents events leading up to and during an anomaly and contextually expose factors that are out of the ordinary. Project scope - Expanding use of Tableau across more use cases across business area. Identifying requirements for reporting, configuring and building reports. Supports National Grid in fulfilling its reporting and data retention regulatory obligations. Project rationale - Improving efficiencies to reduce operational costs is a constant challenge. Providing Data, Visualisations and analytics can provide invaluable insights for both operational and strategic decision making in how we use our resources. Creating the ability to discover hidden savings potential by visualising consumption data of many different resources.
US SAP: Business Warehouse (BW) Consolidation to HANA Enterprise Cloud (HEC)	Tech. Modernization	4562	G020	3/31/19	\$2,366,000	There are no dependencies required for this project to start. Project Description and Benefits - Consolidate the reporting solutions onto a single platform to reduce BAU costs including infrastructure hosting and application support costs. Simplify the reporting solution for the business users. Increase cross functional reporting capabilities. This investment is to provide funding to consolidate National Grid Business Intelligence (BI) / Business Warehouse (BW) to HANA Enterprise Cloud (HEC). This project supports Strategy Alignment by delivering: •Reporting Platform Consolidation •Maintenance Cost Reduction •Reporting Infrastructure Enhancement Project scope - Migrate the T-Systems SAP BW 7.31 SP10 to HEC SAP HANA SP11/BW 7.4 •Success Enterprise •Front Office (FO) - Native HANA •Non Utility Billing (NUB)- BW •Payroll - Native HANA •Employee Actions and Employee Master Data - Native HANA/BW •Supply Chain Management (SCM) - Native HANA •Maximo - Native HANA •Storms - Native HANA •Decommission BW / Oracle •Consolidate reporting onto one instance
Monitoring and Alerting	Tech. Modernization	4493	G020	3/31/19	\$1,000,000	Project Dependencies: This project would have an impact on all existing applications and systems. May require servers, storage and internet bandwidth and Eco-partners willing to accept tight integration of expertise into their delivery model. Curtailed of benefits and increased risk if not funded: Build a centralized (NG owned) APM platform to collect, present and store data from on end user experience. This will drive a Step-change reduction in incident MTTR (Mean Time To Recover): •Earlier detection of performance issues •Fewer false alarms (P1/P2) by having empirical evidence of scale of problem (#users impacted, impact of slowdowns) •Faster identification of fault domain (server/citrix/network etc.) •Faster diagnosis of faults •Strong opportunity to improve IS reputation: •Real-time dashboards shared with customer will build transparency show good performance, and true scale of slowdowns/outages •Ability to trace individual user performance history will allow validation of anecdotes
MWORK and Netmotion Risk Avoidance	Tech. Modernization	4725	G020	3/31/19	\$500,000	Project Dependencies - This project is to move the Mwork device (Legacy National Grid) from Birdstep to the New Netmotion network. Netmotion will be used when mobile field workers move in and out of wireless coverage areas and roam between networks, the product maintains and secures their data connections in order to maximize worker productivity. This project will implement a new solution for MWork that replaces the current Birdstep product with Netmotion.

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Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Improving End User Experience- Cloud based DMZ Service Platform	Tech. Modernization	4723	G020	3/31/19	\$300,000	There are no dependencies for this project to start. Project Description and Benefits - A DMZ or Demilitarized Zone is primarily used to separate the network into multiple segments to enhance security, where only defined traffic is allowed to navigate between these different segments. This project will establish a cloud based service platform where the DMZ will move from a physical to virtual environment.
Mobile Broadband POC	Tech. Modernization	3998	G020	3/31/19	\$100,000	Project Description: The consumerisation of information technology and proliferation of mobile devices has resulted in individuals having a multitude of options in how they access and create digital information. This investment is to conduct an F&A study to review options to enable both NG employees and third parties to use a device of their choice on the National Grid data network. This investment is required to enable core capabilities that are foundational to the Mobile Strategy and will be required to support the mobility requirements for business initiatives such as: - Mobility for Field Force Worker under the US Gas and Electric Operations Roadmap
FY19 Edge Projects	Tech. Modernization	4717	G020	3/31/19	\$1,000,000	There are no dependencies for this project to start. Project Description and Benefits - As we move to any device working in the cloud our focus will change from end points and applications to data and the need to protect the data regardless of where it resides. This projects will provide new services and future projects to build a foundation that will enable or support the Utility of the Future. As customers demand new services, such as smart metering and distributed generation, an investment in our underlying technology infrastructure is needed in order to deliver these strategic programs.
FY19 Network Projects	Tech. Modernization	4718	G020	3/31/19	\$1,000,000	Project dependencies will be developed as the individual projects under this program start up. Project Description, Rationale and Benefits - The hardware and software that make up the legacy network services is now experiencing asset health related issues, which have an operational and business risk of hardware/service failure, performance deterioration and potential of business service interruption. This multi-year investment addresses IS health and capability challenges while enabling National Grid's strategic business objectives.
Digital Asset Management (DAM)	Tech. Modernization	4711	G020	3/31/19	\$500,000	Digital Asset Mgmt involves the creation of an archived infrastructure to preserve and manage digital assets and a search functionality that allows end users to easily identify, locate and retrieve an asset. This investment addresses IS health and capability challenges while enabling National Grid's strategic business objectives. Benefits of a DAM solution are that it allows access to digital media anytime, fast implementation, easy integration, and is intuitive. To help support foundational programs that will enable or support the Utility of the Future. This project supports National Grid in fulfilling its reporting and data retention regulatory obligations. The impacts of this program on the Customer are based on a number of areas: <ul style="list-style-type: none"> •Improves reliability and productivity •Better support for Jurisdictional and business function initiatives •Enables a better Customer Experience

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Business Innovation Projects 1	Tech. Modernization	4707	G020	3/31/19	\$3,973,236	Project Dependencies - Several strategic initiatives are dependent on this project in order to progress and succeed including: NY REV, Advanced Analytics, Finance Controls, Gas Enablement, Customer Experience Transformation, Mobility COE, App Rationalization, and Process and Workflow Automation with Robotics. Benefits: Increased bandwidth and resilience - Delivery of software defined Wide Area Network technology will allow IS to deliver high bandwidth business class service through low cost commodity broadband internet services. The tangible benefits are faster PC start up times, fast file transfers, more responsive applications, and access to bandwidth intensive Internet and cloud based services. Delivery of pervasive Wireless Networks with the capacity to support many devices to support a flexible and mobile field worker or customer agent. (e. g. iPads, specialized tablets, sensors, equipment controllers). Unified Communications - Use of a consistent set of easy to use tools that provide voice, video, and text between parties both within and outside the company. These tools will relay real-time data in the form of pictures, videos, and telemetry to staff and systems that can process the information and provide informed feedback to the remote staff. Virtual Desktop - The current architecture is not a sustainable service, presents a single point of failure and high risk from internal attacks. Cloud - The business will be limited to existing infrastructure options which lack current-state capabilities, are costly and take a long time to provision relative to hyper scale offerings. Agile project approaches will simply not work. Applications - Employees and customers will be able to use applications with more functionality in a more intuitive manner through multiple devices. Application upgrades will enable CFT
Business Innovation Projects 2	Tech. Modernization	4708	G020	3/31/19	\$3,368,613	Project Dependencies - Several strategic initiatives are dependent on this project in order to progress and succeed including: NY REV, Advanced Analytics, Finance Controls, Gas Enablement, Customer Experience Transformation, Mobility COE, App Rationalization, and Process and Workflow Automation with Robotics. Benefits: Increased bandwidth and resilience - Delivery of software defined Wide Area Network technology will allow IS to deliver high bandwidth business class service through low cost commodity broadband internet services. The tangible benefits are faster PC start up times, fast file transfers, more responsive applications, and access to bandwidth intensive Internet and cloud based services. Access Anywhere from Any Device - Delivery of pervasive Wireless Networks with the capacity to support many devices to support a flexible and mobile field worker or customer agent. (e. g. iPads, specialized tablets, sensors, equipment controllers). Unified Communications - Use of a consistent set of easy to use tools that provide voice, video, and text between parties both within and outside the company. These tools will relay real-time data in the form of pictures, videos, and telemetry to staff and systems that can process the information and provide informed feedback to the remote staff. Virtual Desktop - The current architecture is not a sustainable service, presents a single point of failure and high risk from internal attacks. Cloud - The business will be limited to existing infrastructure options which lack current-state capabilities, are costly and take a long time to provision relative to hyper scale offerings. Agile project approaches will simply not work. Applications - Employees and customers will be able to use applications with more functionality in a more intuitive manner
Business Innovation Projects 3	Tech. Modernization	4728	G020	3/31/19	\$3,368,613	Project Dependencies - Several strategic initiatives are dependent on this project in order to progress and succeed including: NY REV, Advanced Analytics, Finance Controls, Gas Enablement, Customer Experience Transformation, Mobility COE, App Rationalization, and Process and Workflow Automation with Robotics. Benefits: Increased bandwidth and resilience - Delivery of software defined Wide Area Network technology will allow IS to deliver high bandwidth business class service through low cost commodity broadband internet services. The tangible benefits are faster PC start up times, fast file transfers, more responsive applications, and access to bandwidth intensive Internet and cloud based services. Access Anywhere from Any Device - Delivery of pervasive Wireless Networks with the capacity to support many devices to support a flexible and mobile field worker or customer agent. (e. g. iPads, specialized tablets, sensors, equipment controllers). Unified Communications - Use of a consistent set of easy to use tools that provide voice, video, and text between parties both within and outside the company. These tools will relay real-time data in the form of pictures, videos, and telemetry to staff and systems that can process the information and provide informed feedback to the remote staff. Virtual Desktop - The current architecture is not a sustainable service, presents a single point of failure and high risk from internal attacks. Cloud - The business will be limited to existing infrastructure options which lack current-state capabilities, are costly and take a long time to provision relative to hyper scale offerings. Agile project approaches will simply not work. Applications - Employees and customers will be able to use applications with more functionality in a more intuitive manner

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
EUC, network, and data center strategy	Tech. Modernization	4715	G020	3/31/19	\$1,542,858	<p>Several other strategic initiatives are dependent on the work described within this document, in order to progress and succeed including:</p> <ul style="list-style-type: none"> •Advanced Analytics •Finance Controls •Gas Enablement •Customer Experience Transformation <p>Project Description - This project encompasses strategy work to assess the current state and plan against the demands and see if the strategies and plans support achievement of those business strategies. The timing of this is important given the timing of several key strategic supplier contracts.</p>
Data Security	Tech. Modernization	4710	G020	3/31/19	\$1,575,000	<p>Project rationale and dependencies- This projects will provide new services and future projects to build a foundation that will enable or support the Utility of the Future. As customers demand new services, such as smart metering and distributed generation, an investment in our underlying technology infrastructure is needed in order to deliver these strategic programs. Project dependencies will be developed as the individual projects start up.</p> <p>Project description - This Data Security project is based on a move to protect data through information rights management and advanced cyber protection both for our end points but also our cloud services. This would be delivered using Microsoft Secure Productive Enterprise Plan E5. Another SAAS based subscription product.</p> <p>Project scope - As we move to any device working in the cloud our focus will change from end points and applications to data and the need to protect the data. Here are the related projects:</p> <ul style="list-style-type: none"> • Data Security / Information Rights Management (SPE) • Advanced Threat Analytics (SPE) • Cloud App Security (SPE) • Windows Advanced Threat Protection (SPE) • Advance Compliance Services (SPE)
FY19 Data Centre Projects	Tech. Modernization	4716	G020	3/31/19	\$2,000,000	<p>There are no dependencies for this project to start. Project Description - Replacement of legacy aging equipment which are in legacy Data Centers. Although these are in the legacy data centers - there are critical applications that are still in the legacy data centers running on these aged assets. In addition, the expectation is that there will be some services retained in these data centers using the aged infrastructure.</p> <p>Project rationale - There is a risk to continuing to run systems in the legacy data centres. A number of mission critical systems remain in the legacy data centers running in aged systems connected to aged network platforms. There is a likelihood that either the compute platform or network could fail and the hardware would not easily be restored. A compute platform failure would impact one system, but a network failure could impact multiple systems.</p> <p>Reliability - Old technology is vulnerable to more DRS threats - removing the old technology will mitigate this risk. This project will implement an agreed plan to decommission or retain equipment in Legacy Data centres.</p>
1327 Interfaces - 523 FTS, 340 RDX, 245 MQSI, 253 JCAPS, 44 PM4D, 7 VB	Tech. Modernization	4706	G020	3/31/19	\$3,300,000	<p>There is a project dependency on INVP 3492 - Comprehensive Integration Services. The primary driver for this project is to mitigate the risks of continuing to be reliant on out of support infrastructure. These risks are :</p> <ul style="list-style-type: none"> •Increased Security risk as out of support infrastructure will not receive security patches. •In the event of failure National Grid IS will be unable to meet the agreed Service Level Agreements (SLAs) for many key applications once the middleware infrastructure goes out of support. •The FTS environment has a single point of failure/no redundancy. •The new technology provides functional benefits in the efficiency of data and file transfer. There are 1327 Interfaces included in the scope of this work - 523 FTS, 340 RDX, 245 MQSI, 253 JCAPS, 44 PM4D, 7 VB <p>The Strategy roadmap for middleware that supports file transfers is SAP PI and Oracle Fusion. Work is required to migrate interfaces from legacy services to strategic services and decommission the legacy services.</p>

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
US Video Conference Programme	Tech. Modernization	4497	G020	6/1/19	\$1,650,000	<p>Dependent on call manger upgrade project</p> <p>Dependent on DRS approving the existing collaboration edge VC gateway architecture. (ongoing progress)</p> <p>Dependent on IDS and forward proxies projects - due to increase of bandwidth requirement. This project will replace the current Verizon OVC (Open Video Conferencing) dedicated service with cloud based WebEx CMR (Collaboration meeting room) service. Project rationale - Migrating onto the webex based CMR service will put audio and video onto a common integrated platform. Providing a more consistent and reliable experience for users.</p>
IS Tools	Tech. Modernization	4513	G020	3/24/20	\$400,000	<p>Project Dependency on INVP3900 - Active Directory Improvements - Active Directory Improvements - Including federation support with cloud services. Project Description - IS utilizes a number of tools to support IS process to improve quality and productivity. Improvements to process through Process Excellence require improvements to these tools. Tools for supporting IS processes - includes extension of use of rational suite (Focal point, rtc etc). Provides productivity and efficiency improvements to IS process primarily for processes supporting IS project processes (from investment planning through to implementation).</p>
US SAP: Enhancement Pack 9 Upgrade	Tech. Modernization	4564	G020	3/31/20	\$8,821,000	<p>Project Dependencies include INVP4348 - US SAP Infrastructure Landscape. In addition, the unknown impact from Enterprise Wide Program:</p> <ul style="list-style-type: none"> - Supply Chain Transformation Program - Gas Enablement - HR Simplification Program <p>Project description and benefits - The SAP Enhancement pack upgrade is an investment to provide for the upgrade of the core SAP application every two years (biennially) excluding the upgrade work associated with the annual HR service pack which is accounted for under a separate mandatory annual investment. The investment would only include the upgrade packs (non HR) which are supplied by the SAP and would exclude any discretionary enhancements as part of this upgrade or any upgrades associated with ancillary USFP systems (ex. PowerPlan, uPerform, OpenText, SABRIX). The investment would also not account for any upgrade work which may be required on the BI/BW SAP platform.</p>
US Network Programme	Tech. Modernization	4496	G020	3/31/20	\$1,575,000	<p>Project Dependencies: customers are demanding new services (i.e. REV, GBE, Customer Contact Centers EMS/OMS), without these Network Improvements in our underlying technology infrastructure, we cannot deliver these new strategic programs. Curtailment of benefits and increased risk if not funded - The impacts of this program on the Customer are based on a number of areas:</p> <ul style="list-style-type: none"> •Improves reliability and productivity •Better support for Jurisdictional and business function initiatives •Enables a better Customer Experience <p>These Network Improvements will better help employees to use applications with more functionality in a more intuitive manner. The Jurisdiction and business function will be able to utilize a more reliable and resilient application, that will help to provide customers with more options when interacting with the Company. Additional benefits are:</p> <p>Legacy network infrastructure no longer meets the functional requirements of business users, Provision of a fully supported reliable network - Removes reliance on aged infrastructure that doesn't meet specifications and is no longer supported - ensuring that the network continues to be reliable and fit for purpose.</p>

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
US VSTIG Programme	Tech. Modernization	4498	G020	3/31/20	\$700,000	<p>The US VSTIG Programme consists of the following projects:</p> <ul style="list-style-type: none"> • US DMZ Risk Avoidance • INVP 4274 VSTIG Hardware Refresh • VSTIG Infrastructure Refresh • VSTIG Inter-Regional Load Balance • VSTIG Log Logic Refresh • VSTIG Upgrade Future Phases <p>Curtailement of benefits and increased risk if not funded: The projects within this programme are to upgrade the network infrastructure and bandwidth of the Internet gateway (VSTIG – Verizon Telecommunications Secure Internet Gateway). This will mitigate the existing risk associated with the amount of bandwidth already in use today and provide room for growth for new services and future projects such as GBE and REV which have a requirement to use additional bandwidth which cannot be provided due to current network hardware limitations and bandwidth utilization in the existing VSTIG.</p>
US Wireless Programme	Tech. Modernization	4499	G020	3/31/20	\$1,500,000	<p>The US Wireless Programme consists of the following projects:</p> <ul style="list-style-type: none"> • NG-M Implementation • Wireless Bridge Replacements • Wireless LAN Expansion • Wireless LAN Management Tools • Wireless Network Expansion <p>Curtailement of benefits and increased risk if not funded: Impactful to GBE, REV Data & Contact Center, etc. projects and operations - This program will expand the current coverage and capacity of the Wireless Local Area Network (WLAN) at various National Grid sites that have been identified as a priority. In addition, this implementation will strengthen the resilience of the WLAN by providing additional corporate and guest network Data Center infrastructure.</p> <p>National Grid Yards have become dependent on the use of WLANs for communications to their vehicles, and many of these WLAN access points are no longer supported.</p>
Monitoring and Alerting	Tech. Modernization	4493	G020	3/31/20	\$1,000,000	<p>Project Dependencies: This project would have an impact on all existing applications and systems. May require servers, storage and internet bandwidth and Eco-partners willing to accept tight integration of expertise into their delivery model.</p> <p>Curtailement of benefits and increased risk if not funded: Build a centralized (NG owned) APM platform to collect, present and store data from on end user experience. This will drive a Step-change reduction in incident MTTR (Mean Time To Recover):</p> <ul style="list-style-type: none"> • Earlier detection of performance issues • Fewer false alarms (P1/P2) by having empirical evidence of scale of problem (#users impacted, impact of slowdowns) • Faster identification of fault domain (server/citrix/network etc.) • Faster diagnosis of faults • Real-time dashboards will build transparency show good performance, and true scale of slowdowns/outages • Ability to trace individual user performance history will allow validation of anecdotes
Service Now - Release 3	Tech. Modernization	4261	G020	3/31/20	\$3,400,000	<p>Cannot start until Service Now Release 2 completes. Project description - Ongoing improvements to SMI (Service Management Integration) processes - extension of channels available for contacting help desk and resolving issues.</p> <p>Annual platform upgrade to:</p> <ul style="list-style-type: none"> - to support new functionality - supportable platform to N-1 <p>Drive down calls to the service desk</p> <p>Open up utilization of other channels of engagement</p> <p>Decommission and consolidate other legacy SMI toolsets into service now transformational improvements in SMI processes and wider automation. Such as:</p> <ul style="list-style-type: none"> - CMDDB (service watch) automated discovery - Supplier operational management - Project and portfolio management <p>Integrating of servicenow with other systems to provide seamless workflow. Such as:</p> <ul style="list-style-type: none"> - Success Factors - SAP solution manager UK/US - To support new functionality

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
FY20 Edge Projects	Tech. Modernization	4720	G020	3/31/20	\$2,000,000	<p>There are no dependencies for this project to start. Project Description and Benefits - As we use more cloud based services that dictate the pace of change we will need new capability to manage this impact on National Grid. This includes services to manage the change as well as reducing complexity in estate to reduce impact of changes. As we move to any device working in the cloud our focus will change from end points and applications to data and the need to protect the data.</p> <p>Reacting to the merging of mobile and PC world's we will need to refresh and manage existing devices in new ways. Project rationale - This projects will provide new services and future projects to build a foundation that will enable or support the Utility of the Future. As customers demand new services, such as smart metering and distributed generation, an investment in our underlying technology infrastructure is needed in order to deliver these strategic programs.</p>
FY20 Network Projects	Tech. Modernization	4721	G020	3/31/20	\$4,000,000	<p>Project dependencies will be developed as the individual projects under this program start up. Project Description, Rationale and Benefits - The hardware and software that make up the legacy network services is now experiencing asset health related issues, which have an operational and business risk of hardware/service failure, performance deterioration and potential of business service interruption. This multi-year investment addresses IS health and capability challenges while enabling National Grid's strategic business objectives.</p>
EMM Licenses	Tech. Modernization	4713	G020	3/31/20	\$1,320,000	<p>Project Dependencies: The completion of Enterprise Mobile Management System Phase 1. Project Description: The Enterprise Mobile Management System (EMM) project will secure corporate data and information stored on mobile devices, mainly by ensuring that policies are enforced on the device. This project will procure the necessary licenses to manage these mobile devices. Project Rationale: The organization is looking to expand the current MDM capability to enable Bring Your Own Devices (BYOD). Key Business Benefits: This investment is required to enable core capabilities that are foundational to the Mobile Strategy and will be required to support the mobility requirements for business initiatives.</p> <p>Additional benefits:</p> <ul style="list-style-type: none"> •Managed mobile devices •Secured mobile devices •Device service wrapper •EMM system management •Mobile application management
Business Innovation Projects 2	Tech. Modernization	4708	G020	3/31/20	\$3,973,236	<p>Project Dependencies - Several strategic initiatives are dependent on this project in order to progress and succeed including: NY REV, Advanced Analytics, Finance Controls, Gas Enablement, Customer Experience Transformation, Mobility COE, App Rationalization, and Process and Workflow Automation with Robotics. Benefits: Increased bandwidth and resilience - Delivery of software defined Wide Area Network technology will allow IS to deliver high bandwidth business class service. The tangible benefits are faster PC start up times, fast file transfers, more responsive applications, and access to bandwidth intensive Internet and cloud based services. Delivery of pervasive Wireless Networks with the capacity to support many devices to support a flexible and mobile field worker or customer agent. (e. g. iPads, specialized tablets, sensors, equipment controllers). Unified Communications - Use of a consistent set of easy to use tools that provide voice, video, and text between parties both within and outside the company. These tools will relay real-time data in the form of pictures, videos, and telemetry to staff and systems that can process the information and provide informed feedback to the remote staff. Virtual Desktop - The current architecture is not a sustainable service, presents a single point of failure and high risk from internal attacks. Cloud - The business will be limited to existing infrastructure options which lack current-state capabilities, are costly and take a long time to provision relative to hyper scale offerings. Agile project approaches will simply not work.</p> <p>Applications - Employees and customers will be able to use applications with more functionality in a more intuitive manner through multiple devices. Application upgrades will enable CET</p>

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Business Innovation Projects 3	Tech. Modernization	4728	G020	3/31/20	\$3,979,236	<p>Project Dependencies - Several strategic initiatives are dependent on this project in order to progress and succeed including: NY REV, Advanced Analytics, Finance Controls, Gas Enablement, Customer Experience Transformation, Mobility COE, App Rationalization, and Process and Workflow Automation with Robotics. Benefits: Increased bandwidth and resilience - Delivery of software defined Wide Area Network technology will allow IS to deliver high bandwidth business class service through low cost commodity broadband internet services. The tangible benefits are faster PC start up times, fast file transfers, more responsive applications, and access to bandwidth intensive Internet and cloud based services. Access Anywhere from Any Device - Delivery of pervasive Wireless Networks with the capacity to support many devices to support a flexible and mobile field worker or customer agent. (e. g. iPads, specialized tablets, sensors, equipment controllers). Unified Communications - Use of a consistent set of easy to use tools that provide voice, video, and text between parties both within and outside the company. These tools will relay real-time data in the form of pictures, videos, and telemetry to staff and systems that can process the information and provide informed feedback to the remote staff. Virtual Desktop - The current architecture is not a sustainable service, presents a single point of failure and high risk from internal attacks. Cloud - The business will be limited to existing infrastructure options which lack current-state capabilities, are costly and take a long time to provision relative to hyper scale offerings. Agile project approaches will simply not work.</p> <p>Applications - Employees and customers will be able to use applications with more functionality in a more intuitive manner</p>
Data Security	Tech. Modernization	4710	G020	3/31/20	\$1,575,000	<p>Project rationale and dependencies- This projects will provide new services and future projects to build a foundation that will enable or support the Utility of the Future. As customers demand new services, such as smart metering and distributed generation, an investment in our underlying technology infrastructure is needed in order to deliver these strategic programs. Project dependencies will be developed as the individual projects start up.</p> <p>Project description - This Data Security project is based on a move to protect data through information rights management and advanced cyber protection both for our end points but also our cloud services. This would be delivered using Microsoft Secure Productive Enterprise Plan E5. Another SAAS based subscription product.</p> <p>Project scope - As we move to any device working in the cloud our focus will change from end points and applications to data and the need to protect the data regardless. Here are the related projects:</p> <ul style="list-style-type: none"> • Data Security / Information Rights Management (SPE) • Advanced Threat Analytics (SPE) • Cloud App Security (SPE) • Windows Advanced Threat Protection (SPE) • Advance Compliance Services (SPE)
Hardware and Software Upgrades	Tech. Modernization	4722	G020	3/31/20	\$7,500,000	<p>Our outsourced contracts include language to keep the hardware and software levels at N-1. However, they do not include a hardware refresh for equipment that goes end of life, nor the testing required supporting the hardware refresh of equipment or the testing required to implement new hardware or software. This project will perform these necessary upgrades. Project Rationale: A stable Network environment is essential for the smooth running of the National Grid businesses. To help support foundational programs that will enable or support the Utility of the Future. Supports National Grid in fulfilling its reporting and data retention regulatory obligations.</p>
Data Centre Consolidation efforts	Tech. Modernization	4709	G020	3/31/20	\$3,500,000	<p>There are no dependencies for this project to start. Project Description: A number of mission critical systems remain in the legacy data centers running in aged systems connected to aged network platforms. There is a likelihood that either the compute platform or network could fail and the hardware would not easily be restored. A compute platform failure would impact one system, but a network failure could impact multiple systems.</p> <p>Reliability - Old technology is vulnerable to more DRS threats - removing the old technology will mitigate this risk.</p>

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
FY20 Data Centre Projects	Tech. Modernization	4719	G020	3/31/20	\$4,000,000	<p>There are no dependencies for this project to start. Project Description - A number of mission critical systems remain in the legacy data centers running in aged systems connected to aged network platforms. There is a likelihood that either the compute platform or network could fail and the hardware would not easily be restored. A compute platform failure would impact one system, but a network failure could impact multiple systems.</p> <p>Reliability - Old technology is vulnerable to more DRS threats - removing the old technology will mitigate this risk. This project will implement an agreed plan to decommission or retain equipment in Legacy Data centres.</p>
Enterprise Data Management Platform	Tech. Modernization	4582	G020	6/1/20	\$4,730,000	<p>Downstream project dependencies include the following: Shaping our Future, Gas Business Enablement, Customer Experience Transformation, NYREV/DSIP, BI and Analytics Strategy Refresh. This project will evaluate, select and provision an Enterprise Data Management platform that will provide Data Quality Management (DQM), Export Transport and Load (ETL) and Master Data Management (MDM) services. The project rationale is that there are many issues and gaps in the way we manage data today. Some of these include: No formal central data governing authority, No formal stewards of the data within each source system, There is no common information model, No tools within the current landscape to allow for data quality. The following are several initiatives attempting to address these issues across the organization: NYREV/DSIP – Proposing efforts to manage data as an asset applying focus and techniques to measure monitor and improve data process and quality. Shaping Our Future (SOF) – As part of the Business Management System (BMS) initiative, the Data Management and Governance work stream has been mobilized to define and pilot the Data Management Governance Framework across the organization, BI and Analytics Strategy Refresh – The strategy is currently under review with initial focus of Self Service BI, Gas Enablement - Mobilizing a Data Management team to develop a comprehensive data management plan in support of the overall program, Customer Experience Transformation (CXT) – Development of a data management strategy, roadmap and plan to address issues and gaps with Data Quality and Data Integration within US Customer. This strategy will complement the refreshed BI and Analytics Strategy, as well as current capabilities which exist</p>
Business Innovation Projects 2	Tech. Modernization	4708	G020	3/31/21	\$4,491,484	<p>Project Dependencies - Several strategic initiatives are dependent on this project in order to progress and succeed including: NY REV, Advanced Analytics, Finance Controls, Gas Enablement, Customer Experience Transformation, Mobility COE, App Rationalization, and Process and Workflow Automation with Robotics. Benefits: Increased bandwidth and resilience - Delivery of software defined Wide Area Network technology will allow IS to deliver high bandwidth business class service through low cost commodity broadband internet services. The tangible benefits are faster PC start up times, fast file transfers, more responsive applications, and access to bandwidth intensive Internet and cloud based services. Access Anywhere from Any Device - Delivery of pervasive Wireless Networks with the capacity to support many devices to support a flexible and mobile field worker or customer agent. (e. g. iPads, specialized tablets, sensors, equipment controllers). Unified Communications - Use of a consistent set of easy to use tools that provide voice, video, and text between parties both within and outside the company. These tools will relay real-time data in the form of pictures, videos, and telemetry to staff and systems that can process the information and provide informed feedback to the remote staff. Virtual Desktop - The current architecture is not a sustainable service, presents a single point of failure and high risk from internal attacks. Cloud - The business will be limited to existing infrastructure options which lack current-state capabilities, are costly and take a long time to provision relative to hyper scale offerings. Agile project approaches will simply not work.</p> <p>Applications - Employees and customers will be able to use applications with more functionality in a more intuitive manner</p>

Niagara Mohawk Power Corporation
d/b/a National Grid
Case: 17-E-0238 17-G-0239
Attachment 1 to DPS-278 IS-7 NM-741
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Investment Name	Programs	INVP #	Bill Pool	In Service Date	Total US CapEx Spend	IS Project Dependencies
Business Innovation Projects 3	Tech. Modernization	4728	G020	3/31/21	\$4,491,484	<p>Project Dependencies - Several strategic initiatives are dependent on this project in order to progress and succeed including: NY REV, Advanced Analytics, Finance Controls, Gas Enablement, Customer Experience Transformation, Mobility COE, App Rationalization, and Process and Workflow Automation with Robotics. Benefits: Increased bandwidth and resilience - Delivery of software defined Wide Area Network technology will allow IS to deliver high bandwidth business class service. The tangible benefits are faster PC start up times, fast file transfers, more responsive applications, and access to bandwidth intensive Internet and cloud based services. Access Anywhere from Any Device - Delivery of pervasive Wireless Networks with the capacity to support many devices to support a flexible and mobile field worker or customer agent. (e. g. iPads, specialized tablets, sensors, equipment controllers). Unified Communications - Use of a consistent set of easy to use tools that provide voice, video, and text between parties both within and outside the company. These tools will relay real-time data in the form of pictures, videos, and telemetry to staff and systems that can process the information and provide informed feedback to the remote staff. Virtual Desktop - The current architecture is not a sustainable service, presents a single point of failure and high risk from internal attacks. Cloud - The business will be limited to existing infrastructure options which lack current-state capabilities, are costly and take a long time to provision relative to hyper scale offerings. Agile project approaches will simply not work. Applications - Employees and customers will be able to use applications with more functionality in a more intuitive manner through multiple devices. Application upgrades will enable</p>

Date of Request: June 7, 2019
Due Date: June 19, 2017

Request No. DPS-278 IS-7
NMPC Req. No. NM-741

NIAGARA MOHAWK POWER CORPORATION d/b/a NATIONAL GRID
Case No. 17-E-0238 and 17-G-0239 –
Niagara Mohawk Power Corporation d/b/a National Grid – Electric and Gas Rates

Request for Information

FROM: DPS Staff, Andy Timbrook
TO: National Grid, Information Services Panel
SUBJECT: **IS PROJECTS**

Request:

In this interrogatory, all requests for data, workpapers or supporting calculations should be construed as requesting any Word, Excel, or other computer spreadsheet models in original electronic format with all formulae intact.

Provide the following information for each proposed project listed in Exhibit__ (ISP-3): For all program categories, identify each proposed capital project that is partly or fully dependent on implementation of this project. Describe how eliminating or substantially reducing this project will affect the feasibility, costs, benefits, and schedule of each dependent project.

Response:

Please see Attachment 1 for project dependencies for each project listed in Exhibit__ (ISP-3). The effect of eliminating or substantially reducing the projects listed in Exhibit__ (ISP-3) is described below for each program.

Cyber Security

Every project listed on Exhibit__ (ISP-3) to some extent is dependent on the protections provided by the Cyber Security Program. Individual cyber security project investments benefit all business functions, such as electric and gas Operations, Shared Services, Customer, and Finance. Eliminating or substantially reducing these projects will substantially increase the risks of cyberattacks and the Company's ability to monitor, prevent, detect, and react to such events. It would also have ramifications to the safeguarding of customer and Company data, the operation of critical network infrastructure, and many other critical services.

Physical Security

There are no projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Physical Security Program. However, as discussed in the testimony of the IS Panel, the individual physical security projects represent investments in security monitoring, access management, and intrusion detection to prevent malicious damage to critical facilities and threats to public safety.

PSC and Other Mandates

Regulatory mandates generally do not have project dependencies because mandates are not discretionary investments. Rather, projects in this category are required by orders, laws, and agreements promulgated by federal, state, or municipal government agencies.

Gas Business Enablement Program

There are no projects listed in Exhibit_(ISP-3) that are specifically dependent upon the Gas Business Enablement Program (“GBE”). As stated in the testimony of the Gas Infrastructure and Operations Panel, GBE is primarily an asset replacement program. The US Gas Business is facing significant challenges, particularly because most of the information systems currently in use are nearing their end of life, and posing the potential of unacceptable risks to core operations. It is essential that GBE focus on replacing these systems as quickly as possible to mitigate that risk.

Because the implementation of GBE will span a number of years, certain projects included in Exhibit_(ISP-3) are planned to provide stopgap measures to mitigate operational risk due to aging systems. This is not to say that these projects are dependent upon GBE. Rather, the current GBE schedule is dependent upon them. Those systems include: INVP4188, Aging System Stabilize; INVP2577C, ArcFM Software Upgrade; and 4398, Storms/iScheduler Upgrade.

If GBE was eliminated or substantially reduced, the Company would need to re-think the entire IS portfolio to evaluate how to address the risks and required capabilities, including continuous improvement in gas safety performance, effective delivery of operational performance, and customer interaction improvements, that GBE has been designed to address.

Technology Modernization

Each project listed on Exhibit__(ISP-3) to some extent has a dependency on the Technology Modernization investments. Specifically, the Technology Modernization program addresses required investments in the infrastructure and networks that are used to compute, store and transfer data and the business applications used to generate information and complete business processes. System modernization/NY REV and GBE programs would not be feasible or delivered on the proposed schedules or projected costs without these foundational investments. The Company’s aging infrastructure, which includes parts that can no longer be sourced and vendors that can only support this infrastructure on a “best efforts” basis, places existing operations and future initiatives such as system modernization/NY REV and GBE at risk. Aging

applications that are no longer vendor supported create a risk of sustained outages of increasing frequency that affect utility operations.

System Modernization/NY REV

The system modernization/NY REV investments have a dependency on the foundational investments of the Technology Modernization Program and data protections from investments in the Cyber Security Program. If the system modernization/NY REV program investments are curtailed or deferred, the underlying investments in Technology Modernization would still be required to replace aging infrastructure and applications. The Cyber Security 1 and 2 programs would also still need to move forward. However, the system modernization/NY REV specific investments in cyber security would have to be evaluated depending on the elements within the DSIP and AMI that were curtailed or deferred.

FY 18 Investment Plan

The FY 18 investment plan is made up of dozens of individual project investments. The plan is comprised of critical investments, such as the Customer Contact Center project to replace aging telephony and IVR equipment that is no longer manufacturer-supported and with replacement parts that are becoming harder to source. The customer experience improvement initiatives in the plan have a project dependency on the successful completion of the Customer Contact Center project. Other critical investments in this program are the US CNI GMS-SCADA Upgrade and Consolidation, STORMS/I Scheduler Upgrade, Windows 7 Refresh Phase 3 and the US CNI-EMS Lifecycle Hardware and Software Upgrade. These are all critical initiatives for NMPC that have dependencies on technology modernization and cyber security protections.

Name of Respondent:
Daniel J. DeMauro, Jr

Date of Reply:
June 19, 2017

Date of Request: June 14, 2017
Due Date: June 26, 2017

Request No. DPS-329 MP-4
NMPC Req. No. NM-808

NIAGARA MOHAWK POWER CORPORATION d/b/a NATIONAL GRID
Case No. 17-E-0238 and 17-G-0239 –
Niagara Mohawk Power Corporation d/b/a National Grid – Electric and Gas Rates

Request for Information

FROM: DPS Staff, Michael Pasinella
TO: National Grid, Gas Safety Panel
SUBJECT: **INDEPENDENT ASSESSMENT**

Request:

In these interrogatories, all requests for data, workpapers or supporting calculations should be construed as requesting any Word, Excel, or other computer spreadsheet models in original electronic format with all formulae intact.

1. The Panel states on pages 9 and 10 of its Pre-Filed Direct Testimony that “the Company proactively engaged an industry expert specializing in compliance to provide an independent assessment (“IA”) of all processes.” Provide the report that summarizes the IA.
2. Indicate how the IA was paid for and the total cost. Include in your response how the costs were allocated to ratepayers and shareholders.
3. If ratepayer funding was used to pay for the IA, indicate what portion of the total was allocated to NMPC.
4. For each recommendation described in the report, indicate whether or not NMPC will accept and implement the recommendation, and when. If NMPC does not intend to implement any such recommendation, explain why not.
5. Does the IA or any of its recommendations deal with the training, assessment, and evaluation related to operator qualifications (OQ) for utility employees or contractor employees? If so, describe the recommendations and how they will improve the security of the OQ testing process, including both cyber and physical security aspects of that process.
6. Describe how the Northeast Gas Association (NGA) ensures that OQ requirements are met for NMPC’s employees and contractor workforce.

7. Describe the changes to the OQ program that NGA is considering, why the changes are necessary from NMPC's perspective, and whether the changes will increase costs to ratepayers.
8. If costs related to OQ will increase, provide the dollar amount of the increase that is expected in the rate year.
9. How will IA recommendations be weighted and prioritized for implementation?
10. Page 10 of the Panel's Pre-Filed Direct Testimony refers to API RP1173, which deals with pipeline safety management standards. Explain how NMPC coordinates API RP 1173 with contractor management?
11. Will adherence to API RP 1173 improve the ability for contractors to report problems in the field? If so, explain how.
12. Does NMPC view the pipeline safety regulations as minimum requirements for the safe operation of a natural gas system, or the maximum requirements that a local distribution company should adhere to?
13. Explain how NMPC's procedures are reviewed to ensure that they comply with all applicable gas safety regulations. In your response, explain whether any of these procedures exceed the requirements specified in applicable regulations (e.g., a leakage survey that is repeated semi-annually instead of annually as required by the regulations).
14. The Panel describes on page 15 of its Pre-Filed Direct Testimony proposed enhancements to the QA/QC program. Describe the current efforts to allow field employees to report problems to local supervision, and how that information gets socialized across NMPC and up to senior management to produce any needed changes in operating practices or procedures.
15. Describe the process used to communicate changes in practices or procedures from senior management to employees working in the field, including the contractor work force.
16. Describe the process used to communicate issues identified by employees in the field to Department of Public Service (DPS) Staff, including both field Staff and senior DPS management.

Response:

1. Please see Attachment 1 for a copy of the report that summarizes the IA (the "Report") . Please note that Attachment 1 contains confidential information. Because of the nature of the confidential information and how it is included throughout the documents comprising Attachment 1, redaction is impractical. Therefore, Attachment 1 is being provided only in confidential form (a redacted version will not be separately provided). As discussed at the recent procedural conference, the Company anticipates that a protective order

governing the handling of confidential material will be issued by the Administrative Law Judges shortly. Please protect the information from public disclosure.

2. The total cost of the IA from inception through April 2017 was \$669,793. The costs were charged to work order XG210016645 as part of the Gas Business Enablement (“GBE”) Program and allocated across all of National Grid’s local gas distribution companies in New York State.
3. The total cost of the IA in the Historic Test Year (calendar year 2016) was \$532,019, of which \$61,319 was allocated to Niagara Mohawk. The IA costs were normalized from the Historic Test Year and not included in the Rate Year forecast. See Exhibit ___ (RRP-11), Workpaper to Exhibit ___ (RRP-3), Schedule 1, Workpaper 2.
4. The Report provides recommendations intended to enhance the Company’s existing Process Safety Management System (“PSMS”), in accordance with API RP 1173. Niagara Mohawk is currently developing a plan and timeline for implementing enhancements to the PSMS, based upon the recommendations in the Report. In addition, the GBE Program will address a majority of the recommendations, as discussed in the testimony of the Gas Infrastructure and Operations Panel.
5. Part Two of the Report (“Addressing Regulatory Compliance Concerns”) addresses the competency and management of contractors (Finding 37), training delivery (Findings 53, 54 and 56), and coordination with the NGA (Finding 55). The findings and accompanying recommendations are as follows:

Finding	Recommendation
<p>(37) <u>Improve Competency and Management of Contractors</u> -- Regulators have identified issues with contractor evaluations, security of tests, individual documentation, management of qualification duties, maintenance of competencies, updating qualifications as procedures change, reevaluation timeframes, and task specific abnormal operating conditions (AOC’s).</p>	<p>(58) Communicate hazard assessment requirements and conduct contractor orientations. Integrate prequalification safety reviews, pre-job reviews of site specific requirements, contractor safety plans, oversight inspections during jobs, and post job evaluations. Use standard metrics to evaluate how well performance supports a path to zero quality or safety incidents.</p> <p>(59) Define and control all stages of managing contractors and establish safety plans that define roles and expectations.</p> <p>(60) Establish a policy that details the steps of the contractor management process and implement a sustainable system.</p>

<p>(53) <u>Evaluate the Blend of Training Delivery</u> -- State audit findings of failure to follow procedures, and our observations that not all employees review procedures indicate the need to evaluate how training on procedures is conducted.</p> <p>(54) <u>Define the Blend of Training – Learning and Development (“L&D”)</u> training does not include specific procedures. Although procedure training is part of on the job training, it can be more consistent.</p> <p>(56) <u>Key Factors in Training Improvement</u> -- Consider: Workforce demographic and how it will change, the best course materials for various audiences, new options for training delivery, intervals for refresher training, short and long term training effectiveness, and training for Supervisors.</p>	<p>(90) Reevaluate and adjust the 70-20-10 (classroom-hands-on-on the job) training blend.</p> <p>(91) Hands on training should be on the equipment that employees and contractors will be using.</p> <p>(92) Conduct procedure specific training at L&D Centers.</p> <p>(93) Provide on the job training on specific equipment used.</p> <p>(94) Tie understanding of individual tasks to the entire job.</p> <p>(96) Continue to develop training that addresses specific federal, state and local requirements as well as requirements to operate and maintain gas operations equipment safely and efficiently.</p>
<p>(55) <u>Ensure There Are No Gaps Between the NGA Task Execution and Company Procedures</u> -- It is important that training include specific requirements in Company procedures, work methods and specifications.</p>	<p>(95) Ensure training content addresses Company specific procedure requirements. Enhance the NGA training to include examples of completed documentation.</p>

With regard to improving the security of the operator qualifications (“OQ”) testing process, Niagara Mohawk had begun to address this issue before the Report was completed. Moreover, the Report focuses primarily on the effectiveness of the Company’s training (as opposed to the testing procedures). In the short term, the Company has undertaken efforts to improve the integrity of the testing environment with enhanced classroom security. For example, room seating has been reconfigured so students are facing out with proctors behind them, and there are now at least two proctors, one serving solely as an observer. Proctors now enter a proctor code to activate e-tests. For the long term, Niagara Mohawk is planning to migrate testing to a third party vendor testing site, which uses certified proctors and physical, operational, and software security to protect test delivery.

6. The NGA currently proctors qualification examinations for Niagara Mohawk's contractors. The NGA does not have a role in the OQ process for Niagara Mohawk employees.
7. The Company understands that NGA is considering migrating to a third-party testing model to increase security around OQ testing. Because the Company does not utilize NGA to conduct testing, this change would not have a direct impact on the Company's testing costs. In the meantime, to support the NGA and to ensure timely contractor OQ testing, National Grid's New York local gas distribution companies, including Niagara Mohawk, have set up testing sites at their facilities in Melville, Millbury, Syracuse, Schenectady, and Springfield. Each site, which can hold two sessions each day (a maximum of 30 contractors per day) for six days each week, will meet the NGA revised testing standards and protocols, and every session has one National Grid proctor and one NGA proctor.
8. Niagara Mohawk is planning to migrate testing to third-party testing sites to provide more security. The Company is evaluating service and cost information provided in early June. A more specific proposal, including costs, will be included in the Company's Corrections & Updates filing on July 10, 2017.
9. The Company continues to evaluate the recommendations and will determine which recommendations should be implemented as part of the PSMS and GBE Program. The Company intends to prioritize measures that affect safety and reliability. The Company will consider changes that can be put in place in a quick, efficient, and cost effective manner.
10. API RP 1173 includes recommendations associated with the use of contractors, including but not limited to:
 - communicating applicable requirements of the PSMS in use;
 - defining responsibility, accountability, and authority for managing contractors;
 - incorporating lessons learned into contractor operations;
 - training and orientation on safety policies, as applicable;
 - evaluating safety performance;
 - communicating risks at the work site; and
 - communicating the Management of Change Procedure.

Niagara Mohawk has processes in place that follow, in whole or in parts, all of the above recommendations. However, the Company will continue to evaluate opportunities to improve upon its existing processes by more fully implementing API RP 1173 to drive continuous improvement in contractor safety performance.

11. Yes. Implementation of the recommendations for use of contractors found in API RP 1173 should result in better two-way communication. As such, contractors will have the ability to share concerns during any of API RP 1173's defined communication points. For example, problems reported by contractors can be captured and used to make improvements in pipeline safety through sharing of lessons learned.

12. Niagara Mohawk’s commitment to implement a comprehensive PSMS using API RP 1173 as a foundational document demonstrates the Company’s commitment to continuously improve overall safety performance. Pipeline safety regulations are viewed as minimum requirements for the safe operation of a natural gas system.

13. Niagara Mohawk Policy and Gas Work Method documents, which include Company procedures, are reviewed on one and three year review cycles, respectively. Compliance with gas safety regulations and current operating practices are reviewed and updated as necessary. If a regulatory requirement or operating process is changed mid-cycle, updates to procedures are initiated sooner. Procedure updates, once identified and initiated, are thoroughly reviewed by all stakeholders prior to implementation.

Many Company procedures exceed regulatory requirements. For example, the CNST02001 Leakage Survey Policy exceeds minimum requirements. While state and federal regulations do not require a winter leak patrol, Policy CNST02001 states that a leak survey using mobile leak detection equipment should be conducted during company defined frost periods for company designated segments of the distribution system, and can be adjusted by regional historical data for individual groups.

14. Field employees may report problems to Compliance Analysts who relay information to local supervision. Company “Performance Hubs” located in each operational area are also available to collect information as well as to socialize information across the Company by Directors or Managers who cascade the information to Supervisors who facilitate local hub meetings. Performance Hubs are intended to keep employees aware of and focused on key performance indicators for public and employee safety, compliance, customer satisfaction, and productivity, as well as to provide a forum for those closest to daily field activities to raise obstacles to performing their job and serving customers. Concerns raised by field employees in Performance Hubs are documented for purposes of tracking and resolution and to share among the entire enterprise. If an issue cannot be resolved at the local level, it is escalated to function/process owners for more extensive review and problem solving. As noted in the Report, the Performance Hub process moves internal field employees concerns on local issues up through management and gathers a response in the identification and assessment of risk. As recommended in the Report (recommendations 10, 11, 38, 41), the Company plans to expand the use of Performance Hubs to all levels: team, manager, director, and executive. Lastly, procedures and policies are accessible *via* the Company’s infonet internal website. The website allows employees to contact the Work Management Team to address specific concerns or report problems related to Policies, Work Methods, and/or Procedures. Concerns are evaluated and, if a revision is deemed to be needed, the revision is handled by the pertinent Work Management Representative. Once completed, revised Policies, Work Methods, or Procedures are communicated back to all stakeholders.

15. The process used to communicate changes in practices or procedures to employees in the field includes:

- Monthly updates via email and conference calls

- Bulletins sent out on an as needed basis
- Monthly field reports
- In person barn/yard meetings

16. Company Compliance Analysts (i) communicate issues identified by field personnel to Staff, (ii) relay issues, questions, and information requests from Staff to field personnel, and (iii) address field and record audit information requests. Company personnel at various levels (Compliance Analyst, Manager, Director, and Executive) communicate with DPS management as appropriate.

Name of Respondent:
Daniel McNamara

Date of Reply:
June 26, 2017

Corrected GIOP-12 Page 2

Niagara Mohawk Power Corporation d/b/a National Grid
Gas Business Enablement
Customer Benefits - Forecasted for Niagara Mohawk Power Corporation
For Rate Year Ending March 31, 2019 and Data Years Ending March 31, 2020 and 2021

<u>Line</u>	<u>Benefit Description</u>	<u>Benefit Type</u>	<u>12-Months Ending March 31, 2019</u>	<u>12-Months Ending March 31, 2020</u>	<u>12-Months Ending March 31, 2021</u>
1	Clerical / Back Office Productivity Improvement	Type I	\$0	\$1,706	\$105,767
2	Damage Prevention - Reduced Travel Mileage	Type I	\$0	\$4,627	\$6,169
3	M&C Productivity Improvements - Base	Type I	\$0	\$124,375	\$883,064
4	Reduction / Redirection in Opex via AIPM	Type I	\$0	\$0	\$2,279
5	Reduction in Damages due to Data Quality Errors	Type I	\$6,937	\$27,748	\$27,748
6			<u>\$6,937</u>	<u>\$158,456</u>	<u>\$1,025,028</u>
7					
	All Type I Benefits Included in Revenue Requirement,				
8	Exhibit ____ (RRP-3), Schedule 27		<u>\$6,937</u>	<u>\$158,456</u>	<u>\$1,025,028</u>
9					
10	*Revised Clerical / Back Office Productivity Improvement	Type I	\$0	\$2,957	\$183,329
11					
12	*In Exhibit __ (GIOP-12), Page 2, Narragansett benefit estimate was used in error. Above is the corrected NMPC benefit.				

Benefits - Detailed

Work Stream	Initiative	Operating Company	Value Lever	Value Lever Detail	Benefit Lookup Field	Benefit Type	Capital / O&M	%	Work Type	Total Benefits	O&M Benefits	Benefit Start Month	Month Index	Benefit Ramp Months	On/Off	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	Row
Work Management	Work Management & Field Enablement	NiagaraMohawk Gas	Increase Clerk / Backoffice Productivity	Clerical / Back Office Productivity Improvement	NiagaraMohawk GasClerical / Back Office Productivity Improvement	Type 1	O&M	68%	Clerk	\$313,086	\$212,899	4/1/20	39	6 month	TRUE	\$0	\$0	\$0	\$2,957	\$183,329	\$212,899	\$212,899	\$212,899	\$212,899	\$212,899	\$159,674	2
Work Management	Work Management & Field Enablement	NiagaraMohawk Gas	Reduced Fleet Costs	Damage Prevention - Reduced Travel Mileage	NiagaraMohawk GasDamage Prevention - Reduced Travel Mileage	Type 1	O&M	81%	Damage Prevention	\$7,617	\$6,169	7/1/19	30	3 month	TRUE	\$0	\$0	\$0	\$4,627	\$6,169	\$6,169	\$6,169	\$6,169	\$6,169	\$6,169	\$4,627	3
Work Management	Work Management & Field Enablement	NiagaraMohawk Gas	Field Productivity	M&C Productivity Improvements - Base	NiagaraMohawk GasM&C Productivity Improvements - Base	Type 1	O&M	55%	Maintenance and Construction	\$1,628,185	\$895,502	1/1/20	36	6 month	TRUE	\$0	\$0	\$0	\$124,375	\$883,064	\$895,502	\$895,502	\$895,502	\$895,502	\$895,502	\$671,626	4
Asset Management	Asset - Advanced Analytics	NiagaraMohawk Gas	OpEx Requirement Reduction/Redirection	Reduction / Redirection in Opex via AIPM	NiagaraMohawk GasReduction / Redirection in Opex via AIPM	Type 1	O&M	100%	M&C - All Opex Jobs	\$328,242	\$328,242	4/1/21	51	12 month	TRUE	\$0	\$0	\$0	\$0	\$2,279	\$202,872	\$328,242	\$328,242	\$328,242	\$328,242	\$246,181	5
Asset Management	Engineering, Design, Estimating & Mobility	NiagaraMohawk Gas	Reduced Damages	Reduction in Damages due to Data Quality Errors	NiagaraMohawk GasReduction in Damages due to Data Quality Errors	Type 1	O&M	55%	M&C Construction Jobs	\$50,451	\$27,748	1/1/19	24	3 month	TRUE	\$0	\$0	\$6,937	\$27,748	\$27,748	\$27,748	\$27,748	\$27,748	\$27,748	\$27,748	\$20,811	6

Note
Month Index is measured as the number of months from GBE Program start-up and corresponds to the Benefits Start Month

Asset Analytics OpEx

Reduction / Redirection in Opex

	FY2017 Controllable O&M ¹	% of Total Opex	% Reduction	Benefits
Boston Gas	\$ 76,358,000	32%	0.82%	\$ 628,814
Colonial Gas	\$ 10,443,000	4%	0.82%	\$ 85,999
Brooklyn Union Gas (KEDNY)	\$ 74,664,000	31%	0.82%	\$ 614,864
Keyspan Gas East (KEDLI)	\$ 25,587,000	11%	0.82%	\$ 210,711
NiagaraMohawk Gas	\$ 39,859,000	17%	0.82%	\$ 328,242
Narragansett Gas	\$ 13,524,000	6%	0.82%	\$ 111,371
Total	\$ 240,435,000			\$ 1,980,000

Assumptions / Sources / Notes

1 Source: US Gas OpEx Review 201609 September (06+06) with Forecast

Data Management Damage

Improved Data Quality - Record Error Damages - M&C Complex Engineering Jobs ¹

Op Co	Category	2013		2014		2015		3 yr Average	% Reduction to Median ³	% Reduction Estimated for NG	Potential Savings
		# of Errors	Cost	# of Errors	Cost	# of Errors	Cost				
UNY	Mismark - Record Errors	4	\$ 14,354	38	\$ 89,690	41	\$ 241,907	\$ 115,317	88%	44%	\$ 50,451
UNY	Mismark - Locator Errors (Internal)		\$ -		\$ -		\$ -	\$ -	40%	20%	\$ -
NYC	Mismark - Record Errors	46	\$ 25,698	54	\$ 20,492	60	\$ 20,181	\$ 22,124	88%	44%	\$ 9,679
NYC	Mismark - Locator Errors (Internal)	3	\$ 700		\$ -		\$ -	\$ 233	40%	20%	\$ 47
LI	Mismark - Record Errors	52	\$ 84,517	63	\$ 514,509	70	\$ 169,928	\$ 256,318	88%	44%	\$ 112,139
LI	Mismark - Locator Errors (Internal)	4	\$ 5,339	6	\$ 15,866		\$ -	\$ 7,069	40%	20%	\$ 1,422
MA	Mismark - Record Errors	139	\$ 465,112	139	\$ 379,541	123	\$ 300,815	\$ 381,823	88%	44%	\$ 167,048
MA	Mismark - Locator Errors (Internal)	3	\$ 3,408	2	\$ 577		\$ -	\$ 1,328	40%	20%	\$ 267
RI	Mismark - Record Errors	23	\$ 376,726.87	29	\$ 475,003.44	45	\$ 737,074	\$ 529,602	88%	44%	\$ 231,701
RI	Mismark - Locator Errors (Internal)	1	\$ 1,884.92	2	\$ 3,769.84	1	\$ 1,885	\$ 2,513	40%	20%	\$ 506
Total	Total Mismark - Record Errors	264	\$ 966,409	323	\$ 1,479,236	339	\$ 1,469,905	\$ 1,305,183	88%	44%	\$ 571,018
Total	Total Mismark - Locator Errors	11	\$ 11,332	10	\$ 20,213	1	\$ 1,885	\$ 11,143	40%	20%	\$ 2,241
TOTAL								\$ 1,316,327			\$ 573,259

RI	Average Cost of Mismark - Record Errors	\$ 16,379
RI	Average Cost of Mismark - Locator Errors (Internal)	\$ 1,885

Damage Benchmarking ²	National Grid Gas Performance - # of Damages 2015	Quartile Ranking per AGA Gas Peers	Median per AGA Gas Peers	Range per AGA Gas Peers	Reduction in # of Damages Needed to Move to the Median ³
Number of Damages due to Locate Errors – Mains	11	2nd	13	3 to 197	0%
Number of Damages due to Locate Errors – Services	76	3rd	39	17 to 380	49%
Number of Damages due to Record Errors – Mains	43	4th	9	0 to 71	79%
Number of Damages due to Record Errors – Services	293	4th	33	0 to 354	89%
Total Number of Damages due to Record Errors	336		42		88%
Total Number of Damages due to Locate Errors	87		52		40%

Benefit by Operating Company

Boston Gas *	\$ 137,198
Colonial Gas *	\$ 30,117
Brooklyn Union Gas (KEDNY)	\$ 9,726
Keyspan Gas East (KEDLI)	\$ 113,561
NiagaraMohawk Gas	\$ 50,451
Narragansett Gas	\$ 232,206
Total	\$ 573,259

Assumptions / Sources / Notes

1 Source: Report of damages provided by Matthew Murlin (Sr. Analyst, Misc & Special Billing), Robert Tejeson (Manager Damage Prevent LI), and Steven Bennett (Manager Damage Prevention NE Gas)

2 Benchmarking of damages performed by Accenture using 2015 AGA data

3 Possible reduction in damages is estimated to move National Grid Gas to the median of its peer set per 2015 AGA data; agreed / confirmed by Nick Raad

4 Boston Gas and Colonial Gas benefits split based on the general allocator %s (Boston Gas - 82%, Colonial Gas - 18%)

Clerical Productivity

Improved Clerical / Back Office Productivity - All M&C and CMS Jobs

Operating Company	# of Clerks / Work Support ¹	# of Annual Workdays per Clerk	Total # of Workdays	Total \$	Productivity Improvement as a Result of New Platforms & Mobile Devices ²	Clerical Hourly Rate ³	Productivity Benefits
Boston Gas Company	69	240	16,560	\$ 3,323,529	25%	\$ 25.09	\$ 830,882
Colonial Gas Company	17	240	4,080	\$ 818,840	25%	\$ 25.09	\$ 204,710
Brooklyn Union Gas-KEDNY	28	240	6,720	\$ 1,348,678	25%	\$ 25.09	\$ 337,170
KS Gas East Corp-KEDLI	22	240	5,280	\$ 1,059,676	25%	\$ 25.09	\$ 264,919
Narragansett Electric Co	15	240	3,600	\$ 722,506	25%	\$ 25.09	\$ 180,627
Niagara Mohawk Power Corp	26	240	6,240	\$ 1,252,344	25%	\$ 25.09	\$ 313,086
Total	177		42,480	\$ 8,525,574			\$ 2,131,393

Benefit by Operating Company

Boston Gas	\$ 830,882
Colonial Gas	\$ 204,710
Brooklyn Union Gas (KEDNY)	\$ 337,170
Keyspan Gas East (KEDLI)	\$ 264,919
NiagaraMohawk Gas	\$ 313,086
Narragansett Gas	\$ 180,627
Total	\$ 2,131,393

Assumptions / Sources / Notes

1 # of Clerks derived from HRIS extract provided by J'Wynn DeRamos; resources with Clerk or "CLK" in their titles in M&C, CMS, and Ops Support / Work Support were counted in this analysis

2 Estimate of % productivity improvement as result of new platforms and mobile devices provided by Danielle Morrissey and Mark Scaparotti

3 Clerk rate provided by NG Finance; hourly rate assumes an average for that category of employee if there were multiple titles / levels (e.g., Clerk, CMS Clerk, etc.)

Damage Prevention Travel

Reduced Drive Time and Reduced Mileage - M&C Damage Prevention Jobs

Opex	Category	Units (Mains = Miles, Services = Units) ¹	Travel Time					Mileage					Fleet Benefits			
			Travel Mins Per Job ²	Total Travel Mins	Cost Basis	Travel Time Reduction ³	Total Time Saved in Mins	Field Worker Hourly Rate ⁴	Travel Time Benefits	Miles Per Job ²	Assumed Miles Driven	Cost Basis		Mileage Reduction ³	Miles Reduced	Cost Per Mile ⁵
Boston Gas	Damage Prevention	130,880	14	1,832,320	\$ 1,066,716	2.5%	45,808	\$ 34.93	\$ 26,668	4.17	546,410	\$ 377,023	2.5%	13,660	\$ 0.69	\$ 9,426
Colonial Gas	Damage Prevention	47,609	14	666,526	\$ 388,029	2.5%	16,663	\$ 34.93	\$ 9,701	4.17	198,763	\$ 137,146	2.5%	4,969	\$ 0.69	\$ 3,429
KEDNY	Damage Prevention	190,066	11	2,090,726	\$ 1,217,151	2.5%	52,268	\$ 34.93	\$ 30,429	4.17	793,505	\$ 547,519	2.5%	19,838	\$ 0.69	\$ 13,688
KEDLI	Damage Prevention	154,225	10	1,542,250	\$ 897,847	2.5%	38,556	\$ 34.93	\$ 22,446	4.17	643,873	\$ 444,272	2.5%	16,097	\$ 0.69	\$ 11,107
Niagara Mohawk	Damage Prevention	105,761	13	1,374,893	\$ 800,417	2.5%	34,372	\$ 34.93	\$ 20,010	4.17	441,541	\$ 304,663	2.5%	11,039	\$ 0.69	\$ 7,617
RI	Damage Prevention	61,581	12	738,972	\$ 430,205	2.5%	18,474	\$ 34.93	\$ 10,755	4.17	257,094	\$ 177,395	2.5%	6,427	\$ 0.69	\$ 4,435
TOTAL BENEFITS		690,122		8,245,687	\$ 4,800,364		206,142		\$ 120,009		2,881,186	\$ 1,988,018		72,030		\$ 49,700

Assumptions / Sources / Notes

1 Source: US Gas OpEx Review 201609 September (06+06) with Forecast

2 Travel time and miles per job for damage prevention is assumed to be similar to CMS planned work by OpCo; travel time and miles per job is not tracked for M&C

3 Damage prevention % reduction is assumed to be similar to the % reduction for CMS planned work which was calculated using OptimoRoute software; assumption based on the fact that damage prevention resources can be pulled for emergent work

4 Tech rate provided by NG Finance; hourly rate assumes an average for that category of employee if there were multiple titles / levels (e.g., Field Tech, Mechanic, etc.)

5 Fleet cost for mile provided by Joseph Nicoletti, Supply Chain / Fleet; cost includes fuel, parts, and external maintenance only

M&C Productivity Improve

Field Productivity Improvement via Improved Platforms - All M&C Work Types

	Improvement in Productivity						
	Straight Hours ^{1,5}	OT Hours ⁵	Total Hours	% of OT	Improvement Rate ²	Hours of Improvement	Benefit
Boston Gas	1,116,603	401,446	1,518,048	26%	3.00%	33,498	\$ 1,755,132
Colonial Gas	177,186	53,456	230,641	23%	3.00%	5,316	\$ 278,509
KEDNY *	1,231,360	320,889	1,552,249	21%	3.00%	36,941	\$ 1,935,513
KEDLI *	765,440	180,086	945,526	19%	3.00%	22,963	\$ 1,203,157
Niagara Mohawk *	1,035,840	85,349	1,121,189	8%	3.00%	31,075	\$ 1,628,185
RI	366,822	133,904	500,726	27%	3.00%	11,005	\$ 576,589
Totals	4,693,250	1,175,129	5,868,379	20%	3.00%	140,798	\$ 7,377,085

	Hourly Rate ³	Hours per year	Annual Rate
Annual Rate	\$ 34.93	2080	\$ 72,654
OT Rate	\$ 52.40	2080	\$ 108,982

Field Techs ⁴

Boston Gas Company	698
Colonial Gas Company	108
Brooklyn Union Gas-KEDNY	592
KS Gas East Corp-KEDLI	368
Niagara Mohawk Power Corp	498
Narragansett Electric Co	206
Grand Total	1876

Assumptions / Sources / Notes

1 For KEDNY, KEDLI, and Niagara Mohawk, calculated straight hours = # of field techs * 2080 hours per year

2 3% improvement rate = 15 minutes per day (480 minutes * 3%); % used is estimated based on time spent performing data capture with a crew size of 3 (5 minutes per person)

3 Tech rate provided by NG Finance; hourly rate assumes an average for that category of employee if there were multiple titles / levels (e.g., Field Tech, Mechanic, etc.)

4 # of Field Techs derived from HRIS extract provided by J'Wynn DeRamos; Field Techs in this benefit stream include I&R, Corrosion, and M&C Techs, Inspectors and Damage Prevention excluded

5 Source for Hours: NY - Yuan Zhou (Finance Business Partners- NY Budgeting & Forecasting) & Phillip Jeffrey; MA & RI - James Loschiavo (Financial Planning & Partnering)

Date of Request: June 28, 2017
Due Date: July 10, 2017

Request No. DPS-430 AT-3
NMPC Req. No. NM-1003

NIAGARA MOHAWK POWER CORPORATION d/b/a NATIONAL GRID
Case No. 17-E-0238 and 17-G-0239 –
Niagara Mohawk Power Corporation d/b/a National Grid – Electric and Gas Rates

Request for Information

FROM: DPS Staff, Andy Timbrook
TO: National Grid, Gas Infrastructure and Operations Panel
SUBJECT: **GAS BUSINESS ENABLEMENT (GBE) SAVINGS**

Request:

In this interrogatory, all requests for data, workpapers or supporting calculations should be construed as requesting any Word, Excel or other computer spreadsheet models in original electronic format with all formulae intact.

1. In Exhibit__(GIOP-12), Schedule 1 page 2, the Company estimates the customer benefits resulting from GBE. For all Type 1 benefits listed, provide the following:
 - a. The calculation of the projected benefit, by rate year and data year;
 - b. All assumptions and inputs used when estimating the benefit; and
 - c. An explanation of the benefit's timing.
2. List any customer benefit(s) from GBE that the Company was unable to quantify in Exhibit__(GIOP-12), but expects to realize with program rollout.

Response:

1. Please see Attachment 1 and the discussion below for the calculation, assumptions, and timing of each of the Type 1 benefits in Exhibit __ (GIOP-12), page 2.

Asset – Advanced Analytics - Reduction / Redirection in OPEX via AIPM

Delivery of an integrated Asset Investment Planning and Management tool with advanced analytics capabilities is intended to improve National Grid's ability to incorporate asset health and performance factors into its investment plan. For

purposes of calculating Type I benefits, National Grid assumed that improved investment planning will result in a reduction in controllable opex spend through increased efficiencies in delivering capital investments and more informed repair vs. replace decisions. The calculation of the full benefit (“Total Annual Benefit”) once the enabling solutions are fully embedded, as reflected in the “Asset Analytics OpEx” tab of Attachment 1, was based on an estimated percentage reduction in the annual controllable OPEX spend (utilizing the total gas O&M spend for Niagara Mohawk in FY2017). The estimated percentage reduction was based on the expertise of internal gas business and GBE team subject matter experts, as well as on the expert judgment and expertise of National Grid’s external partners.

Benefits for Niagara Mohawk phase-in beginning FY21 and Total Annual Benefits will not be realized for a full year until FY23, as reflected in the “Benefits – Detailed” tab of Attachment 1 and Exhibit __ (GIOP-12), page 2. The timing of the benefits is based on the current planned implementation schedule for the enabling asset management, data, financial integration, GIS and mobile GBE solutions, and functionality planned for Niagara Mohawk. In addition, the timing of the realization of full benefits is due to “new” history that must be created to collect and analyze data under the new systems to enable better decision making.

Engineering Design, Estimating and Mobility / Reduction in Damages due to Data Quality Errors

National Grid collects and retains information on the number of damages due to data quality errors. Each of these damages requires a repair of some sort to be made by National Grid personnel. Calculation of the estimated benefit was performed by using the actual number of mismarks due to records and locate errors from CY13-15 and comparing that to American Gas Association (“AGA”) 3-year average published in 2015 for similar size companies. The benefits assume National Grid will move closer to the AGA average of number of mismarks by 50%. The target level of improvement would place the Company’s gas business at the median of its peer set within the AGA information. The 3-year average Niagara Mohawk cost was then applied to the number of reduced damages. The calculation of the full benefit (“Total Annual Benefit”) once the enabling solutions are fully embedded is reflected in the “Data Management Damage” tab of Attachment 1. A capital/operating expense split is applied at 45/55% based on historical cost splits to arrive at the total annual Type I operating savings once benefits are fully embedded (reflected in the “O&M Benefits” column of tab “Benefits – Detailed” tab of Attachment 1).

Benefits for Niagara Mohawk phase-in beginning FY19 and Total Annual Benefits will not be realized for a full year until FY20, as reflected in the “Benefits – Detailed” tab of Attachment 1 and Exhibit __ (GIOP-12), page 2. The timing of the benefit was based on the current planned implementation schedule

for the enabling asset management, GIS, data and system integration GBE solutions, and functionality planned for Niagara Mohawk.

Work Management and Field Enablement / Clerical/Back Office Productivity Improvement

Because few of the systems currently used by National Grid are integrated, even data captured electronically needs to be entered manually into multiple systems. This manual effort will be greatly reduced with implementation of the new platforms. Calculation of the estimated benefit once fully embedded (“Total Annual Benefit”) was performed by using an estimated productivity increase of two hours saving per day associated with implementation of the new platforms and applying the productivity increase to Niagara Mohawk’s total annual costs for clerks (determined by multiplying the total annual hours of Niagara Mohawk clerks by the average daily rate for the clerical/back office job classifications). The calculation is detailed in tab “Clerical Productivity” of Attachment 1. A capital/operating expense split is applied at 32/68% based on historical cost splits to arrive at the total annual Type I operating savings once benefits are fully embedded (reflected in the “O&M Benefits” column of tab “Benefits – Detailed” tab of Attachment 1). The estimated productivity increase of two hours of savings per day was determined by subject matter experts within the Company’s gas business, members of the GBE project team, and external consulting partners.

Benefits for Niagara Mohawk phase-in beginning FY20 and Total Annual Benefits will not be realized for a full year until FY22, as reflected in the “Benefits – Detailed” tab of Attachment 1. The timing of the benefit was based on the current planned implementation schedule for the enabling GBE work management and system integration solutions and functionality planned for Niagara Mohawk that allow field data to be transferred to customer, work management, and payroll systems among others.

Please note that in the course of preparing this response, the Company realized that it inadvertently utilized the “Total Annual Benefits” calculated for the gas segment of the Narragansett Electric Company in the Type I benefits reflected in Exhibit __ (GIOP-12), page 2. In the tab, “Corrected GIOP-12 Page 2,” tab of Attachment 1, the Company includes the appropriate allocation for Niagara Mohawk for this Type I benefit. Because the error was only recently discovered, this correction is not reflected in the Company’s July 10, 2017 Corrections and Updates filing.

Work Management and Field Enablement / Damage Prevention – Reduced Travel Mileage

The actual routes driven by technicians for Niagara Mohawk were sampled. These same routes were then analyzed by routing optimization software to obtain an optimized travel plan for technicians to follow. A mileage reduction percentage was determined based on the difference between the routes actually driven by the technicians and the routes identified by the routing optimization software. Calculation of the estimated benefit when fully embedded (“Total Annual Benefit”) was performed by applying the mileage reduction percentage to the average number of miles driven between jobs for Niagara Mohawk damage prevention workers. The calculation is detailed in tab “Damage Prevention Travel” of Attachment 1. A capital/operating expense split of 19/81% (based on historical cost splits) was used to arrive at the total annual Type I operating savings once benefits are fully embedded (reflected in the “O&M Benefits” column of tab “Benefits – Detailed” tab of Attachment 1).

Benefits for Niagara Mohawk phase-in beginning FY20 and Total Annual Benefits will not be realized for a full year until FY21, as reflected in the “Benefits – Detailed” tab of Attachment 1 and Exhibit __ (GIOP-12), page 2. The timing of the benefit was based on the current planned implementation schedule for the enabling GBE work management, field mobility, and dispatch, solutions and functionality planned for Niagara Mohawk.

Work Management and Field Enablement / M&C Productivity Improvements – Base

Current data capture in the field is inefficient due to the use of paper forms and outdated field devices. Implementation of the new platforms will enable field technicians to capture field information more efficiently by taking advantage of current technology. Also, integration of systems will allow technicians to find relevant job information in an expedited fashion rather than searching individually in multiple systems to find the information. To calculate the benefit, the Company assumed that the use of new technology will reduce the time required to enter data on paper forms and outdated field devices. The calculation of the full benefits applies a 3% improvement to total hours worked by field technicians to arrive at the hours reduction in overtime. Applying the hours reduction in overtime at the hourly overtime rate results in the “Total Annual Benefit” shown in the “M&C Productivity Improve” tab in Attachment 1. A capital/operating expense split is applied at 45/55% based on historical cost splits to arrive at the total annual Type I operating savings once benefits are fully embedded (reflected in the “O&M Benefits” column of tab “Benefits – Detailed” tab of Attachment 1). The estimated 3% improvement was based on the expertise of internal gas business and GBE team subject matter experts, as well as on the expert judgment and expertise of our external partners.

Benefits for Niagara Mohawk phase-in beginning FY20, as reflected in the “Benefits – Detailed” tab of Attachment 1 and Exhibit __ (GIOP-12), page 2 with

Total Annual Benefits not realized for a full year until FY22. The timing of the benefit was based on the current planned implementation schedule for the enabling GBE work management, data, financial integration, GIS and mobile solutions GBE initiatives, and functionality planned for Niagara Mohawk. In addition, the timing in the realization of full benefits reflects the time field supervisors, dispatchers, technicians, and crews, as well as clerks will need to become fully trained and proficient in the new software, processes, and systems.

2. There are many benefits of the GBE program that cannot be quantified. First and foremost, GBE addresses the significant and increasing risk of using aging and unsupported information systems to support the gas business.

These benefits are described in the Pre-Filed Testimony of the GIOP Panel, most prominently pp. 87 – 92, 94, and 102 – 103 and Exhibit __ (GIOP-9). Some examples of specific customer and operational benefits are noted below.

- Interactions between Company personnel and customers will change dramatically. Integrated systems will contain information not only about work being performed at a customer's premise, but about work being performed in the customer's neighborhood. With GBE, customer representatives will be able to view work (rather than calling field supervision for an explanation), and can explain the circumstances to the customer.
 - With GBE, customers will have expanded opportunities to schedule appointments with the Company for service. In addition, contact with the customer as the appointment approaches will significantly reduce missed and rescheduled appointments.
 - Records will be kept in GBE systems that will show the work that needs to be done at a customer's premise, and work can be combined in a single visit, thus reducing inconvenience to customers.
 - Customers will be able to communicate with the Company through multiple channels, such as online, land telephone, mobile telephone, and text.
 - When considering conversion to gas, customers will be able to take advantage of online estimating tools to assist them in reaching a decision.
- Customers and field workers will be able to attach photographs and documents to communications vs. paper copies, mail, or in-person visits.

Name of Respondent:
Johnny Johnston

Date of Reply:
July 10, 2017

Corrected GIOP-12 Page 2

Niagara Mohawk Power Corporation d/b/a National Grid
 Gas Business Enablement
 Customer Benefits - Forecasted for Niagara Mohawk Power Corporation
 For Rate Year Ending March 31, 2019 and Data Years Ending March 31, 2020 and 2021

<u>Line</u>	<u>Benefit Description</u>	<u>Benefit Type</u>	12-Months Ending March 31, 2019	12-Months Ending March 31, 2020	12-Months Ending March 31, 2021
1	Clerical / Back Office Productivity Improvement	Type I	\$0	\$1,706	\$105,767
2	Damage Prevention - Reduced Travel Mileage	Type I	\$0	\$4,627	\$6,169
3	M&C Productivity Improvements - Base	Type I	\$0	\$124,375	\$883,064
4	Reduction / Redirection in Opex via AIPM	Type I	\$0	\$0	\$2,279
5	Reduction in Damages due to Data Quality Errors	Type I	\$6,937	\$27,748	\$27,748
6			<u>\$6,937</u>	<u>\$158,456</u>	<u>\$1,025,028</u>
7					
8	All Type I Benefits Included in Revenue Requirement, Exhibit ___ (RRP-3), Schedule 27		<u>\$6,937</u>	<u>\$158,456</u>	<u>\$1,025,028</u>
9					
10	*Revised Clerical / Back Office Productivity Improvement	Type I	\$0	\$2,957	\$183,329
11					
12	*In Exhibit ___ (GIOP-12), Page 2, Narragansett benefit estimate was used in error. Above is the corrected NMPC benefit.				

Asset Analytics OpEx

Reduction / Redirection in Opex

	FY2017 Controllable O&M ¹	% of Total Opex	% Reduction	Benefits
Boston Gas	\$ 76,358,000	32%	0.82%	\$ 628,814
Colonial Gas	\$ 10,443,000	4%	0.82%	\$ 85,999
Brooklyn Union Gas (KEDNY)	\$ 74,664,000	31%	0.82%	\$ 614,864
Keyspan Gas East (KEDLI)	\$ 25,587,000	11%	0.82%	\$ 210,711
NiagaraMohawk Gas	\$ 39,859,000	17%	0.82%	\$ 328,242
Narragansett Gas	\$ 13,524,000	6%	0.82%	\$ 111,371
Total	\$ 240,435,000			\$ 1,980,000

Assumptions / Sources / Notes

1 Source: US Gas OpEx Review 201609 September (06+06) with Forecast

Data Management Damage

Improved Data Quality - Record Error Damages - M&C Complex Engineering Jobs ¹

Op Co	Category	2013		2014		2015		3 yr Average	% Reduction to Median ³	% Reduction Estimated for NG	Potential Savings
		# of Errors	Cost	# of Errors	Cost	# of Errors	Cost				
UNY	Mismark - Record Errors	4	\$ 14,354	38	\$ 89,690	41	\$ 241,907	\$ 115,317	88%	44%	\$ 50,451
UNY	Mismark - Locator Errors (Internal)		\$ -		\$ -		\$ -	\$ -	40%	20%	\$ -
NYC	Mismark - Record Errors	46	\$ 25,698	54	\$ 20,492	60	\$ 20,181	\$ 22,124	88%	44%	\$ 9,679
NYC	Mismark - Locator Errors (Internal)	3	\$ 700		\$ -		\$ -	\$ 233	40%	20%	\$ 47
LI	Mismark - Record Errors	52	\$ 84,517	63	\$ 514,509	70	\$ 169,928	\$ 256,318	88%	44%	\$ 112,139
LI	Mismark - Locator Errors (Internal)	4	\$ 5,339	6	\$ 15,866		\$ -	\$ 7,069	40%	20%	\$ 1,422
MA	Mismark - Record Errors	139	\$ 465,112	139	\$ 379,541	123	\$ 300,815	\$ 381,823	88%	44%	\$ 167,048
MA	Mismark - Locator Errors (Internal)	3	\$ 3,408	2	\$ 577		\$ -	\$ 1,328	40%	20%	\$ 267
RI	Mismark - Record Errors	23	\$ 376,726.87	29	\$ 475,003.44	45	\$ 737,074	\$ 529,602	88%	44%	\$ 231,701
RI	Mismark - Locator Errors (Internal)	1	\$ 1,884.92	2	\$ 3,769.84	1	\$ 1,885	\$ 2,513	40%	20%	\$ 506
Total	Total Mismark - Record Errors	264	\$ 966,409	323	\$ 1,479,236	339	\$ 1,469,905	\$ 1,305,183	88%	44%	\$ 571,018
Total	Total Mismark - Locator Errors	11	\$ 11,332	10	\$ 20,213	1	\$ 1,885	\$ 11,143	40%	20%	\$ 2,241
TOTAL								\$ 1,316,327			\$ 573,259

RI	Average Cost of Mismark - Record Errors	\$ 16,379
RI	Average Cost of Mismark - Locator Errors (Internal)	\$ 1,885

	National Grid Gas Performance - # of Damages 2015	Quartile Ranking per AGA Gas Peers	Median per AGA Gas Peers	Range per AGA Gas Peers	Reduction in # of Damages Needed to Move to the Median ³
Damage Benchmarking ²					
Number of Damages due to Locate Errors – Mains	11	2nd	13	3 to 197	0%
Number of Damages due to Locate Errors – Services	76	3rd	39	17 to 380	49%
Number of Damages due to Record Errors – Mains	43	4th	9	0 to 71	79%
Number of Damages due to Record Errors – Services	293	4th	33	0 to 354	89%
Total Number of Damages due to Record Errors	336		42		88%
Total Number of Damages due to Locate Errors	87		52		40%

Benefit by Operating Company	
Boston Gas *	\$ 137,198
Colonial Gas *	\$ 30,117
Brooklyn Union Gas (KEDNY)	\$ 9,726
Keyspan Gas East (KEDLI)	\$ 113,561
NiagaraMohawk Gas	\$ 50,451
Narragansett Gas	\$ 232,206
Total	\$ 573,259

Assumptions / Sources / Notes

¹ Source: Report of damages provided by Matthew Murlin (Sr. Analyst, Misc & Special Billing), Robert Tejeson (Manager Damage Prevent LI), and Steven Bennett (Manager Damage Prevention NE Gas)

² Benchmarking of damages performed by Accenture using 2015 AGA data

³ Possible reduction in damages is estimated to move National Grid Gas to the median of its peer set per 2015 AGA data; agreed / confirmed by Nick Raad

⁴ Boston Gas and Colonial Gas benefits split based on the general allocator %s (Boston Gas - 82%, Colonial Gas - 18%)

Clerical Productivity

Improved Clerical / Back Office Productivity - All M&C and CMS Jobs

Operating Company	# of Clerks / Work Support ¹	# of Annual Workdays per Clerk	Total # of Workdays	Total \$	Productivity Improvement as a Result of New Platforms & Mobile Devices ²	Clerical Hourly Rate ³	Productivity Benefits
Boston Gas Company	69	240	16,560	\$ 3,323,529	25%	\$ 25.09	\$ 830,882
Colonial Gas Company	17	240	4,080	\$ 818,840	25%	\$ 25.09	\$ 204,710
Brooklyn Union Gas-KEDNY	28	240	6,720	\$ 1,348,678	25%	\$ 25.09	\$ 337,170
KS Gas East Corp-KEDLI	22	240	5,280	\$ 1,059,676	25%	\$ 25.09	\$ 264,919
Narragansett Electric Co	15	240	3,600	\$ 722,506	25%	\$ 25.09	\$ 180,627
Niagara Mohawk Power Corp	26	240	6,240	\$ 1,252,344	25%	\$ 25.09	\$ 313,086
Total	177		42,480	\$ 8,525,574			\$ 2,131,393

Benefit by Operating Company

Boston Gas	\$ 830,882
Colonial Gas	\$ 204,710
Brooklyn Union Gas (KEDNY)	\$ 337,170
Keyspan Gas East (KEDLI)	\$ 264,919
Niagara Mohawk Gas	\$ 313,086
Narragansett Gas	\$ 180,627
Total	\$ 2,131,393

Assumptions / Sources / Notes

1 # of Clerks derived from HRIS extract provided by J'Wynn DeRamos; resources with Clerk or "CLK" in their titles in M&C, CMS, and Ops Support / Work Support were counted in this analysis

2 Estimate of % productivity improvement as result of new platforms and mobile devices provided by Danielle Morrissey and Mark Scaparotti

3 Clerk rate provided by NG Finance; hourly rate assumes an average for that category of employee if there were multiple titles / levels (e.g., Clerk, CMS Clerk, etc.)

Damage Prevention Travel

Reduced Drive Time and Reduced Mileage - M&C Damage Prevention Jobs

Opex	Category	Units (Mains = Miles, Services = Units) ¹	Travel Time					Mileage								
			Travel Mins Per Job ²	Total Travel Mins	Cost Basis	Travel Time Reduction ³	Total Time Saved in Mins	Field Woker Hourly Rate ⁴	Travel Time Benefits	Miles Per Job ²	Assumed Miles Driven	Cost Basis	Reduction ³	Miles Reduced	Cost Per Mile ⁵	Fleet Benefits
Boston Gas	Damage Prevention	130,880	14	1,832,320	\$1,066,716	2.5%	45,808	\$ 34.93	\$ 26,668	4.17	546,410	\$ 377,023	2.5%	13,660	\$ 0.69	\$ 9,426
Colonial Gas	Damage Prevention	47,609	14	666,526	\$ 388,029	2.5%	16,663	\$ 34.93	\$ 9,701	4.17	198,763	\$ 137,146	2.5%	4,969	\$ 0.69	\$ 3,429
KEDNY	Damage Prevention	190,066	11	2,090,726	\$1,217,151	2.5%	52,268	\$ 34.93	\$ 30,429	4.17	793,505	\$ 547,519	2.5%	19,838	\$ 0.69	\$ 13,688
KEDLI	Damage Prevention	154,225	10	1,542,250	\$ 897,847	2.5%	38,556	\$ 34.93	\$ 22,446	4.17	643,873	\$ 444,272	2.5%	16,097	\$ 0.69	\$ 11,107
Niagara Mohawk	Damage Prevention	105,761	13	1,374,893	\$ 800,417	2.5%	34,372	\$ 34.93	\$ 20,010	4.17	441,541	\$ 304,663	2.5%	11,039	\$ 0.69	\$ 7,617
RI	Damage Prevention	61,581	12	738,972	\$ 430,205	2.5%	18,474	\$ 34.93	\$ 10,755	4.17	257,094	\$ 177,395	2.5%	6,427	\$ 0.69	\$ 4,435
TOTAL BENEFITS		690,122		8,245,687	\$4,800,364		206,142		\$ 120,009		2,881,186	\$1,988,018		72,030		\$ 49,700

Assumptions / Sources / Notes

- 1 Source: US Gas OpEx Review 2016/09 September (06-06) with Forecast
- 2 Travel time and miles per job for damage prevention is assumed to be similar to CMS planned work by OpCo; travel time and miles per job is not tracked for M&C
- 3 Damage prevention % reduction is assumed to be similar to the % reduction for CMS planned work which was calculated using OptimoRoute software; assumption based on the fact that damage prevention resources can be pulled for emergent work
- 4 Tech rate provided by NG Finance; hourly rate assumes an average for that category of employee if there were multiple titles / levels (e.g., Field Tech, Mechanic, etc.)
- 5 Fleet cost per mile provided by Joseph Nicoletti, Supply Chain / Fleet, cost includes fuel, parts, and external maintenance only

M&C Productivity Improve

Field Productivity Improvement via Improved Platforms - All M&C Work Types

	Improvement in Productivity						
	Straight Hours ^{1,5}	OT Hours ⁵	Total Hours	% of OT	Improvement Rate ²	Hours of Improvement	Benefit
Boston Gas	1,116,603	401,446	1,518,048	26%	3.00%	33,498	\$ 1,755,132
Colonial Gas	177,186	53,456	230,641	23%	3.00%	5,316	\$ 278,509
KEDNY *	1,231,360	320,889	1,552,249	21%	3.00%	36,941	\$ 1,935,513
KEDLI *	765,440	180,086	945,526	19%	3.00%	22,963	\$ 1,203,157
Niagara Mohawk *	1,035,840	85,349	1,121,189	8%	3.00%	31,075	\$ 1,628,185
RI	366,822	133,904	500,726	27%	3.00%	11,005	\$ 576,589
Totals	4,693,250	1,175,129	5,868,379	20%	3.00%	140,798	\$ 7,377,085

	Hourly Rate ³	Hours per year	Annual Rate
Annual Rate	\$ 34.93	2080	\$ 72,654
OT Rate	\$ 52.40	2080	\$ 108,982

Field Techs ⁴

Boston Gas Company	698
Colonial Gas Company	108
Brooklyn Union Gas-KEDNY	592
KS Gas East Corp-KEDLI	368
Niagara Mohawk Power Corp	498
Narragansett Electric Co	206
Grand Total	1876

Assumptions / Sources / Notes

1 For KEDNY, KEDLI, and Niagara Mohawk, calculated straight hours = # of field techs * 2080 hours per year

2 3% improvement rate = 15 minutes per day (480 minutes * 3%); % used is estimated based on time spent performing data capture with a crew size of 3 (5 minutes per person)

3 Tech rate provided by NG Finance; hourly rate assumes an average for that category of employee if there were multiple titles / levels (e.g., Field Tech, Mechanic, etc.)

4 # of Field Techs derived from HRIS extract provided by J'Wynn DeRamos; Field Techs in this benefit stream include I&R, Corrosion, and M&C Techs, Inspectors and Damage Prevention excluded

5 Source for Hours: NY - Yuan Zhou (Finance Business Partners- NY Budgeting & Forecasting) & Phillip Jeffrey; MA & RI - James Loschiavo (Financial Planning & Partnering)

Date of Request: June 28, 2017
Due Date: July 10, 2017

Request No. DPS-431 AT-4
NMPC Req. No. NM-1004

NIAGARA MOHAWK POWER CORPORATION d/b/a NATIONAL GRID
Case No. 17-E-0238 and 17-G-0239 –
Niagara Mohawk Power Corporation d/b/a National Grid – Electric and Gas Rates

Request for Information

FROM: DPS Staff, Andrew Timbrook
TO: National Grid, Gas Information Systems Panel
SUBJECT: **GAS BUSINESS ENABLEMENT (GBE) – COST ESTIMATION**

Request:

In this interrogatory, all requests for data, workpapers or supporting calculations should be construed as requesting any Word, Excel, or other computer spreadsheet models in original electronic format with all formulae intact.

Concerning the cost estimation process for the proposed GBE program, provide the following:

- a. A description of Accenture & PwC's roles in the cost estimation process;
- b. Any inputs and assumptions used to estimate program costs;
- c. The historic performance of Accenture when estimating the costs of similar programs;
and
- d. Explain how the Company verified that the cost estimates were reasonable.

Response:

- a. As noted in the initial testimony of the Gas Infrastructure and Operations Panel, National Grid worked with two of the top system integrators ("SI") in the U.S., Accenture and PwC, to complete a high-level design and develop a roadmap for the Gas Business Enablement ("GBE") Program.

Accenture

Accenture was selected as the Strategic Assessment (Design) partner to help develop the high-level design, road map, and business case. In support of these efforts, Accenture's role included consulting on the current state/gap analysis, future state technical design,

implementation approach, change analysis/strategy, risk analysis, and draft work packet for the SI.

Cost estimates for the GBE Program were developed by Accenture utilizing its proprietary “Delivery Estimator” model described in Attachment 1. Costs were developed utilizing a bottom-up approach for each initiative that included (i) the labor effort required (as determined by Accenture from their actual experience with prior technology and platform implementations of a similar size and scope); (ii) software and hardware costs (utilizing the latest vendor quoted prices where available or Accenture’s experience), and (iii) labor rates, which were derived from National Grid’s internal labor rates and, where internal rates were not applicable, current external market labor rates were used. As discussed further in response to part (d), as part of the development of cost estimates described above, Accenture validated the estimates by comparing them to their actual experience with other programs of similar size and scope.

PwC

PwC was selected as a business assurance partner for National Grid to provide additional assurance that the business design/roadmap developed for GBE is “fit-for-purpose” and meets National Grid’s requirements for business functionality, deliverability (including risk management), and cost efficiency. PwC’s role included reviewing and analyzing business/technology and project design alignment; market and best practices; design flexibility and process; implementation strategy; integration plan; design process; and risk analysis. Attachment 2 includes PwC’s Stage Gate Report (“Report”) on the Future State Design and Scope and Roadmap for GBE. Attachment 3 is National Grid’s response to PwC’s report. A key finding of PwC’s Report was that the cost estimate for GBE was appropriate compared with the total costs of other industry benchmarks of similar scale projects. PwC also noted that the final version of the SI Work Package provides the level of information necessary for SIs to understand the full scope of the GBE Program and to enable National Grid to compare equivalent bids.

The following are other key assurance findings in PwC’s Report:

- the solution design was based on industry leading software applications that can support National Grid’s GBE Program objectives;
- the proposed GBE roadmap work streams and initiatives provide a program scope well matched to achieve the targeted objectives of GBE;
- the initiative scope goes beyond process and technology to address gaps across the full set of elements of the required core operational business capabilities; and
- the 4.5 year deployment duration in the roadmap work streams and initiative listing is achievable.

- b. Please see response to part (a) and Attachment 4.
- c. Please see page 5 of Attachment 1.
- d. The Company has verified and plans to continue to validate that cost estimates are reasonable throughout the Program’s life cycle:

- As described above, the Company retained Accenture to help develop and validate cost estimates for the GBE Program. As shown in Attachment 1, Accenture's estimates of prior similar projects were within acceptable variance ranges.
- Importantly, National Grid provided Accenture much of the raw data from workshops with the business on the technology gaps. In addition, National Grid's internal GBE team engaged representatives from Information Services departments, including Enterprise Architecture, Strategic Solution Delivery, Service Delivery, and Digital Risk and Security to review technical and cost outputs. Also included in the review were representatives from the Company's Asset Management and Process Excellence teams, with experience in work and asset management platforms, financial systems, field force systems, meter management, and GIS.
- In addition, National Grid partnered with PwC, another highly experienced system integrator, to review the cost estimates and SI work packages to provide additional assurance that cost estimates were reasonable and assurance that the SI work packages would allow National Grid to pursue a rigorous competitive procurement process.
- Finally, as the GBE Program proceeds into design and implementation, National Grid will utilize a competitive procurement process for change leadership and ten key modules of GBE including: Work Management, Asset Management, Customer Engagement, GIS, and Supply Chain and Data Management. In addition, National Grid will competitively bid any core software, hardware, infrastructure, and application products and alternatives available in the market.

Name of Respondent:
Johnny Johnston

Date of Reply:
July 10, 2017

Niagara Mohawk Power Corporation
d/b/a National Grid
Case 17-E-0238 and 17-G-0239
Attachment 1 to DPS-431 AT-4
Page 1 of 5

CONFIRMATION OF ACCENTURE ESTIMATE ACCURACY

June 14, 2017

VERIFICATION OF ACCURACY OF ACCENTURE ESTIMATORS

Accenture employs robust and industrialized calibration processes for our estimators in order to ensure accuracy of the estimates we produce.

- Accenture conducts two ongoing processes to enable accuracy of its estimating tools:

Harvesting

Conduct periodic harvests of actuals from projects for specific technologies and platforms

Calibration

Collaborate with practice sponsors to update factors in the estimators to better align with actuals

The estimators are re-certified every 2 years based on harvesting and calibration of at least 6 projects within that timeframe

COST ESTIMATING OF GBE PROGRAM

- GBE program costs were estimated using Accenture Delivery Estimators built up using bottom-up details for all initiatives

Effort

The labor effort for each initiative was estimated using one of 2 distinct approaches:



1. Factor-based estimates using Accenture Development Methodology estimators to create a detailed resource plan



2. Capacity-based estimates using historical experience aligned to initiative scope to create a detailed resource plan

Software / Hardware

Software and hardware estimates used the latest vendor quoted prices where possible; Accenture experience used where vendor quoted prices were not available

Rates

Labor rates were applied to labor effort and were derived from 2 sources:

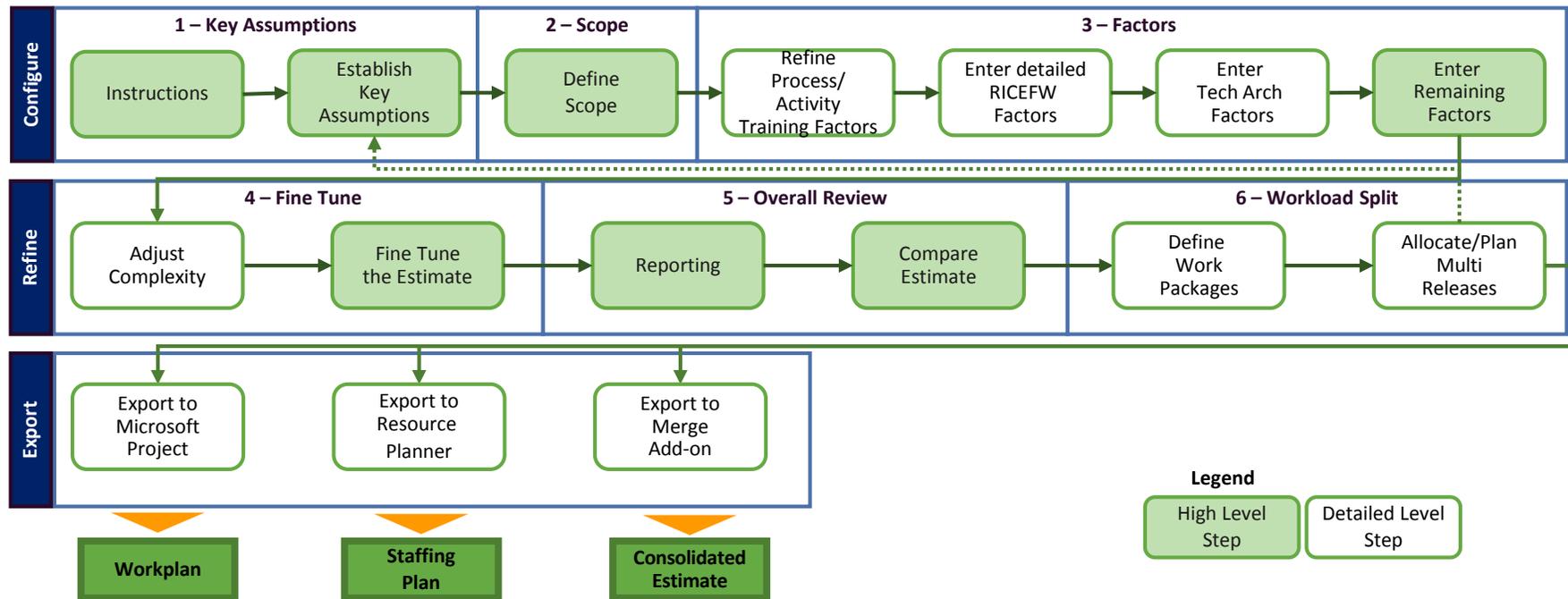
1. National Grid current daily labor rates for various roles and levels validated by National Grid Finance
2. External SI daily labor rates calculated by Accenture based on typical “market rates”

Costs were compared with other transformation programs to validate program costs based on program scope

ACCENTURE DEVELOPMENT METHODOLOGY ESTIMATOR APPROACH

Niagara Mohawk Power Corporation
d/b/a National Grid
Case 17-E-0238 and 17-G-0239
Attachment 1 to DPS-431 AT-4
Page 4 of 5

Accenture's employs a standard approach within its Development Methodology Estimators



- Accenture Develop Methodology Estimators are maintained and updated to reflect our experience with actual implementation effort to ensure estimated effort reflects actual effort as closely as possible

COST ESTIMATE COMPARISONS

Solution Component	NG Estimate Approach	National Grid	Utility A	Utility B	Utility C
Scope		- 6 OpCos - 3 states - Gas Only (includes Electric CMS), D Only	- 4 OpCos - 4 states - Gas and Electric, T & D	- 1 OpCo - 1 State - Electric Only, T & D	- 2 OpCos - 2 States - Gas and Electric, T & D
Transformation Office	Capacity-Based	X	X	X	X
EAM / Scheduling / Mobility	Factor-Based	X	X	X	X
PowerPlan	NG Estimated	X	-	-	-
GIS	Factor-Based	X	-	-	-
Engineering, Design, Estimation, Mobility	Factor-Based	X	Process only	Process only	X
AIPM	Capacity-Based	X	-	X	X
Asset Analytics	Capacity-Based	X	X	X	X
Integrity Management	Capacity-Based	X	-	-	X
Integrated Resource Planning	Capacity-Based	X	X	-	X
Project and Program Management	Capacity-Based	X	X	-	-
Supply Chain	Capacity-Based	Process only	X	-	'Lite'
Customer Experience	High-Level Comparison	X	-	-	-
Data Management	Capacity-Based	X	'Lite'	'Lite'	-
Legacy Remediation	Capacity-Based	X	X	X	X
IS Capabilities / Other	Capacity-Based	X	X	-	-
Business Enablement	Capacity-Based	X	X	X	X
Compliance / Technical Training	NG Estimated	X	-	-	-
		\$458M	\$330M	\$158M	\$211M

Actuals for Utilities A, B, and C landed within acceptable success thresholds.

Johnny Johnston
National Grid USA Service Company, Inc.
40 Sylvan Road
Waltham, MA 02465

February 22, 2017

Re: Stage Gate Report with PwC Advisory findings/observations and high-level recommendations to inform the Stage Gate to move to the next phase of the project.

Stage Gate Report

Dear Johnny,

This report is intended to provide an overview of key findings and high-level recommendations based on review of the deliverables that have been completed by National Grid and Accenture during Phase I of the Gas Business Enablement program. In particular, this report focuses on the Future State Design and Scope and Roadmap for Gas Business Enablement

Stage Gate Recommendation

The GBE Strategic Assessment has been thorough in its approach and provides substantial reference material for the next Phase. It has effectively defined a comprehensive program scope which is well aligned to deliver the program outcomes and developed an appropriate cost estimate for the scope and transformative ambitions of the program.

We believe it would be advantageous to further optimize the roadmap tactics and efficiency of deployment of the current program scope as you progress through the next phase to allow for greater emphasis on user adoption and driving the benefits realization and targeted outcomes. We encourage National Grid to consider the recommendations provide below seriously.

Our assessment is that the program is ready to move into the next stage.

The sections below contain more detail on our findings and recommendations:

Future-State Design

Key Findings

- The solution design is based on industry leading software applications that can support National Grid's GBE Program objectives.
- The design conforms to industry standards to deliver a consistent solution, but can be further tailored to National Grid in specific areas. These areas include contractor management, contractor use of the system, materials handling and clear definition of the Customer Relationship Management solution component.
- There are numerous industry-leading customer experience aspirations that are documented within the requirements matrix that address simplicity and usability, but further definition is required on how CRM will serve as a wrapper for CIS to allow a single application for the CSRs.

- The design would benefit from a clearer and more systematic linkage of scope to initiatives (e.g. mapping of business processes, data objects, RICEFW/RAWICE Objects, operating model decisions, KDDs, applications to the program initiatives) and the precedence linking of the initiatives; this can be refined during the next phase and will help with governance decisions during delivery
- Impact to the business roles and responsibilities and overall Change Impact is also in early stages of development and is planned to be a focus in the next stages of the project.

Recommendations

- Minimization of customizations is critical to providing the agility to evolve the solution by upgrading with each new product release. This should be a guiding principle for the detailed design teams.
- Establish design governance processes to maintain tight controls on Requirements and Key Design Decisions.
- Conduct an early deep dive to drive out the details in contractor management, contractor use of the system and materials handling to streamline the detailed design effort.
- A similar deep dive concerning the Customer Relationship Management solution component should be conducted early in the detailed design. Particular attention should be devoted to how the Customer Relationship Management solution will serve as a wrapper for CIS allowing a single application for the CSRs.
- The future state for technology is evolving. Emphasis should be placed on the data flow, system of record/entry for key data objects and the overall integration model to ensure that data is synchronized and consistent and supports business processes and analysis for continuous improvement.
- Continue to socialize the solution with the business so they develop a clear vision and build a sense of ownership in decision making within their areas.

Gas Business Enablement Scope and Roadmap

Key Findings

- The proposed GBE roadmap work streams and initiatives provide a program scope well matched to achieve the targeted outcomes and objectives of GBE. The initiative scope goes beyond process and technology to address gaps across the full set of elements of the required core operational business capabilities.
- The 4.5 year deployment duration for the GBE scope elements in the roadmap work streams and initiative listing is achievable.
- When comparing the total costs of this transformation to other industry benchmarks, a business case estimate of >\$500 million is appropriate to cover a transformation of this scale.
- The final version of the SI Work Package provides the level of information necessary for System Integrators to understand the full scope of the Gas Business Enablement program and to enable National Grid to compare equivalent bids.
- National Grid should consider increasing program focus on user adoption of new work practices and tools and resulting benefits realization. This is underserved in the current roadmap where activity typically stops after initial support periods for deployments of new applications and processes.
- We believe the deployment planning of the EAM/WM scope will benefit from further analysis to (a) understand the pros and cons of the proposed “work type” phased approach (which increases

technical complexity) compared to deployment of a core WM solution, and (b) evaluate the initial ramp up of resources and balance between core operational and supporting modules..

Key Recommendations

- While the scope is well structured and the funding is of appropriate magnitude, National Grid should consider optimizing the proposed roadmap planning tactics to focus on more accelerated deployment of the core systems and placing a stronger emphasis on user adoption of new work practices and tools to ensure sustainable business transformation/benefits realization.
- National Grid should consider utilizing a “hybrid agile” deployment during deployment of the EAM/Work Management core. This means that user facing aspects of the solution are developed using a multi-cycle “agile approach” which aligns with the structure/timing of the design-build-test system development life-cycle (SDLC) required for the integration and data management components. Thus the accelerated deployment of core EAM-WM scope will bring forward the viable date for agile ongoing improvement of the core.
- Compliance with the elements of API RP 1173 for a Pipeline Safety Management System has been one of National Grid’s requirements for Gas Business Enablement, however not all elements are as clearly linked to the proposed roadmap as they could be. While it is believed that most requirements are satisfied by the current GBE scope, several areas will need follow-up during implementation – including end-to-end materials traceability process, corrective action program and management of change.

Yours sincerely,



Chris Fynn, Principal

christopher.c.fynn@pwc.com

T: [1-646-284-6562](tel:1-646-284-6562)

Johnny Johnston
Senior Vice President
Gas Business Enablement

Niagara Mohawk Power Corporation
d/b/a National Grid
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Attachment 3 to DPS-431 AT-4
Page 1 of 2

Chris Fynn, Principle
PricewaterhouseCoopers LLP
300 Madison Ave,
New York, NY 10017

March 1, 2017

Re: Stage Gate Report

Dear Chris

Thank you for Stage Gate Report on Gas Business Enablement dated February 22, 2017, and for the support that PWC provided to National Grid through the Strategic Assessment Phase of this important program of work for National Grid and our customers.

As you are aware a lot of work has gone into the first phase and we are pleased to see your overall assessment that the scope is well matched to the desired outcomes, the deployment appears achievable, and the costs are appropriate to cover a transformation of this scale; ultimately that the program is ready to move into the next phase.

I did want to highlight some of the actions that National Grid's is taking to address your findings and recommendations:

1. We have instigated a number of additional interim work items prior to the next phase that specifically will provide clearer and more systematic linkages of scope to initiatives including developing standardized L3 processes. This work has also more clearly defined our requirements around contractors and materials traceability. We are also doing an extended piece of work on data to better inform our thinking in this area.
2. We will be conducting a competitive collaborative/agile procurement process to source our future delivery partners for the next phase. We are planning to leverage this process to better understand potential solutions around the delivery of the customer capabilities that we have said that we need. We have also undertaken a separate customer strategy exercise that is helping better inform the best direction. Our procurement approach will also allow us to assess opportunities that suppliers might have to further optimize the roadmap.
3. Finally, National Grid intends to have overall control of the PMO through the delivery phase. We believe this will help address the various recommendations made around maintaining discipline and strong governance as we go through delivery. We will also be

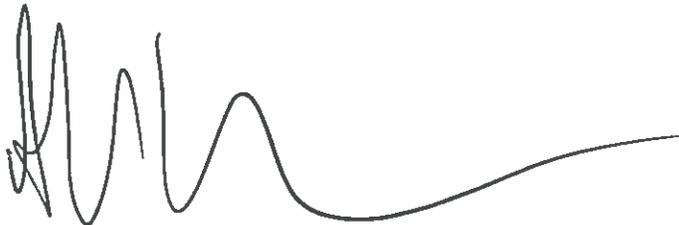
Johnny Johnston
Senior Vice President
Gas Business Enablement

looking to hire a Value Assurance partner that will provide independent assurance that we are continuing to focus on the right things to support a successful outcome.

I did want to follow up on one area of recommendations where perhaps you didn't have full visibility to all the work we have been doing; that was around Pipeline Safety Management and API 1173. This has been an area of focus for us since the beginning of the program. However we have been leading this work through Dan McNamara with support from a niche consulting firms P-Pic and Mosaic. This has been done in parallel with the Accenture work that PWC has been overseeing and so might be why you believed there were still some gaps. I can confirm materials traceability is part of our requirements and there is a significant piece of work looking at the management of change, particularly related to our policies and procedures. As we move into the next phase we will look to do a better job of articulating how this all comes together into a single roadmap that covers people, process, technology, training and governance to support the implementation of all the elements of API 1173 into National Grid as part of the Gas Enablement program.

Thank you again for the work of your team over the last year, I am excited to see this move into implementation and the difference that this program will make for our employees and customers.

Yours sincerely,



Johnny Johnston,
Senior Vice President, Gas Business Enablement

Inputs and Assumptions Used to Estimate Gas Business Enablement (“GBE”) Program Costs

GBE Program Costs were developed utilizing bottom-up detail for all initiatives primarily along the (i) labor effort required (ii) software and hardware costs and (iii) labor rates. Detailed inputs and assumptions varied by the type of costs estimated for GBE initiatives as elaborated below. Importantly, costs were also estimated by scaling implementation costs from previous peer utility experiences with similar initiatives.

A. Labor Effort

The level of effort used to determine the labor estimates for initiatives was calculated by Accenture’s estimating model based on the implementation schedule for the GBE initiatives. By applying the level of effort to the implementation schedule, the number of resources by “role” or staff type could be calculated. The level of effort was allocated to consulting support roles and internal staff types.

Estimated total expenditure per staff type was calculated by multiplying the average number of resources required each period based on the implementation schedule by the respective monthly rate (defined as the appropriate period’s daily rate multiplied by 20 work days per month). Resources (and corresponding monthly rate) were defined for all staff types (*i.e.* business – non-executive) by standard role (*i.e.* analyst).

Operational and capital expenditures are calculated from the total cost by staff type per standard role. Operational and capital expenditures are then calculated by multiplying total cost by staff type per standard role by the corresponding operating and capital expenditure splits in accordance with the capitalization guidelines outlined in the ASC 350-40 accounting policy.

i. National Grid Labor Rates

National Grid’s Finance department developed labor rates for the following internal staff types: business – non-executive, business –executive, and Information Services. These resources have a corresponding daily rate (comprised of base labor, labor burdens, and employee expenses) that is escalated at 2% annually.

ii. Consultant Labor Rates

Labor rates for System Integrator and Business Management vendors were developed based on Accenture’s experience, and reflect market rates for System Integrator and Business Management services. with a corresponding daily rate for onshore and offshore consultants escalated at 3% annually for inflation.

iii. *Legacy Integration Contractor Labor Rates*

Labor rates for the Application Maintenance vendor were developed by using the current rates paid to vendors who supply Application Maintenance services to the Company today. with a corresponding daily rate for onshore and offshore consultants escalated at 3% annually.

B. Software & Hardware

Accenture developed cost estimates for the software and hardware required for the GBE initiatives by (1) creating a target architecture based on technology needs and gaps; (2) modeling that architecture using Accenture tools to identify candidate hardware and software that was fit for purpose; and (3) scaling for size. Indicative costs were drawn from Accenture's past practice in the industry and adjusted to fit the delivery method (traditional waterfall delivery or Agile), and were used in conjunction with Accenture's Delivery Methods Estimators to form the indicative cost model.

Specifically, technology information and gaps were considered on the target technology blueprint and technology principles with respect to:

- Application architecture, including application portfolio, application integrations (major data elements, mechanism, protocol);
- Information architecture, including master data objects, structured and unstructured data objects, analytics, and reporting architecture;
- Infrastructure architecture, including data center, servers, storage, network;
- Security / cyber security architecture, including operational monitoring, security analytics, security incident management, threat intelligence; and
- Development and operations architecture, including development tools, automation, and monitoring.

Tools Utilized for Estimates:

- Accenture Delivery Architectures - (ADA) model provides a blueprint for architectural design & decisions.
- National Grid Cyber Security Operating Model and Diagnostic to identify areas for significant improvement in security of GBE solutions.
- Accenture Analytics Information & Security Architecture to assess current state structured and unstructured data and link insights to value.
- High Performance Utility Model Architectures to link business process/functions / information and the underlying technologies.

- Accenture’s Market Scan/POV to ensure alignment and linkage to reference architecture (high level requirements).
- Accenture Agile and DevOps (Transformation) - Capabilities (e.g. provisioning, continuous integration) that support Agile delivery and associated set of reference tools/ architecture.
- Accenture Delivery Methods and Estimators – To estimate the cost of initiatives and utilizing the appropriate Accenture Delivery Model estimators such as the Distributed Agile Development estimator.

C. Specialty Consultants

i. CRM / Contact Center

In December 2016, Accenture was asked to estimate costs for Contact Center tool to improve the user experience of customers and customer service agents. This tool would enable customers and agents to seamlessly “plug in” with the systems being delivered by GBE. Agents will have a more complete view of the customers’ situation, leading to more tailored service and a reduction in errors.

Estimating Approach:

- Confirmed capabilities that National Grid plans to deliver for the Customer Experience and the integration with Field Operations.
- Collected solution rough order of magnitude estimates and costs of delivery for other similar utilities.
- Developed rough order of magnitude estimate for National Grid.

Estimating Assumptions:

- The solution was based on a project using Salesforce Service Cloud, Marketing Cloud, and Communities with SAP supporting systems in place.
- Requirements for Contact Center were not originally captured during the GBE strategic assessment.
- Duration is 1 – 2 years for delivery.
- Both electric and gas commodities.
- Rates and billing rules not included.
- Customer Transformation (CxT) Portal and Channel Management would handle multi-channel capabilities

ii. CxT Portal & Channel Management

Estimates are based on:

- Full time National Grid business resources to deliver the business needs of program including communication, business decisions, change management.
- Full time IS resources to deliver the software in order to meet the business decisions and needs.
- Estimated cost of software, will continue to go through a formal procurement process in order to finalize the selection of the software and final costs.

iii. Data Remediation: GIS Upgrade/ Migration & GIS Mobility

Data Management includes the following efforts: profiling; cleansing; enriching; transforming; migrating; monitoring and reporting; archiving; and deleting activities. In addition, part of the data management program is to establish data operations processes that would manage the movement of data from the source application, cleaning the data, conversion of the data and preparing the data for loading into target system(s) and establish the data retention policies (Business, Regulatory, and Legal holds), data archiving policies, and the data deletion and destruction policies. Ultimately, the goal of the data management initiatives is to improve data accuracy and record-keeping.

The assumptions were derived from a qualitative assessment of the gas operations information systems landscape to provide a directional sense of complexity for the data management effort under GBE.

The total estimated cost for data management was based on a resource-driven model over a 48 month duration to delivery data efforts iteratively. The resource structure and size assumed 22 resources (split between external and National Grid resources) and were based off a similarly-sized West Coast utility operating in multiple jurisdictions. Considering the estimated program duration and the resource requirements, the number of days was derived based on the assumption of 18 productive days per month per person. The number of days estimated for each of the resource types was then multiplied by their respective external or National Grid average daily rates resulting in the estimated cost for each resource type to deliver the data management efforts.

iv. *Regulatory/Compliance*

Training estimates were developed using industry-standard ratios for how long it takes to develop one hour of training and applying those ratios across National Grid's desired future training catalogue. The ratios were an application of Chapman benchmarks adjusted based on Mosaic's experience in the industry. The Chapman benchmark data comes from a report the Chapman Alliance, a consulting organization for learning initiatives, published based on data from 250 organizations, including 4,000 learning development professionals, across a wide variety of industries. The report provides a range of ratios for how long it takes to develop one hour of training, factoring in a number of considerations including complexity of materials, audience, available materials, desired level of interactivity, etc. for both instructor led training ("ILT") and web based training ("WBT") materials.

Where existing materials appear to have some reusability, factors were applied to consider the efficiencies derived through re-use of existing material(s).

National Grid calculated the operating expense estimates for the Regulatory/Compliance initiative as follows:

Total Development Cost = Desired hours of curriculum* Estimated development time per hour of curriculum*Reusability factor * Standard hourly rate.

National Grid's existing portfolio was evaluated, and the following reusability estimates were used in the calculation above:

- Complete rebuild: 50% of portfolio (0% reusability)
- Significant rebuild: 25% of portfolio (25% reusability)
- Medium rebuild: 25% of portfolio (50% reusability)
- Conversion of ILT to WBT +/-1% of portfolio

Date of Request: June 28, 2017
Due Date: July 10, 2017

Request No. DPS-432 AT-5
NMPC Req. No. NM-1005

NIAGARA MOHAWK POWER CORPORATION d/b/a NATIONAL GRID
Case No. 17-E-0238 and 17-G-0239 –
Niagara Mohawk Power Corporation d/b/a National Grid – Electric and Gas Rates

Request for Information

FROM: DPS Staff, Andrew Timbrook
TO: National Grid, Gas Information Systems Panel
SUBJECT: **GAS BUSINESS ENABLEMENT (GBE) - JUSTIFICATION**

Request:

In this interrogatory, all requests for data, workpapers or supporting calculations should be construed as requesting any Word, Excel or other computer spreadsheet models in original electronic format with all formulae intact.

Concerning the proposed GBE program, provide the following:

1. A graphic showing the current NMPC programs and the average age of those programs. Does the age of NMPC's systems drive the need for GBE?
2. Explain how crews currently acquire new or revised procedures.
3. Explain how GBE will change the process by which crews acquire new or revised procedures.
4. Explain how customers currently make appointments.
5. Explain how GBE will change the process by which customers make appointments.
6. Explain how customers currently acquire information from the Company.
7. Explain GBE will change the process by which customers acquire information from the Company.

8. Explain why the Company plans to roll out (program) at its Rhode Island gas distribution company first.
9. Explain how the Company engaged stakeholders when it developed the GBE business plan.
10. Did the Company conduct any Pilot programs associated with GBE? If so, identify each Pilot program, describe its results, identify lessons learned from each Pilot program, and explain how those lessons were incorporated into the GBE plan.
11. Page 88 of the Panel's Pre-Filed Direct Testimony states that "it is becoming increasingly difficult to support safe, compliant, operations and meet regulatory obligations."
 - a. Identify the areas where the Company was either unsafe, non-compliant, or did not meet regulatory obligations.
 - b. Explain how specific components of GBE will improve each of the issues identified in response to the preceding question.

Response:

1. Attachment 1 depicts the current state of applications that support functions required by Niagara Mohawk's gas business, as well as the projected future state of the same functions after GBE implementation. The average age of the systems supporting Niagara Mohawk's gas business is eleven years.

The age of the systems supporting Niagara Mohawk is an important driver of GBE. These systems are quite old, and in many cases are no longer supported by the vendor. This creates an unacceptable risk to gas business operations and Niagara Mohawk's ability to effectively serve customers. As systems age, and technology changes, it is increasingly difficult to make modifications to the systems to support changing business requirements. In addition, the current systems, many of which rely on paper records, no longer support the way today's gas businesses need to operate, manage performance, and provide employees with the right information and effective tools. Modern supported solutions are also needed to help reliably deliver capital investment and growth.

2. Currently, crews utilize two methods of acquiring new or revised procedures. In some locations, paper procedure manuals are produced and distributed to field workers. In areas where field workers have access to the Company InfoNet, a link to an automated procedure library provides access to the procedures in a truck-mounted computer.
3. Following GBE implementation, all field workers will have access to modern mobile devices, and will be able to access a procedure portal online. Importantly, this will enable workers to access procedures in the field where the work is being performed. There are also plans to make learning libraries available online for common procedures, tasks and repairs, and these may include photographs and short training videos.

4. To make a service appointment today, a customer must contact the call center and speak to a customer representative. The customer representative, while speaking with the customer, accesses a system function that shows appointment availability. Appointment availability is based on the average number of jobs per day per field worker, the season, day of the week, time of day, etc.
5. Following GBE implementation, in addition to contacting the call center, the customer will also have the option of using the web to make the appointment, and will be presented with a screen with the available appointment windows. The customer will also have the option of receiving a call or a text when the field worker leaves for the appointment.
6. A great deal of information is available on the Company's website. However, if a customer has a specific question about billing, equipment, pending work, etc., the customer must contact the call center and speak to a customer representative. While speaking with the customer, the representative is presented with a number of screens to research the customer's question. Today, however, much information, such as that related to construction or maintenance work and new service requests, is not available to the customer representative, and it is often necessary to refer the customer to other Company departments, or request that the customer submit the request in writing.
7. Following GBE implementation, the customer will be given the opportunity to use the Company's website on a much broader scale to obtain information from the Company. In addition, the customer will have many more self-service options through digital channels to enable them to choose how they interact with National Grid. The customer will be able to access screens that were previously available only to customer representatives, and that will guide the customer through the website to the answers they require. Customers will be able to request further information online, and will be able to upload documents and photographs to support their questions. The integration of the new systems that are part of GBE will make much more information directly available to customers, without the need to work through a customer representative.

For customers calling the call center, the process will also be enhanced by providing customer representatives with much more information to better serve customers.

8. Please see the Pre-Filed testimony of the GIOP Panel, page 95, lines 1 – 7.
9. Development of the GBE business case required detailed analysis of the current gas processes, including functions that were particularly difficult to perform, given the aging systems that supported those processes. Significant analysis was also required to identify what the new processes would be needed to support the gas business now and into the future. Stakeholders for these activities included subject matter experts from throughout the gas business, and included management personnel and field workers from across all gas business functions and regions. It is important to note that the GBE project team itself was staffed with individuals with direct experience across the gas business. The GBE Program conducted 44 workshops with over 400 employees at all levels across 44 departments in the gas business to collaborate on systems and process pain points, system

design and functionality, and processes that could better serve customers. Workers from the Contact Center, Dispatch, Meter Work, Maintenance, Construction, Asset Management, and GIS, among other groups, participated in these sessions. The GBE team engaged the much larger Operations teams by travelling to each jurisdiction and various groups within those jurisdictions to discuss pain points, and the Operations driven proposals. Support departments such as Supply Chain and Human Resources have also been kept fully aware of the direction of GBE, and have participated in the workshops as appropriate. The workshops formed the basis for development of the roadmap, comparing the “as is” processes to the “to be” processes. Approximately fifteen team members continue to ride weekly with field workers and supervisors to better understand the pain points and incorporate recommendations. As the solution is being designed, each capability is being designed with the leads described above and with the Operations subject matter experts. Testing and training will also be conducted using the same teams.

Stakeholder outreach was also conducted with unions in Fall 2016. Union meetings are continuing for the next few weeks to provide status updates and also respond to any questions.

10. The GBE Program conducted two main pilots in 2016 to test important concepts that National Grid is planning to leverage through GBE to determine if they were viable. The first was a process pilot, the second involved two technology pilots. Four Meter-To-Cash processes were chosen for the pilots: Collections, Advanced Consumption, Stopped Meter, and Long Term Estimates.

The process pilot was focused on feasibility of standardizing processes across the National Grid’s various jurisdictions, recognizing the need to meet any regulatory requirements in each jurisdiction. The pilot involved workshops in all jurisdictions to understand current processes and to achieve broad engagement to define the “to be” process. The pilot was a significant success with four new “to be” processes being developed that were able to account for regional variations. By removing duplication across the jurisdictions, the total number of process steps from “as is” to “to be” was reduced by 56%, providing a good example of the potential for simplification.

The goal of the technology pilots was to demonstrate that one of the new standard processes could be effectively implemented using Agile development methods. There were two technology pilots, one on Collections that was piloted in the field and one using the Stopped Meter process that was used as a back office demonstration. The pilots were successful in demonstrating that the Agile development methods were very effective, and were also very well received by management and field workers from the gas business.

The Collections pilot was based in Long Island. It took less than 12 weeks from the start of the pilot to use of the solution in the field. It was also possible to see feedback from front-line employees built into the solution through the pilot process. The pilot introduced a modern technology device and user interface to the workforce, which were very favorably received.

The Stopped Meter pilot was based in Syracuse. It provided greater visibility into the process and activity status across all parts of the business was achieved. This was a desktop pilot but was able to show some of the opportunities a modern platform would provide the Company to more effectively manage work.

The technology pilots confirmed the benefit of using the Agile development methodology, which involved frequent engagement with business and field workers, and resulted in accelerated delivery of business value. The Agile methodology was well received by all participants in the pilots.

The results of the process and technology pilots were key inputs that validated assumptions around the approach to the GBE Program. The learnings were fully incorporated into the roadmap, including the ambition to consolidate processes across regions before developing the solution, leveraging the Agile methodology where practical, and utilizing cloud computing technologies.

11. In the testimony of the GIOP Panel, the Company states that the age of the systems supporting the gas business limits the ability to make modifications and increases the amount of time the systems are down. These systems limitations present challenges in supporting safety, compliance, and regulatory obligations. The Company did not state, however, that it is unable to support safe, compliant operations or meet regulatory obligations.

The Company takes its gas safety and compliance obligations very seriously and has a broad range of systems and controls currently in place to deliver its obligations. However, there are certain areas where the current systems are preventing the Company from achieving its desired level of performance:

Missing or being late for a required work activity. Today, this often requires additional manual controls and local tracking, follow up, and checking. Post GBE, all work will be contained in one system with pre-defined rules that will automatically schedule work in advance of its due date, and there will be central visibility to ensure all mandated activities are completed in a timely fashion.

Documenting work activity. Many work activities involve paper documentation or filling out open text fields in truck-based computers. While the Company has implemented additional controls, including re-trainings, review meetings with crews, and modifications across multiple systems to enhancing tracking of these activities, post GBE employees will have devices that they can take to the job site, which will allow for paper forms to be replaced with electronic ones. Workers will have real-time access to the procedures for the work they are doing, as well as additional relevant training materials and electronic forms, which will validate required fields to support the accurate capture of the right information the first time. This information will be electronically stored to enable future access and reporting as appropriate.

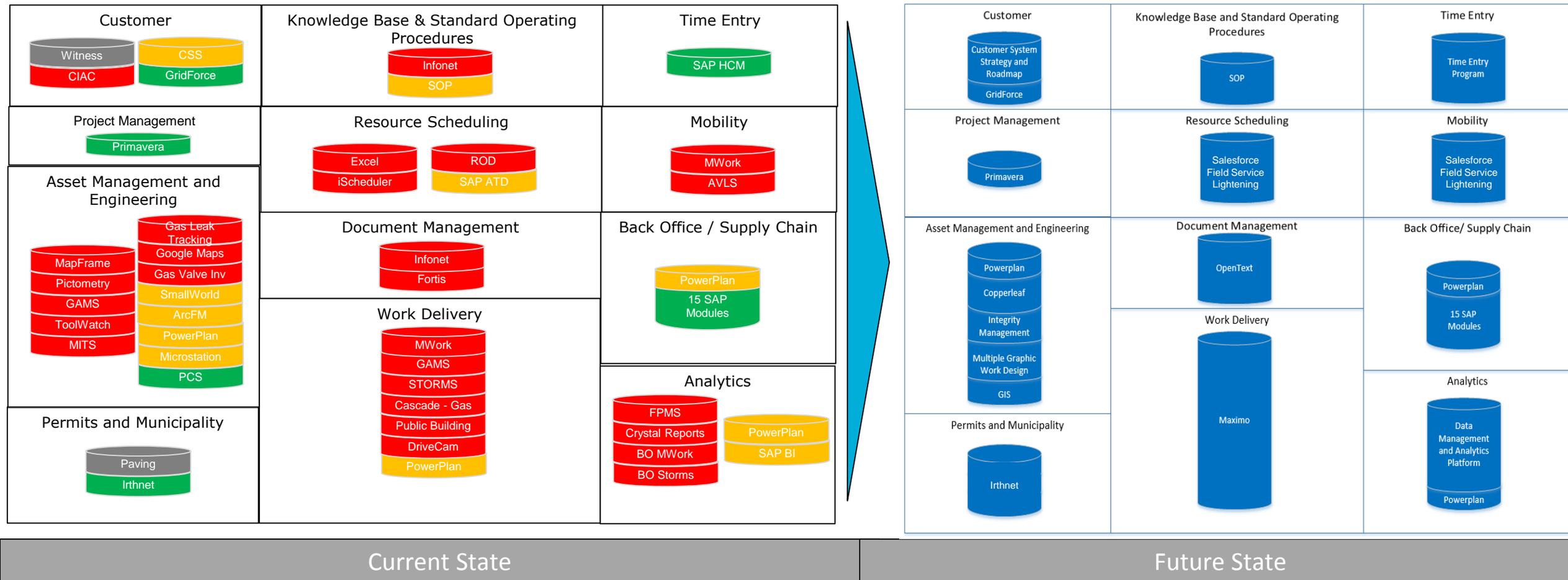
Completing, and following up on, warning tags. Today, these are manual processes with manual controls such as backup personnel and additional human review. Post GBE, warning tags will be completed electronically and printed in the field – this will enable validation of information as the tag is completed, and it will give the Company an electronic copy of every warning tag. It will also enable any follow up work to be automatically scheduled, significantly reducing the reliance on manual processes and controls.

Beyond these specific examples, GBE initiatives are anticipated to provide various capabilities that will further support the Company’s approach to gas pipeline safety and compliance, including customer engagement capabilities that will facilitate making appointments with customers,, reducing the number of jobs that are unable to be completed due to access issues. The GBE Program will also facilitate having CMS and Field Operations employees working on the same system – making it easier to transfer work between teams. The mobile platform will also make it easier to take pictures of abnormal conditions in the field and transfer them to the appropriate person/team so they can be more quickly assessed to identify any corrective action required. In short, the modern platforms to be delivered through GBE will enable Niagara Mohawk to move from mainly manual controls to more automated controls and give the Company great flexibility and agility to meet future requirements to continuously improve the approach to gas pipeline safety and compliance.

Name of Respondent:
Johnny Johnston

Date of Reply:
July 10, 2017

Current to Future State – Upstate NY



Current Disposition Risk (Technology/Business)

Unknown
 Acceptable
 →
 Unacceptable

- Moving from ~50* to ~19** different systems across multiple functional areas
- Simplifying Integration across Asset & Engineering and Work Management Systems

*Multiple Modules/ Technologies / Instances not depicted due to multiple or incomplete mappings 36/59 are depicted in current diagram. SAP Modules are not included in this count.
 **The Variability of 19 is due to Customer Experience not being a part of US GBE.



Date of Request: June 28, 2017
Due Date: July 10, 2017

Request No. DPS-433 AT-6
NMPC Req. No. NM-1006

NIAGARA MOHAWK POWER CORPORATION d/b/a NATIONAL GRID
Case No. 17-E-0238 and 17-G-0239 –
Niagara Mohawk Power Corporation d/b/a National Grid – Electric and Gas Rates

Request for Information

FROM: DPS Staff, Andrew Timbrook
TO: National Grid, Gas Information Systems Panel
SUBJECT: **GAS BUSINESS ENABLEMENT (GBE) - IMPLEMENTATION**

Request:

In this interrogatory, all requests for data, workpapers or supporting calculations should be construed as requesting any Word, Excel or other computer spreadsheet models in original electronic format with all formulae intact.

Concerning the proposed GBE program, provide the following:

1. Fully explain how the Company plans to deliver GBE on time and on budget. Include in your response a full explanation of how the current approach differs from the development and delivery of major Information Systems (IS) projects implemented previously.
2. Did the Company interview peers that have implemented major IT projects? If so, explain:
 - a. The lessons learned from those discussions; and
 - b. How the lessons validated, or were incorporated into, the plan.
3. Explain how the Company plans to train its employees to maximize productivity.
4. How will GBE impact the execution of the Capital plan in the Rate Year and Data Years?
5. Provide an assessment of how GBE relates to the overall IS program. Include in your response answers to the following questions:
 - a. Does GBE rely on any IS programs for functionality, or can it function as a stand-alone project?
 - b. Are there any duplicate budget items between GBE and the other IS projects?

c. Are any of the IS investments (other than GBE) required to achieve the full benefits of GBE? If yes, identify each such investment and explain why it is required.

Response:

1. To deliver the GBE Program on time and on budget, National Grid has (i) adopted various best practices in program governance and management; (ii) selected deployment strategies and development methodologies to manage risks and improve outcomes; (iii) is implementing a new approach to change management; and (iv) retaining a third party value assurance partner to evaluate program direction and deliverables.

Program Governance and Management:

After studying the lessons learned from past IS projects at National Grid as well as accepted industry best practices, National Grid developed a framework of eight Critical Success Factors (CSFs) to ensure the successful delivery of the GBE Program. The GBE Program has been closely adhering to these CSFs since the beginning of the program and continually checks itself against them. The CSFs are:

Active Sponsors – Performance for the sponsor is linked to success of the project

- The GBE Program Steering Group includes senior executives from National Grid US and National Grid plc. The Steering Group meets periodically with the Program Sponsor to exercise oversight, including on budget and timing, over the GBE Program and to provide guidance and access to resources as required.
- A full time Program Sponsor has been appointed to lead the Program and ensure alignment and focus on strategic business priorities and outcomes.
- The Program Sponsor and Leadership Team's success is directly tied to the achievement of the GBE Program as well as budget and timing.

Carefully Managed Scope – Project scope is realistic and achievable

- High level design workshops with participation from business subject matter experts and leadership were conducted. These served to focus the GBE Program scope on business need and opportunity, tightly aligned with the business case, and supported by the business itself.
- Prior to the start of work, the GBE Program will roll out a comprehensive change control – including scope – process and educate all team members on their responsibilities in scope management process

Clear Success Criteria – Project outcomes are clear and compelling

- Clear ambitions have been set for this program – to reduce operational risk, improve operational performance and create a flexible platform for the future.
- The program team has defined business benefits anticipated as a result of GBE as detailed in Exhibit __ (GIOP-12).
- National Grid has developed a value framework to baseline, measure and track improvements in operational performance metrics as a result of GBE.

Readied Business – An informed, engaged business is ready to successfully implement the change.

- Change management and business engagement activities will occur continuously throughout the GBE Program’s lifecycle and have been planned and resourced with the same rigor as the systems delivery work streams.
- Business resources will participate in all phases of the work including design, development, testing and deployment. This will facilitate smooth handover from the GBE Program team to the business user community.

Rigorous Stage Gating – Tightly defined criteria must be met for projects to move between stages.

- Stage gating is built into GBE Program plans and management frameworks.
- The GBE Program will use a scaled agile development methodology that is performance data driven and includes regular planning workshops to evaluate progress, quality, risk and outcomes achieved.

Good Governance – Established governance groups, supported to operate effectively.

- A comprehensive GBE Program Handbook has been developed including processes, tools, templates, roles and responsibilities. The Handbook supports integrated program planning, resource and finance management, scope control, risk and issues management, commercial management, quality assurance, performance management and governance support.
- The GBE Program engages independent reviewers to provide feedback on deliverable quality, process compliance, alignment to business case and strategic business objectives and priorities.

Well Managed Partners – The right partners/resources fit for the GBE Program, held accountable to deliver.

- A rigorous sourcing process is underway to retain highly capable consulting partners at competitive rates.
- Service levels and incentives are tied to achievement of the National Grid business benefit case and captured in contracts.
- Contracts with experienced delivery partners are being established, it is expected that these will be on a fixed price basis, supported by rigorous oversight and change control processes.
- The GBE Portfolio Office has established the capability to manage all program consulting and service contracts.

High Performing Teams – One team, the right people, highly motivated.

- The GBE Program is competitively recruiting all team members for the right mix of capabilities, skills and experience, as well as alignment with National Grid and GBE values and culture.
- Program “ways of working” are designed to foster a “badge-less, one team” culture between employees and consultants.

Attachment 1 provides a further description of the CSFs.

Deployment Strategies and Development Methodologies

The GBE Program differs from previous major implementation in that it is placing greater emphasis on upfront and continuous business engagement and alignment and has invested significant effort in ensuring that the scope and road map are aligned and supportable. This supports on time, on budget delivery by reducing unplanned scope change, facilitating timely business resource availability and handover of GBE solutions. Different from previous programs, the performance of both GBE consulting partners and the National Grid team is directly measured by success in realizing the business case. Additionally, in the past, some programs and projects did not sufficiently enable their governance and management organizations to support the size and complexity of the efforts they were supporting. National Grid is deploying a governance structure that is appropriate to the size, scale and impact of the GBE Program. The GBE Program management organization is enabled with the resources, tools and capabilities necessary to support on time, on budget delivery of the program scope of work.

To lower overall costs, reduce and manage delivery risks and accelerate the time between kick-off and deployment of functionality and capabilities to the user community, the GBE Program will deploy multiple work streams working concurrently and delivering in a phased approach based on geography and work type. Further, the program will adopt an agile deployment method based on SAFe (Scaled Agile Framework) that supports

quicker development of initial functionality, routinely engaging the user community throughout, and providing an approach to prioritizing and delivering enhancements. The GBE Program will also leverage cloud-based industry standard solutions to support faster deployments, provide greater scalability and security, and reduce legacy infrastructure upgrades and risk of obsolescence.

Change Management

A key learning from National Grid's past experience and from discussions with peer companies is that change management must be a core program capability and must be active throughout the entire program lifecycle. Additionally, all levels of the organization must be engaged through a managed plan including communications and activities that maintain a strong link between the user community and the GBE Program. The GBE Program's phased deployment strategy breaks the level of change that users will experience into more manageable increments and reduces the likelihood of process disruptions and delays as the various phases of the program are implemented.

In some previous programs, change management tended to be regarded as more of a "back end" activity performed by a select group of change specialists focused more on educating users on solutions they were receiving rather than engaging them in the actual process of developing the solution. Additionally, business engagement tended to be more episodic and focused primarily on the employees who would be directly using the solution. The GBE Program treats change management as an essential capability and key enabler of successful program delivery. Change management activities occur continuously throughout the program lifecycle, are supported by the entire program team, and engage not only the US gas business leaders and employees but also stakeholders within the Jurisdictional teams, support organizations such as Supply Chain and Information Services, as well as other parts of the US Business.

Third Party Value Assurance

The GBE Program is planning on procuring a third party "Value Assurance" partner. Their role will be to provide ongoing independent assessment of program delivery to either provide confidence the program is on track or early warning of any changes needed to secure the desired outcomes. The Value Assurance partner will report directly to the Program Sponsor and Steering Group on their findings.

2. Attachment 2 describes the interviews with peers on similarly complex projects.
3. GBE will provide comprehensive training to all users of the system, including office and field employees at all levels in the organization. Training will be tailored to the type of employee (*e.g.*, manager, service technician) based on the level of detail required by that type of employee. Training design will be a collaborative effort between a dedicated GBE training team and the business to ensure that the training is appropriately targeted and minimizes the disruption to business operations. The training will be delivered through various media such as computer based training, video, and classroom. In addition to pre-

deployment training, procedures, help guides, and strategically located subject matter experts will be available following deployment.

In addition to system training, managers at all levels will be trained in change leadership beginning in October 2017. As the program progresses, leaders will be formally coached on how to lead their teams through system implementation. This approach has been shown by change experts to effectively prepare teams for the upcoming changes and minimize productivity issues. Work on the training plan and materials will commence shortly, and the initial materials will be developed over the next 3–4 months.

GBE will also be implementing a tailored approach to engage, upskill and enhance capability of the field force and front-line management to change behaviors, remove obstacles and enable change with respect to serving and interacting with customers. The timing of this training will follow the established release schedule.

4. Implementation of the GBE Program roadmap and initiatives is not expected to adversely impact delivery of the capital plan in the Rate or Data Years.

The GBE Program initiatives will deploy capabilities to support capital plan execution in the following areas:

- Deployment of a graphic work design tool and compatible unit estimating to improve the accuracy of project estimates to actual performance enabling improved planning of work and associated resources;
- Enterprise Asset Management system deployment along with new methodology and mobile tools for employee time capture, equipment assignment, and materials allocations by project with greater traceability for installed assets. Further, enhanced ability for contractors to submit invoices electronically against CU estimates with enhanced reporting capability will improve in-year budget forecasting as a result of greater transparency and accuracy with project spending.
- Increased estimate accuracy and forecasting will support capital planning activities
- Development and deployment of asset integrity management tools to support the selection and prioritization of mains as part of proactive replacement programs

As detailed in Exhibit __ (GIOP-9), the following GBE initiatives with in-service dates by the Rate and Data Years specifically support the execution of the capital plan:

- CU Governance & Library – process (in-service November 2018)
- Asset Investment Planning and Management (“AIPM”) Tool – Enhancements (in-service December 2018)
- Additional Integrity Management (“IM”) Modules (in-service February 2019)
- EAM-FIN Integration (in-service June 2019)
- PowerPlan Integration & Enhancements (in-service June 2020)
- Design (GWD), Estimating (CU), & Mobility (in-service September 2020)
- Construction Work & Leak Repair (in-service September 2020)
- Asset Analytics Integration (in-service December 2020)

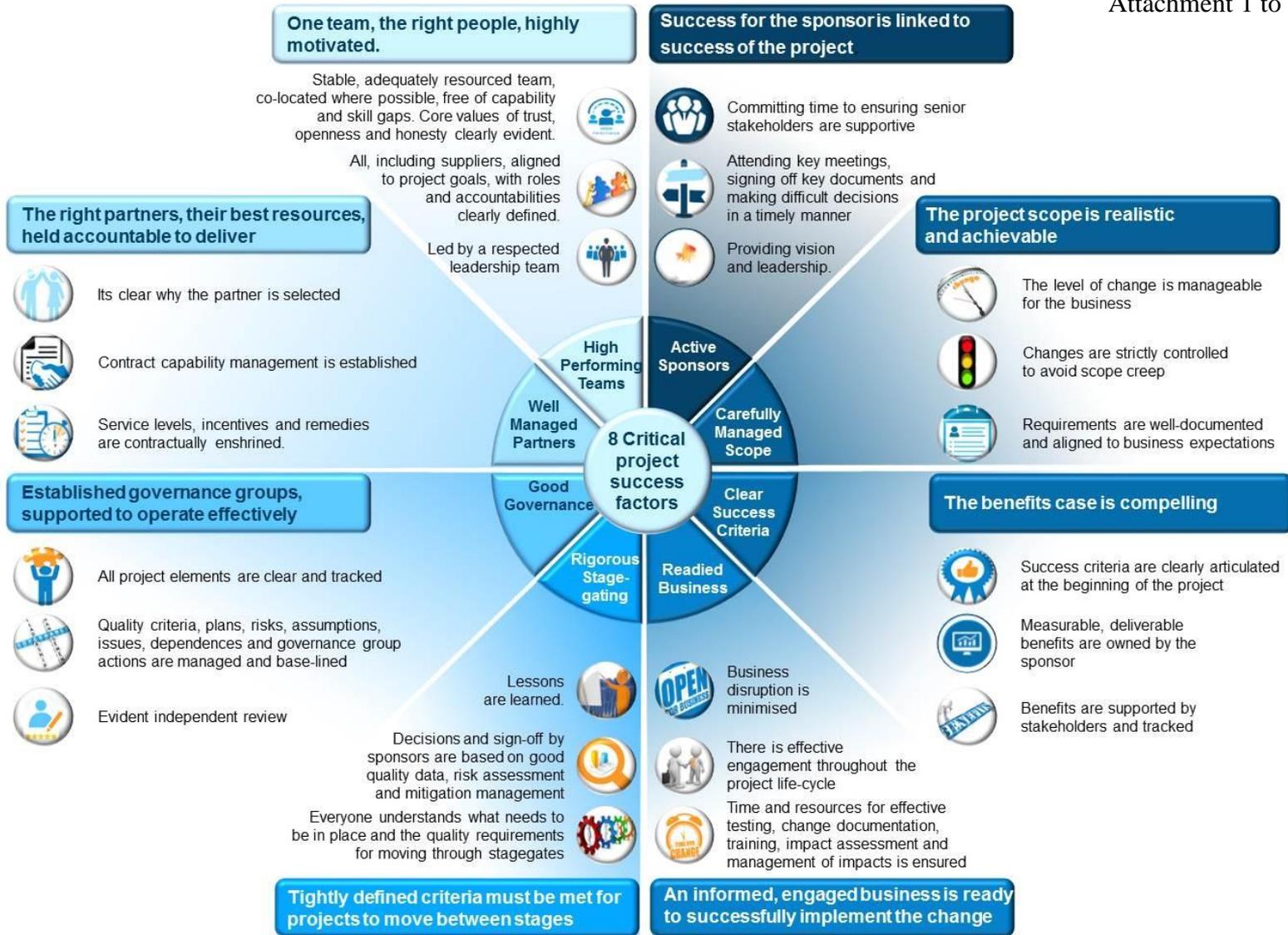
- GIS (GWD/CU) – Project Portfolio Management (“PPM”) Integration (in-service December 2020)
- GIS-EAM Integration (in-service December 2020)
- Complex Design (CAD) & Estimating (ESW) (in-service March 2021)
- Use Case No.1 - Asset Risk (in-service March 2021)

5.

- a) The GBE Program implements a suite of work and asset management systems that will assist in managing the Company’s gas business. Besides feeding other systems such as the financial and asset register systems, the GBE Program does not rely on other IS programs for functionality. Please note that Attachment 1 to DPS-278 (IS-7) described certain Technology Modernization investments (RAS/VPN Re-Platform/Mobile, US Network Programme, ICE Replacement, US VSTIG Programme, US Wireless Programme) as technical changes, network upgrades, and wireless capabilities that can be leveraged for the GBE program; however, these investments are not specific requirements of the GBE Program but rather function to facilitate the future implementation of any new systems required by the business such as GBE and NY REV/grid modernization.
- b) Beginning late last year, the GBE team conducted a review of all projects in the IS portfolio to determine if any IS projects overlapped with GBE initiatives. That review occurs on an ongoing basis to determine if any new projects that are proposed impact GBE. No duplicate budget items between GBE and other IS projects have been identified.
- c) No other IS investments are required to achieve the full benefits of GBE.

Name of Respondent:
Christopher Murphy
John Stavrakas

Date of Reply:
July 10, 2017



The National Grid Gas Business Enablement (GBE) team conferred with three peer utility companies to gain insight and lessons learned from their experiences implementing similarly complex IT projects.

These lessons learned have informed the GBE Program’s development of strategy, delivery approach and methods as well as governance and management frameworks. Lessons learned and how they validated, or were incorporated into, the GBE plan are shown below.

Company	Key Lessons Learned	Impact
<p><u>One Gas</u></p> <ul style="list-style-type: none"> • 2.1M Customers over 3 states • 5 Year Maximo, CGI and Copperleaf Implementation 	<ul style="list-style-type: none"> • Take a phased approach to implementation and use pilots • “Grow your own talent” by hiring new college graduates and letting them learn the solution from the ground up. They bring new and fresh perspectives • When working with legacy data, be careful about its quality. It can unfavorably skew analysis results • Make sure you have thought through, designed and built your initial Day 1 reporting • Don’t assume that sending messages to VP’s will result in trickle down through the organization. Your change program should directly engage the impacted users • Get your change program established right up front 	<ul style="list-style-type: none"> • The GBE roadmap is built around the concept of phased deployment of functionality and solutions with the first release serving as a pilot. Once that release is stable, functionality is progressively deployed over time • The GBE team is recruiting team members both internally and externally – based on “best fit” for the capabilities required. External hires include qualified new college graduates who are learning the solution at a fundamental level while adding value through personal capabilities, skills and perspectives. • GBE stood up a data management team at the outset of the program to evaluate legacy data quality and provide input to program plans, estimates and scope • GBE has adopted an end to end process approach that captures process and reporting requirements • GBE has developed a governance model and communication approach that engages leadership and users at all levels • Change Management has been established as a core program capability and has been actively engaged throughout
<p><u>ATMOS Energy</u></p> <ul style="list-style-type: none"> • 3M Gas Customers across 8 states • 3 Year SAP, Click, Scylo implementation 	<ul style="list-style-type: none"> • CEO set the tone for a culture of change management and employee engagement and common values to insure alignment between business and program • Formed a process council of business leaders that were accountable for key process design decisions to support ownership and buy-in • Addressed data cleansing from the 	<ul style="list-style-type: none"> • US Gas Business Leadership has visibly demonstrated support of the GBE program and have actively participated in a series of events designed to engage employees at all levels and foster alignment between program and business • A Design Authority consisting of the leaders of US gas business units and key supporting functions was formed to directly engage the business in key process

Company	Key Lessons Learned	Impact
	<p>beginning of the program and continuously throughout</p> <ul style="list-style-type: none"> • Focused program scope on key processes rather than trying to fix everything at once 	<p>design decisions and to provide input on program scoping, planning and delivery activities</p> <ul style="list-style-type: none"> • Data cleansing activities occur throughout the program lifecycle. Program governance and management activities insure these activities are appropriately prioritized, monitored and resourced • The GBE Program conducted a Strategic Assessment activity to define scope, business case and roadmap that aligned to business and strategic priorities
<p><u>DTE Energy</u></p> <ul style="list-style-type: none"> • 1.1M Gas customers • Implemented Maximo, CGI, and SAP in 2007 	<ul style="list-style-type: none"> • Training needs to include the business process, not just how to operate a screen. Users need to be taught how to do their job in the new solution • At the very beginning of the program, focus on getting data hierarchies correct – they are very expensive to change later • Engaged unions early and regularly, used a quarterly “pulse check” to understand how people are feeling • Developed a strong performance management cadence including daily stand-up/Hub meeting, weekly performance calls etc. 	<ul style="list-style-type: none"> • The GBE Program will incorporate the process / job orientation into training protocols and development standards • The GBE Integrated Program Plan will support alignment of the Data Management Team with Work Streams and Projects within the GBE Program to insure that hierarchies are developed in a timely and complete manner • GBE business engagement plans include union specific activities. An employee engagement evaluation process will be deployed- similar to a “Pulse Check” • The GBE Program participates in the US Gas Business performance cadence to further support business/program alignment. The GBE Program has a regular cadence of “Hub” and performance oriented meetings which will be expended as appropriate during mobilization. Tools and processes are being deployed to support a dynamic approach to program and project management

Niagara Mohawk Power Corporation d/b/a National Grid
Case No. 17-E-0238 and 17-G-0239
Attachment 5A to DPS 447 AAM-21

Financial Summary of the Proposed Investment

Investment Name:	EUC Windows 7 Refresh Phase 3b Deployment					
Project Name:	EUC Windows 7 Refresh Phase 3b Deployment					
Investment Plan No:	4307	Investment Start (Fiscal Year):				2016 / 17

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6+	Total
	16/17	17/18	18/19	19/20	20/21		

INVESTMENT PLAN DETAILS:

OpEx	-	-	-	-	-	-	-
CapEx	-	-	-	-	-	-	-
Asset Lease	-	-	-	-	-	-	-
Net RTB Impact	-	-	-	-	-	-	-

INVESTMENT COST SUMMARY

Start-Up:	OpEx	-	-	-	-	-	-
	CapEx	-	-	-	-	-	-
	Risk Margin - OpEx	-	-	-	-	-	-
	Risk Margin - CapEx	-	-	-	-	-	-
	Subtotal - Start-Up	-	-	-	-	-	-

R&D:	OpEx	-	-	-	-	-	-
	CapEx	-	-	-	-	-	-
	Risk Margin - OpEx	-	-	-	-	-	-
	Risk Margin - CapEx	-	-	-	-	-	-
	Asset Lease	-	-	-	-	-	-
	Subtotal - R&D	-	-	-	-	-	-

D&I - OpEx:	Resource costs (NG)	598	-	-	-	-	598
	SDC - Time & Materials	-	-	-	-	-	-
	SDC - Fixed Cost	-	-	-	-	-	-
	Software licenses	-	-	-	-	-	-
	Hardware (NG owned)	-	-	-	-	-	-
	Other	44	-	-	-	-	44
	Risk Margin - OpEx	-	-	-	-	-	-
	Subtotal - D&I OpEx	643	-	-	-	-	643

D&I - CapEx:	Resource costs (NG)	1,448	-	-	-	-	1,448
	SDC - Time & Materials	-	-	-	-	-	-
	SDC - Fixed Cost	-	-	-	-	-	-
	Software licenses	1,038	-	-	-	-	1,038
	Hardware (NG owned)	3,217	-	-	-	-	3,217
	Other	5,804	-	-	-	-	5,804
	Risk Margin - CapEx	-	-	-	-	-	-
	Subtotal - D&I CapEx	11,508	-	-	-	-	11,508

D&I - Lease:	Subtotal - D&I Lease	-	-	-	-	-	-
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D&I:	Subtotal - D&I	12,150	-	-	-	-	12,150
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Post-Project Leases: Subtotal - PP Leases	-	-	-	-	-	-	-
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Total Investment: OpEx	643	-	-	-	-	-	643
CapEx	11,508	-	-	-	-	-	11,508
Asset Lease	-	-	-	-	-	-	-
TOTAL	12,150	-	-	-	-	-	12,150

Non-Regulated Uplift	-	-	-	-	-	-	-
Projects: TOTAL	12,150	-	-	-	-	-	12,150

Future Investments:	-	-	-	-	-	-	-
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VARIANCES TO INVESTMENT PLAN

OpEx	(643)	-	-	-	-	-	(643)
CapEx	(11,508)	-	-	-	-	-	(11,508)
Asset Lease	-	-	-	-	-	-	-

RTB ANALYSIS

RTB if Status Quo Continues	-	-	-	-	-	-	-
RTB if Project Implemented	8	201	199	-	-	-	408
Net RTB Impact	8	201	199	-	-	-	408
Variance to Investment Plan	8	201	199	-	-	-	408

INVESTMENT BENEFITS

Total Investment Benefits	-	-	-	-	-	-	-
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KEY INVESTMENT RETURN METRICS

Discount Rate:	7%	NPV:	(9882) \$000s	IRR:	-39%	Payback:	no payback 0 years months
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Niagara Mohawk Power Corporation d/b/a National Grid
Case No. 17-E-0238 and 17-G-0239
Attachment 5A to DPS 447 AAM-21

Summary: Investment Forecast and Analysis

	Investment Plan Funding						
	Fiscal Year						
	16/17	17/18	18/19	19/20	20/21	Yr 6+	Total
OpEx	-	-	-	-	-	-	-
CapEx	-	-	-	-	-	-	-
Asset Lease	-	-	-	-	-	-	-
Net Change in RTB	-	-	-	-	-	-	-

(All figures in \$000s)		Cost Forecast and Investment Analysis							Project Phase		
		Fiscal Year							Str.-Up	R&D	D&I
		16/17	17/18	18/19	19/20	20/21	Yr. 6+	Total			
Personnel: NG	OpEx	598	-	-	-	-	-	598	-	-	598
	CapEx	1,448	-	-	-	-	-	1,448	-	-	1,448
Personnel: SDC T&M	OpEx	-	-	-	-	-	-	-	-	-	-
	CapEx	-	-	-	-	-	-	-	-	-	-
Personnel: Fixed Cost	OpEx	-	-	-	-	-	-	-	-	-	-
	CapEx	-	-	-	-	-	-	-	-	-	-
Hardware	OpEx	-	-	-	-	-	-	-	-	-	-
	CapEx	3,217	-	-	-	-	-	3,217	-	-	3,217
Software	OpEx	-	-	-	-	-	-	-	-	-	-
	CapEx	1,038	-	-	-	-	-	1,038	-	-	1,038
Other	OpEx	30	-	-	-	-	-	30	-	-	30
	CapEx	5,337	-	-	-	-	-	5,337	-	-	5,337
Shared & Financial Costs	OpEx	14	-	-	-	-	-	14	-	-	14
	CapEx	467	-	-	-	-	-	467	-	-	467
Risk Margin	OpEx	-	-	-	-	-	-	-	-	-	-
	CapEx	-	-	-	-	-	-	-	-	-	-

Asset Lease Costs	-	-	-	-	-	-	-	-	-	-	
Total Investment	12,150	-	-	-	-	-	-	12,150	-	-	12,150
OpEx	643	-	-	-	-	-	-	643	-	-	643
CapEx	11,508	-	-	-	-	-	-	11,508	-	-	11,508
Lease	-	-	-	-	-	-	-	-	-	-	-
Non-Reg. Uplift	-	-	-	-	-	-	-	-	-	-	-
Non-Regulated Total	-	-	-	-	-	-	-	-	-	-	-
Future Investments	-	-	-	-	-	-	-	-	-	-	-

	RTB Forecast and Analysis						
If Status Quo Continues	-	-	-	-	-	-	-
If Project Implemented	8	201	199	-	-	-	408
Net Change in RTB Cost	8	201	199	-	-	-	408

	Variance to Investment Plan						
OpEx	(643)	-	-	-	-	-	643
CapEx	(11,508)	-	-	-	-	-	11,508
Asset Lease	-	-	-	-	-	-	-
Net Change in RTB Cost	(8)	(201)	(199)	-	-	-	408

	Forecast Value of Project's Benefits						
Quantifiable Benefits	-	-	-	-	-	-	-

Data Tables for the INVP Summary

Asset Lease Costs	-	-	-	-	-	-	-
Non-Reg. Uplift	-	-	-	-	-	-	-
Quantifiable Benefits	-	-	-	-	-	-	-

Niagara Mohawk Power Corporation d/b/a National Grid
Case No. 17-E-0238 and 17-G-0239
Attachment 5A to DPS 447 AAM-21

For additional details see soft copy

Monthly Forecast: Summary View

Table 1: Project Costs	2016											
	Str-Up	Str-Up	Dev	Dev	Dev	Imp	Imp	Imp	Imp	Imp	Imp	Imp
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
Personnel: NG	-	-	-	116	165	201	240	244	317	254	254	
OpEx	-	-	-	30	78	116	96	109	86	28	28	
CapEx	-	-	-	86	86	85	144	135	231	227	227	
SDC Personnel: Time & Mat.	-	-	-	-	-	-	-	-	-	-	-	
OpEx	-	-	-	-	-	-	-	-	-	-	-	
CapEx	-	-	-	-	-	-	-	-	-	-	-	
SDC Personnel: Fixed-Price	-	-	-	-	-	-	-	-	-	-	-	
OpEx	-	-	-	-	-	-	-	-	-	-	-	
CapEx	-	-	-	-	-	-	-	-	-	-	-	
Hardware	-	-	-	2	539	2	1,080	-	1,264	329	-	
OpEx	-	-	-	-	-	-	-	-	-	-	-	
CapEx	-	-	-	2	539	2	1,080	-	1,264	329	-	
Software	-	-	-	38	-	-	1	250	250	250	250	
OpEx	-	-	-	-	-	-	-	-	-	-	-	
CapEx	-	-	-	38	-	-	1	250	250	250	250	
Other	-	-	-	266	467	655	840	823	619	566	565	
OpEx	-	-	-	-	30	-	-	-	0	-	-	
CapEx	-	-	-	266	437	655	840	823	619	566	565	
Overhead / Shared	-	-	-	10	27	20	50	30	56	32	25	
OpEx	-	-	-	1	2	3	2	2	2	1	1	
CapEx	-	-	-	9	24	17	48	28	54	32	24	
AFUDC	-	-	-	-	1	5	11	19	29	39	51	
Subtotal (without Risk)	-	-	-	432	1,199	883	2,222	1,367	2,535	1,471	1,145	
OpEx	-	-	-	31	111	118	98	111	88	28	28	
CapEx	-	-	-	402	1,088	765	2,124	1,256	2,447	1,443	1,116	

Niagara Mohawk Power Corporation d/b/a National Grid
Case No. 17-E-0238 and 17-G-0239
Attachment 5A to DPS 447 AAM-21

Investment Analysis

Results →
Detailed Analysis ↓

Results 1: Investment Metrics				
Free Cash Flow-based				
IRR		-39.24%		EBITDA
NPV (\$ '000s)		(9,882)		Pre-Tax
Payback Period	years	no payback		Net Incr
	and months			Free Ca

Months from Project Start	2016												PP →
	Str-Up 1	Str-Up 2	Dev 3	Dev 4	Dev 5	Imp 6	Imp 7	Imp 8	Imp 9	Imp 10	Imp 11	Imp 12	
OPERATING COSTS & INCOME													
Project Operating Costs [OpEx]	-	-	-	(31)	(111)	(118)	(98)	(111)	(88)	(28)	(28)	(28)	-
Asset Lease Costs	-	-	-	-	-	-	-	-	-	-	-	-	-
Net RTB Impact	-	-	-	-	-	-	-	-	(2)	(2)	(2)	(2)	(19)
Operating Benefits	-	-	-	-	-	-	-	-	-	-	-	-	-
AFUDC add-back	-	-	-	-	1	5	11	19	29	39	51	58	-
EBITDA	-	-	-	(31)	(110)	(113)	(87)	(92)	(61)	9	20	28	(19)
D&A EXPENSE (and calculations)													
Capital Investment [CapEx]	-	-	-	(402)	(1,088)	(765)	(2,124)	(1,256)	(2,447)	(1,443)	(1,116)	(869)	-
Capital Benefits [CapEx]	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Capital Benefit (Expense)	-	-	-	(402)	(1,088)	(765)	(2,124)	(1,256)	(2,447)	(1,443)	(1,116)	(869)	-
Accumulated CapEx - calculation row	-	-	-	-	402	1,489	2,254	4,378	5,633	8,080	9,522	10,638	11,508
AFUDC: Capitalized Interest	-	-	-	-	(1)	(5)	(11)	(19)	(29)	(39)	(51)	(58)	-
Capital Assets (Asset Account)	-	-	-	-	402	1,490	2,260	4,395	5,669	8,145	9,627	10,794	11,721
Accumulated Dpr. (Contra Asset Acct.)	-	-	-	-	-	-	-	-	-	-	-	-	-
D&A Expense*	-	-	-	-	-	-	-	-	-	-	-	-	(140)
EBIT	-	-	-	(31)	(110)	(113)	(87)	(92)	(61)	9	20	28	(158)
Net Interest Expense (assumed zero)													
Pre-Tax Income	-	-	-	(31)	(110)	(113)	(87)	(92)	(61)	9	20	28	(158)
TAX EXPENSE													
Tax Expense (benefit)	-	-	-	(6)	(22)	(23)	(18)	(19)	(13)	2	4	6	(32)
Net Income (Net Impact of Project)	-	-	-	(24)	(87)	(90)	(69)	(73)	(49)	7	16	22	(126)
CALCULATE FCFE													
add back depreciation	-	-	-	-	-	-	-	-	-	-	-	-	140
subtract net CapEx benefits (expense)	-	-	-	(402)	(1,088)	(765)	(2,124)	(1,256)	(2,447)	(1,443)	(1,116)	(869)	-
Free Cash Flow to Equity	-	-	-	(426)	(1,175)	(854)	(2,193)	(1,329)	(2,496)	(1,436)	(1,100)	(847)	14
PRESENT VALUE CALCULATIONS													
Discount Factor	1.00	0.99	0.99	0.98	0.98	0.97	0.97	0.96	0.96	0.95	0.95	0.94	0.94
Discounted FCFE	-	-	-	(419)	(1,150)	(832)	(2,123)	(1,279)	(2,390)	(1,367)	(1,042)	(798)	13

Explanatory Notes

* Depreciation is calculated using the straight-line method. The useful life of capital assets is determined by National Grid's Finance Department and is dependent on project location info on the 'Variables for Senior Management' worksheet of this model. To ensure accuracy, the useful life that applies to this project is automatically calculated and applied to all net your reference, it appears right here →
Do NOT alter the useful life figure on this worksheet.

Do Not Alter Any Information Below this Line (all data and inputs below are the basis for essential calculations)

Results 2: Income Measures					
	FY1	FY2	FY3	FY4	FY5
	(437)	(201)	(199)	-	-
Earnings	(437)	(1,876)	(1,874)	(1,674)	(1,674)
Income	(348)	(1,494)	(1,492)	(1,334)	(1,334)
Cash Flow	(11,856)	181	182	341	341

2017								2018													
14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)	(17)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11,508	11,508	11,508	11,508	11,508	11,508	11,508	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11,581	11,442	11,302	11,163	11,023	10,884	10,744	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
140	279	419	558	698	837	977	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)
(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)
(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)	(156)
(32)	(32)	(32)	(32)	(32)	(32)	(32)	(32)	(32)	(32)	(32)	(32)	(32)	(32)	(32)	(32)	(32)	(32)	(32)	(32)	(32)	(32)
(124)	(124)	(124)	(124)	(124)	(124)	(124)	(124)	(124)	(124)	(124)	(124)	(124)	(124)	(124)	(124)	(124)	(124)	(124)	(124)	(124)	(124)
140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
0.93	0.93	0.92	0.92	0.91	0.91	0.90	0.90	0.89	0.89	0.88	0.88	0.87	0.87	0.86	0.86	0.85	0.85	0.85	0.84	0.84	0.84
14	14	14	14	14	14	14	14	14	13	13	13	13	13	13	13	13	13	13	13	13	13

(U.S. or U.K.). Finance officials enter this necessary calculations DO NOT alter it. For	Depreciation - Useful Life	7 years
	Depreciation - Useful Life	84 months
	DO NOT ALTER the Useful Life figures above	

2019											2020											2021			
35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(17)	(17)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(17)	(17)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####	####
(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)
(156)	(156)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)
(156)	(156)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)	(140)
(32)	(32)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)	(28)
(124)	(124)	(111)	(111)	(111)	(111)	(111)	(111)	(111)	(111)	(111)	(111)	(111)	(111)	(111)	(111)	(111)	(111)	(111)	(111)	(111)	(111)	(111)	(111)	(111)	(111)
140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	15	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
0.83	0.83	0.82	0.82	0.81	0.81	0.81	0.80	0.80	0.79	0.79	0.78	0.78	0.78	0.77	0.77	0.76	0.76	0.75	0.75	0.75	0.74	0.74	0.73	0.73	0.73
13	13	23	23	23	23	23	23	23	23	22	22	22	22	22	22	22	22	21	21	21	21	21	21	21	21



Niagara Mohawk Power Corporation d/b/a National Grid
Case No. 17-E-0238 and 17-G-0239
Attachment 5A to DPS 447 AAM-21

*** Reminder: This worksheet should NOT be modified by BAs, PMs or other team members unless they have been explicitly directed to do so by Senior Management. ***

Key Financial & Economic Inputs and Assumptions

Inflation Inputs, Assumptions, and Outputs for model	
Annual Inflation Rate U.S.	2.50%
Annual Inflation Rate U.K.	3.00%
Notes on above inflation assumptions:	
U.S. inflation rates are based upon the Federal Reserve's implicit target for Core CPI in 2013, as issued in FOMC minutes (December 2012)	
Inflation Rate currently being applied to this Analysis	2.50%
Resulting monthly inflation rate	0.21%
Explanatory note on use of inflation in this model: The decision to apply the U.S. or U.K. rate is based on user's currency choice on the 'Characteristics' worksheet.	
The inflation rate above is applied as the perpetual growth rate of all expenses from Year 5 onwards. It is also applied to the wage rates from Year 2 onwards. The model does not apply inflation to software, licenses, leases, service contracts, etc. during Years 2-5 because inflationary price adjustments are typically incorporated into the terms of such agreements - thus, the users of this model would enter that information directly into the appropriate line item in this model. SEE Guidance Notes for complete explanation.	

AFUDC		
U.S. AFUDC Rates	Annual Rate	7.00%
	Daily Rate	0.019%
U.K. AFUDC Rates	Annual Rate	0.00%
	Daily Rate	0.000%
Daily Rate being applied to this analysis:		0.019%
Note: The daily AFUDC rate is derived in accordance with National Grid document 'Financial Policies and Procedures,' Sequence 21, October 1, 2002, p. 2., which specifies that it should be calculated simply by dividing the annual rate by 365, ignoring all compounding effects.		

Depreciation	
Useful Life in Years - U.S.	7
Useful Life in Years - U.K.	5
Above, you can input the useful life (in years) of assets - your inputs will be used for calculating depreciation. Assets are depreciated using straightline depreciation.	

Key Accounting Inputs and Assumptions

Matrix of Shared Cost Rates				
		Project Jurisdiction / Type		
		US	US-exclusion	UK
Firm Managing Project	IBM	3.9%	2.2%	3.2%
	IBM and Wipro	3.4%	1.7%	3.0%
	Wipro	2.7%	1.0%	2.7%
	Internal, CNI, or Other	2.3%	0.6%	2.0%

iRise			
	US (\$ '000s)	UK (£ '000s)	UK (£ '000s)
Breakpoint (Total Project Cost)	500	500	5000
Charge if below breakpoint	10	5	5 or 10
Charge if above breakpoint	25	10	15

RTC		
License Type	U.S. License Cost (\$)	U.K. License Cost (£)
Contributor	3285	2190
Stakeholder	1224	816

Other Key Inputs and Assumptions

Cost Structure and Calculation Inputs	
Workdays per Month (used in calculating personnel costs)	20
Workdays per month --- based on the assumption that: 1) a work-year with no holidays consists of 260 workdays [365 days * 5/7 = 260 days workdays per year]; 2) holidays, absences, etc. per year average 20 days [260 days - 20 days = 240]; 3) 240/12 months = 20 workdays per month	

Non-Personnel Categories	
This model is organized around five fundamental cost categories. The categories are used to organize and present data on the Summary Sheets and Output Sheets, and also guide the user as he/she thinks about the project and enters data into the Input Sheets.	
Two of the five categories are immutable: 'Personnel' and 'Shared Costs.' However, the table below allows you to modify the other categories - the three Non-Personnel Categories that this model is built around.	
Currently, the default Non-Personnel categories are: Hardware, Software, and Other. In the event you wish to change these, whatever you enter in the table below will modify this entire model accordingly.	
#1	Hardware
#2	Software
#3	Other ← "Other" is permanent

--- Section on Discount Rates ---

Discount rate currently being applied to this model	6.72%
Annual rate (above) converted into a monthly rate	0.54%
There are two possible rates that can be applied: the Hurdle Rate or the Cost of Equity. The model decides which rate to apply based upon the user's currency choice on the 'Project Characteristics' worksheet. ("E" applies Hurdle Rate; "S" applies Cost of Equity). This is consistent with NG policy. In addition, WACC calculations are provided in case these become desired.	

Hurdle Rate (this is applied to U.K. projects) **15%**

Cost of Capital Inputs and Calculations			
Debt-Related		Equity-Related	
Effective Tax Rate	20.36%	Risk Free Rate	1.68%
Cost of Debt	3.75%	Equity Risk Premium	6.00%
Weight of Debt	72%	Beta (adjusted)	0.84
		Cost of Equity	6.72%
		Weight of Equity	28%
4.03% = WACC			
0.33% = monthly WACC			

Notes:
Effective Tax Rate: Sourced from xxxxxx's 2011 annual report and filings
Cost of Debt: Based upon current yield-to-maturity of xxx's 10-yr notes, issue due 2017
Weight of Debt and Equity: Current as of 6/15/2012
Risk free rate: U.S. treasury 10-year yield, as of 08/20/2012
Equity Risk Premium: Drawn from proprietary research, and in-line with Ibbotson's estimates
Beta: S&P 500 beta (0.66), 0.82 adjusted for leverage, peer group, mkt. cap factors

RTB Type
Resource Provider
App.Sup. - SDC 1
App.Sup. - SDC 2
App.Sup. - other
SW maintenance
SaaS
HW support
Other: IS
Other: Non-IS

Uplift Assumptions - % UpLift Applicable to Each FY Year - Historical, Current, Projected										
	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20
Percentage Uplift applied to N.G.	0%	58%	49%	49%	49%	49%	49%	49%	49%	49%
Percentage Uplift applied to SDC	0%	6%	4%	4%	4%	4%	4%	4%	4%	4%

Years and Rates Applicable to this Analysis					
	16/17	17/18	18/19	19/20	20/21
Percentage Uplift applied to N.G. Labor	49%	49%	49%	49%	49%
Percentage Uplift applied to SDC	4%	4%	4%	4%	4%

Niagara Mohawk Power Corporation d/b/a National Grid
Case No. 17-E-0238 and 17-G-0239
Attachment 5B to DPS 447 AAM-21

Financial Summary of the Proposed Investment

Investment Name:	Customer Contact Center / SDC Technology Upgrade
Project Name:	Customer Contact Center / SDC Technology Upgrade
Investment Plan No:	3932 Investment Start (Fiscal Year): 2016 / 17

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6+	Total
	16/17	17/18	18/19	19/20	20/21		

INVESTMENT PLAN DETAILS:

OpEx	888	562	547	-	-	-	1,996
CapEx	1,403	14,530	3,519	-	-	-	19,452
Asset Lease	-	-	-	-	-	-	-
Net RTB Impact	-	-	-	-	-	-	-

INVESTMENT COST SUMMARY

Start-Up:	OpEx	5	-	-	-	-	5
	CapEx	-	-	-	-	-	-
	Risk Margin - OpEx	-	-	-	-	-	-
	Risk Margin - CapEx	-	-	-	-	-	-
	Subtotal - Start-Up	5	-	-	-	-	5

R&D:	OpEx	364	512	-	-	-	876
	CapEx	9,890	2,769	-	-	-	12,659
	Risk Margin - OpEx	-	50	-	-	-	50
	Risk Margin - CapEx	967	248	-	-	-	1,215
	Asset Lease	-	-	-	-	-	-
	Subtotal - R&D	11,221	3,579	-	-	-	14,800

D&I - OpEx:	Resource costs (NG)	-	-	-	-	-	-
	SDC - Time & Materials	-	-	-	-	-	-
	SDC - Fixed Cost	-	-	-	-	-	-
	Software licenses	-	-	-	-	-	-
	Hardware (NG owned)	-	-	-	-	-	-
	Other	-	-	512	-	-	512
	Risk Margin - OpEx	-	-	35	-	-	35
	Subtotal - D&I OpEx	-	-	547	-	-	547

D&I - CapEx:	Resource costs (NG)	-	772	463	-	-	1,235
	SDC - Time & Materials	-	17	10	-	-	26
	SDC - Fixed Cost	-	-	-	-	-	-
	Software licenses	-	-	-	-	-	-
	Hardware (NG owned)	-	85	-	-	-	85
	Other	-	9,728	2,947	-	-	12,675
	Risk Margin - CapEx	-	911	99	-	-	1,010
	Subtotal - D&I CapEx	-	11,513	3,519	-	-	15,031

D&I - Lease:	Subtotal - D&I Lease	-	-	-	-	-	-
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D&I:	Subtotal - D&I	-	11,513	4,065	-	-	15,578
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Post-Project Leases:	Subtotal - PP Leases	-	-	-	-	-	-
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Total Investment:	OpEx	369	562	547	-	-	-	1,477
	CapEx	10,856	14,530	3,519	-	-	-	28,905
	Asset Lease	-	-	-	-	-	-	-
	TOTAL	11,226	15,091	4,065	-	-	-	30,382

Non-Regulated Projects:	Uplift	-	-	-	-	-	-	-
	TOTAL	11,226	15,091	4,065	-	-	-	30,382

Future Investments:	-	-	-	-	-	-	-
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VARIANCES TO INVESTMENT PLAN

OpEx	519	-	-	-	-	-	519
CapEx	(9,453)	0	0	-	-	-	(9,453)
Asset Lease	-	-	-	-	-	-	-

RTB ANALYSIS

RTB if Status Quo Continues	-	-	920	2,208	2,208	5,772	11,108
RTB if Project Implemented	-	-	1,187	2,850	2,850	7,450	14,337
Net RTB Impact	-	-	267	642	642	1,678	3,229
Variance to Investment Plan	-	-	267	642	642	1,678	3,229

INVESTMENT BENEFITS

Total Investment Benefits	-	-	-	-	-	-	-
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KEY INVESTMENT RETURN METRICS

Discount Rate: **NPV:** **IRR:** **Payback:**
\$000s years months

Niagara Mohawk Power Corporation d/b/a National Grid
Case No. 17-E-0238 and 17-G-0239
Attachment 5B to DPS 447 AAM-21

Summary: Investment Forecast and Analysis

	Investment Plan Funding						
	Fiscal Year						
	16/17	17/18	18/19	19/20	20/21	Yr 6+	Total
OpEx	888	562	547	-	-	-	1,996
CapEx	1,403	14,530	3,519	-	-	-	19,452
Asset Lease	-	-	-	-	-	-	-
Net Change in RTB	-	-	-	-	-	-	-

(All figures in \$000s)	Cost Forecast and Investment Analysis										
	Fiscal Year							Project Phase			
	16/17	17/18	18/19	19/20	20/21	Yr. 6+	Total	Str.-Up	R&D	D&I	
Personnel: NG	OpEx	188	-	-	-	-	-	188	3	185	-
	CapEx	157	1,073	463	-	-	-	1,692	-	458	1,235
Personnel: SDC T&M	OpEx	14	-	-	-	-	-	14	-	14	-
	CapEx	11	68	10	-	-	-	88	-	62	26
Personnel: Fixed Cost	OpEx	-	-	-	-	-	-	-	-	-	-
	CapEx	-	-	-	-	-	-	-	-	-	-
Hardware	OpEx	-	-	-	-	-	-	-	-	-	-
	CapEx	-	85	-	-	-	-	85	-	-	85
Software	OpEx	-	-	-	-	-	-	-	-	-	-
	CapEx	9,438	-	-	-	-	-	9,438	-	9,438	-
Other	OpEx	159	500	500	-	-	-	1,159	2	658	500
	CapEx	61	10,372	1,587	-	-	-	12,019	-	2,192	9,826
Shared & Financial Costs	OpEx	8	12	12	-	-	-	31	0	20	12
	CapEx	224	1,773	1,361	-	-	-	3,357	-	508	2,849
Risk Margin	OpEx	-	50	35	-	-	-	85	-	50	35
	CapEx	967	1,160	99	-	-	-	2,225	-	1,215	1,010
Asset Lease Costs		-	-	-	-	-	-	-	-	-	-
Total Investment		11,226	15,091	4,065	-	-	-	30,382	5	14,800	15,578
OpEx		369	562	547	-	-	-	1,477	5	926	547
CapEx		10,856	14,530	3,519	-	-	-	28,905	-	13,874	15,031
Lease		-	-	-	-	-	-	-	-	-	-
Non-Reg. Uplift		-	-	-	-	-	-	-	-	-	-
Non-Regulated Total		-	-	-	-	-	-	-	-	-	-
Future Investments		-	-	-	-	-	-	-	-	-	-

RTB Forecast and Analysis							
If Status Quo Continues	-	-	920	2,208	2,208	5,772	11,108
If Project Implemented	-	-	1,187	2,850	2,850	7,450	14,337
Net Change in RTB Cost	-	-	267	642	642	1,678	3,229

Variance to Investment Plan							
OpEx	519	-	-	-	-	-	(519)
CapEx	(9,453)	0	0	-	-	-	9,453
Asset Lease	-	-	-	-	-	-	-
Net Change in RTB Cost	-	-	(267)	(642)	(642)	(1,678)	3,229

Forecast Value of Project's Benefits							
Quantifiable Benefits	-	-	-	-	-	-	-

Data Tables for the INVP Summary

Asset Lease Costs	-	-	-	-	-	-	-
Non-Reg. Uplift	-	-	-	-	-	-	-
Quantifiable Benefits	-	-	-	-	-	-	-

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For additional
details

Monthly Forecast: Summary View

Table 1: Project Costs	2016								
	---	---	---	Str-Up	Req	Req	Req	Req	Req
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Personnel: NG	-	-	-	3	6	13	37	66	63
OpEx	-	-	-	3	6	13	37	66	63
CapEx	-	-	-	-	-	-	-	-	-
SDC Personnel: Time &	-	-	-	-	-	2	2	5	5
OpEx	-	-	-	-	-	2	2	5	5
CapEx	-	-	-	-	-	-	-	-	-
SDC Personnel: Fixed-Price	-	-	-	-	-	-	-	-	-
OpEx	-	-	-	-	-	-	-	-	-
CapEx	-	-	-	-	-	-	-	-	-
Hardware	-	-	-	-	-	-	-	-	-
OpEx	-	-	-	-	-	-	-	-	-
CapEx	-	-	-	-	-	-	-	-	-
Software	-	-	-	-	-	-	-	-	-
OpEx	-	-	-	-	-	-	-	-	-
CapEx	-	-	-	-	-	-	-	-	-
Other	-	-	-	2	2	25	47	42	43
OpEx	-	-	-	2	2	25	47	42	43
CapEx	-	-	-	-	-	-	-	-	-
Overhead / Shared	-	-	-	0	0	1	2	3	3
OpEx	-	-	-	0	0	1	2	3	3
CapEx	-	-	-	-	-	-	-	-	-
AFUDC	-	-	-	-	-	-	-	-	-
Subtotal (without Risk)	-	-	-	5	7	41	87	116	113
OpEx	-	-	-	5	7	41	87	116	113
CapEx	-	-	-	-	-	-	-	-	-
Risk Margin	-	-	-	-	-	-	-	-	-
OpEx	-	-	-	-	-	-	-	-	-
CapEx	-	-	-	-	-	-	-	-	-
TOTAL OpEx & CapEx	-	-	-	5	7	41	87	116	113
OpEx	-	-	-	5	7	41	87	116	113
CapEx	-	-	-	-	-	-	-	-	-
Asset Lease Costs	-	-	-	-	-	-	-	-	-
Total Investment	-	-	-	5	7	41	87	116	113

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Investment Analysis

Results →
Detailed Analysis ↓

Results 1: Investment Metrics			Result
Free Cash Flow-based			
IRR		-57.40%	EBITDA
NPV (\$ '000s)		(24,127)	Pre-Tax Earnings
Payback Period	years	no payback	Net Income
	and months		Free Cash Flow

Months from Project Start	2016													
	Str-Up	Req	Req	Req	Req	Req	Dsign	Dsign	Dsign	Dsign	Dsign	Dsign		
	1	2	3	4	5	6	7	8	9	10	11	12		
OPERATING COSTS & INCOME														
Project Operating Costs [OpEx]	(5)	(7)	(41)	(87)	(116)	(113)	-	-	-	(281)	-	(281)		
Asset Lease Costs	-	-	-	-	-	-	-	-	-	-	-	-		
Net RTB Impact	-	-	-	-	-	-	-	-	-	-	-	-		
Operating Benefits	-	-	-	-	-	-	-	-	-	-	-	-		
AFUDC add-back	-	-	-	-	-	-	-	0	1	45	90	92		
EBITDA	(5)	(7)	(41)	(87)	(116)	(113)	-	0	1	(236)	90	(188)		
D&A EXPENSE (and calculations)														
Capital Investment [CapEx]	-	-	-	-	-	-	(74)	(76)	(10,707)	(230)	(279)	(2,508)		
Capital Benefits [CapEx]	-	-	-	-	-	-	-	-	-	-	-	-		
Net Capital Benefit (Expense)	-	-	-	-	-	-	(74)	(76)	(10,707)	(230)	(279)	(2,508)		
Accumulated CapEx - calculation row	-	-	-	-	-	-	-	74	149	10,856	11,087	11,366		
AFUDC: Capitalized Interest	-	-	-	-	-	-	-	(0)	(1)	(45)	(90)	(92)		
Capital Assets (Asset Account)	-	-	-	-	-	-	-	74	150	10,858	11,133	11,502		
Accumulated Dpr. (Contra Asset Acct.)	-	-	-	-	-	-	-	-	-	-	-	-		
D&A Expense*	-	-	-	-	-	-	-	-	-	-	-	-		
EBIT	(5)	(7)	(41)	(87)	(116)	(113)	-	0	1	(236)	90	(188)		
Net Interest Expense (assumed zero)														
Pre-Tax Income	(5)	(7)	(41)	(87)	(116)	(113)	-	0	1	(236)	90	(188)		
TAX EXPENSE														
Tax Expense (benefit)	(1)	(2)	(8)	(18)	(24)	(23)	-	0	0	(48)	18	(38)		
Net Income (Net Impact of Project)	(4)	(6)	(32)	(70)	(92)	(90)	-	0	1	(188)	72	(150)		
CALCULATE FCFE														
add back depreciation	-	-	-	-	-	-	-	-	-	-	-	-		
subtract net CapEx benefits (expense)	-	-	-	-	-	-	(74)	(76)	(10,707)	(230)	(279)	(2,508)		
Free Cash Flow to Equity	(4)	(6)	(32)	(70)	(92)	(90)	(74)	(75)	(10,706)	(418)	(207)	(2,658)		
PRESENT VALUE CALCULATIONS														
Discount Factor	1.00	1.00	1.00	0.99	0.99	0.98	0.98	0.97	0.97	0.96	0.96	0.95	0.95	0.94
Discounted FCFE	(4)	(6)	(32)	(68)	(90)	(88)	(71)	(73)	(10,252)	(398)	(196)	(2,504)		

Explanatory Notes

* Depreciation is calculated using the straight-line method. The useful life of capital assets is determined by National Grid's Finance Department and is dependent on project location. Finance officials enter this info on the 'Variables for Senior Management' worksheet of this model. To ensure accuracy, the useful life that applies to this project is automatically calculated to all necessary calculations. DO NOT alter it. For your reference, it appears right here → Do NOT alter the useful life figure on this worksheet.

Do Not Alter Any Information Below this Line (all data and inputs below are the basis for essential calculations)

Items 2: Income Measures				
FY1	FY2	FY3	FY4	FY5
(368)	945	500	(642)	(642)
(368)	945	(1,767)	(5,174)	(5,174)
(293)	752	(1,407)	(4,121)	(4,121)
(11,150)	(13,777)	(2,659)	412	412

2017						2018										
Dev	Dev	Dev	Dev	Dev	Dev	Imp	Imp	Imp	Imp	Imp	Imp	Imp	Imp	Imp	PP →	PP →
13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
-	-	-	-	-	-	-	-	-	(168)	(112)	(112)	(51)	(51)	(51)	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(53)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
104	115	118	129	141	145	161	175	191	207	212	218	221	224	231	-	-
104	115	118	129	141	145	161	175	191	39	100	105	170	173	180	-	(53)
(250)	(357)	(2,510)	(275)	(772)	(3,098)	(307)	(3,611)	(333)	(916)	(359)	(471)	(355)	(1,151)	(266)	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(250)	(357)	(2,510)	(275)	(772)	(3,098)	(307)	(3,611)	(333)	(916)	(359)	(471)	(355)	(1,151)	(266)	-	-
13,874	14,124	14,481	16,991	17,266	18,037	21,135	21,442	25,053	25,386	26,302	26,661	27,133	27,488	28,639	28,905	28,905
(104)	(115)	(118)	(129)	(141)	(145)	(161)	(175)	(191)	(207)	(212)	(218)	(221)	(224)	(231)	-	-
14,103	14,457	14,928	17,556	17,960	18,873	22,116	22,583	26,369	26,894	28,017	28,589	29,278	29,854	31,229	31,726	31,348
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	378
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(378)	(378)
104	115	118	129	141	145	161	175	191	39	100	105	170	173	180	(378)	(431)
104	115	118	129	141	145	161	175	191	39	100	105	170	173	180	(378)	(431)
21	23	24	26	29	30	33	36	39	8	20	21	35	35	37	(77)	(88)
83	92	94	103	112	116	128	139	152	31	80	84	135	138	143	(301)	(343)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(250)	(357)	(2,510)	(275)	(772)	(3,098)	(307)	(3,611)	(333)	(916)	(359)	(471)	(355)	(1,151)	(266)	-	-
(168)	(265)	(2,416)	(172)	(659)	(2,983)	(178)	(3,472)	(181)	(885)	(280)	(387)	(220)	(1,013)	(123)	77	34
0.94	0.93	0.93	0.92	0.92	0.91	0.91	0.90	0.90	0.89	0.89	0.88	0.88	0.87	0.87	0.86	0.86
(157)	(247)	(2,240)	(159)	(605)	(2,720)	(162)	(3,132)	(163)	(790)	(248)	(342)	(193)	(885)	(107)	66	29

on (U.S. or U.K.). calculated and applied	Depreciation - Useful Life	7 years
	Depreciation - Useful Life	84 months
	DO NOT ALTER the Useful Life figures above	

2019																
30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28,905	28,905	28,905	28,905	28,905	28,905	28,905	28,905	28,905	28,905	28,905	28,905	28,905	28,905	28,905	28,905	28,905
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30,971	30,593	30,215	29,837	29,460	29,082	28,704	28,327	27,949	27,571	27,194	26,816	26,438	26,061	25,683	25,305	24,928
755	1,133	1,511	1,888	2,266	2,644	3,022	3,399	3,777	4,155	4,532	4,910	5,288	5,665	6,043	6,421	6,798
(378)	(378)	(378)	(378)	(378)	(378)	(378)	(378)	(378)	(378)	(378)	(378)	(378)	(378)	(378)	(378)	(378)
(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)
(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)
(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)
(343)	(343)	(343)	(343)	(343)	(343)	(343)	(343)	(343)	(343)	(343)	(343)	(343)	(343)	(343)	(343)	(343)
378	378	378	378	378	378	378	378	378	378	378	378	378	378	378	378	378
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
0.85	0.85	0.85	0.84	0.84	0.83	0.83	0.82	0.82	0.81	0.81	0.81	0.80	0.80	0.79	0.79	0.78
29	29	29	29	29	29	28	28	28	28	28	28	27	27	27	27	27

2020								2021		
47	48	49	50	51	52	53	54	55	56	57
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)	(53)
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
28,905	28,905	28,905	28,905	28,905	28,905	28,905	28,905	28,905	28,905	28,905
-	-	-	-	-	-	-	-	-	-	-
24,550	24,172	23,794	23,417	23,039	22,661	22,284	21,906	21,528	21,151	20,773
7,176	7,554	7,931	8,309	8,687	9,065	9,442	9,820	10,198	10,575	10,953
(378)	(378)	(378)	(378)	(378)	(378)	(378)	(378)	(378)	(378)	(378)
(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)
(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)	(431)
(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)	(88)
(343)	(343)	(343)	(343)	(343)	(343)	(343)	(343)	(343)	(343)	(343)
378	378	378	378	378	378	378	378	378	378	378
-	-	-	-	-	-	-	-	-	-	-
34	34	34	34	34	34	34	34	34	34	34
0.78	0.78	0.77	0.77	0.76	0.76	0.75	0.75	0.75	0.74	0.74
27	27	26	26	26	26	26	26	26	25	25



Niagara Mohawk Power Corporation d/b/a National Grid
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*** Reminder: This worksheet should NOT be modified by BAs, PMs or other team members unless they have been explicitly directed to do so by Senior Management. ***

Key Financial & Economic Inputs and Assumptions

Inflation Inputs, Assumptions, and Outputs for model	
Annual Inflation Rate U.S.	2.50%
Annual Inflation Rate U.K.	3.00%
Notes on above inflation assumptions: U.S. inflation rates are based upon the Federal Reserve's implicit target for Core CPI in 2013, as issued in FOMC minutes (December 2012)	
Inflation Rate currently being applied to this Analysis	2.50%
Resulting monthly inflation rate	0.21%
Explanatory note on use of inflation in this model: The decision to apply the U.S. or U.K. rate is based on user's currency choice on the 'Characteristics' worksheet.	
The inflation rate above is applied as the perpetual growth rate of all expenses from Year 5 onwards. It is also applied to the wage rates from Year 2 onwards. The model does not apply inflation to software, licenses, leases, service contracts, etc. during Years 2-5 because inflationary price adjustments are typically incorporated into the terms of such agreements - thus, the users of this model would enter that information directly into the appropriate line item in this model. SEE Guidance Notes for complete explanation.	

AFUDC		
U.S. AFUDC Rates	Annual Rate	10.00%
	Daily Rate	0.027%
U.K. AFUDC Rates	Annual Rate	0.00%
	Daily Rate	0.000%
Daily Rate being applied to this analysis:		0.027%
Note: The daily AFUDC rate is derived in accordance with National Grid document 'Financial Policies and Procedures,' Sequence 21, October 1, 2002, p. 2, which specifies that it should be calculated simply by dividing the annual rate by 365, ignoring all compounding effects.		

Depreciation	
Useful Life in Years - U.S.	7
Useful Life in Years - U.K.	5
Above, you can input the useful life (in years) of assets - your inputs will be used for calculating depreciation. Assets are depreciated using straightline depreciation.	

Key Accounting Inputs and Assumptions

Matrix of Shared Cost Rates				
Firm Managing Project	Project Jurisdiction / Type			
	US	US-exclusion	UK	
IBM	3.9%	2.2%	3.2%	
IBM and Wipro	3.4%	1.7%	3.0%	
Wipro	2.7%	1.0%	2.7%	
Internal, CNI, or Other	2.3%	0.6%	2.0%	

iRise			
	US (\$ '000s)	UK (£ '000s)	UK (£ '000s)
Breakpoint (Total Project Cost)	500	500	5000
Charge if below breakpoint	10	5	5 or 10
Charge if above breakpoint	25	10	15

RTC			
License Type	U.S. License Cost (\$)	U.K. License Cost (£)	
Contributor	3285	2190	
Stakeholder	1224	816	

Other Key Inputs and Assumptions

Cost Structure and Calculation Inputs	
Workdays per Month (used in calculating personnel costs)	20
Workdays per month --- based on the assumption that: 1) a work-year with no holidays consists of 260 workdays [365 days * 5/7 = 260 days workdays per year]; 2) holidays, absences, etc. per year average 20 days [260 days - 20 days = 240]; 3) 240/12 months = 20 workdays per month	

Non-Personnel Categories	
This model is organized around five fundamental cost categories. The categories are used to organize and present data on the Summary Sheets and Output Sheets, and also guide the user as he/she thinks about the project and enters data into the Input Sheets.	
Two of the five categories are immutable: 'Personnel' and 'Shared Costs.' However, the table below allows you to modify the other categories - the three Non-Personnel Categories that this model is built around.	
Currently, the default Non-Personnel categories are: Hardware, Software, and Other. In the event you wish to change these, whatever you enter in the table below will modify this entire model accordingly.	
#1	Hardware
#2	Software
#3	Other ← "Other" is permanent

--- Section on Discount Rates ---

Discount rate currently being applied to this model	6.72%
Annual rate (above) converted into a monthly rate	0.54%

There are two possible rates that can be applied: the Hurdle Rate or the Cost of Equity. The model decides which rate to apply based upon the user's currency choice on the "Project Characteristics" worksheet. ("E" applies Hurdle Rate; "S" applies Cost of Equity). This is consistent with NG policy. In addition, WACC calculations are provided in case there becomes a desired.

Hurdle Rate (this is applied to U.K. projects)	15%
---	-----

Cost of Capital Inputs and Calculations			
Debt-Related		Equity-Related	
Effective Tax Rate	20.36%	Risk Free Rate	1.68%
Cost of Debt	3.75%	Equity Risk Premium	6.00%
Weight of Debt	72%	Beta (adjusted)	0.84
		Cost of Equity	6.72%
		Weight of Equity	28%

4.03% = WACC
0.33% = monthly WACC

Notes:
Effective Tax Rate: Sourced from xxxxxx's 2011 annual report and filings
Cost of Debt: Based upon current yield-to-maturity of xxx's 10-yr notes, issue due 2017
Weight of Debt and Equity: Current as of 6/15/2012
Risk free rate: U.S. treasury 10-year yield, as of 08/20/2012
Equity Risk Premium: Drawn from proprietary research, and in-line with Ibbotson's estimates
Beta: S&P 500 beta (0.66), 0.82 adjusted for leverage, peer group, mkt. cap factors

RTB Type
Resource Provider
App.Sup. - SDC 1
App.Sup. - SDC 2
App.Sup. - other
SW maintenance
SaaS
HW support
Other: IS
Other: Non-IS

Uplift Assumptions - % Uplift Applicable to Each FY Year - Historical, Current, Projected										
	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20
Percentage Uplift applied to N.G.	0%	58%	49%	49%	49%	49%	49%	49%	49%	49%
Percentage Uplift applied to SDC Labor	0%	6%	4%	4%	4%	4%	4%	4%	4%	4%

Years and Rates Applicable to this Analysis					
	16/17	17/18	18/19	19/20	20/21
Percentage Uplift applied to N.G. Labor	49%	49%	49%	49%	49%
Percentage Uplift applied to SDC Labor	4%	4%	4%	4%	4%

Date of Request: June 28, 2017
Due Date: July 10, 2017

Request No. DPS-447 AAM-21
NMPC Req. No. NM-1020

NIAGARA MOHAWK POWER CORPORATION d/b/a NATIONAL GRID
Case No. 17-E-0238 and 17-G-0239 –
Niagara Mohawk Power Corporation d/b/a National Grid – Electric and Gas Rates

Request for Information

FROM: DPS Staff, Allison Manz
TO: National Grid, Information Services Panel and Revenue Requirements Panel
SUBJECT: **SERVICE COMPANY RENTS - AFUDC**

Request:

In these interrogatories, all requests for workpapers or supporting calculations should be construed as requesting any Word, Excel, or other computer spreadsheet models in original electronic format with all formulae intact.

1. Explain the Company’s methodology for calculating AFUDC on IS projects. Include in your response how the Company determines the rate used in the calculation.
2. Provide the NMPC and Service Company AFUDC rates, by month, for the last two years.
3. For each of the existing IS projects, as shown in Exhibit__(RRP-3), Schedule 9, workpaper 2, provide the amount of AFUDC that has been included in the total project cost
4. For each of the projects listed below, provide the detailed calculation of the AFUDC referenced in DPS-447(2).

Ref #	Investment Name	INVP #	Inception to Date \$
1	INVP 4172 - Cross Company Customer	4172	\$ 13,889,170
2	EHR1 - Supply Chain	USFP	\$ 18,657,154
3	DMS/OMS Replacement	N/A	\$ 65,683,888
4	USFP Test SS	USFP	\$ 46,113,703
5	USFP-Testing -R1	USFP	\$ 61,366,885

5. For each of the projects listed below, provide the detailed calculation of the AFUDC included in the total forecast project cost.

Ref #	Investment Name	INVP #	FY19 Total Spend
1	US Win 7 Refresh Ph 3	4307	11,562,999
2	US CNI-EMS Lifecycle Hardware and Software Upgrade	4568	13,348,000
3	Call Center Customer Contact Center/SDC Technology Upgrade Implement Solution	3932	27,724,719
4	Corrosion and I&R Work	GBE	24,678,251
5	Load and DER Forecasting (Acquisition of Remote Sensing Data - NY)	4729	8,632,000

Response:

1. Please see Attachment 1 for an explanation of the Company’s methodology for calculating AFUDC on IS projects.
2. Please see Attachment 2 for the NMPC and Service Company AFUDC rates, by month, for the last two years.
3. Please refer to Attachment 3 for the amount of AFUDC that has been included in the total project cost. Pursuant to discussions with Department of Public Service Staff, the Company has provided the amount of AFUDC that has been included in the total project cost for the top 50 projects by dollar value as shown in Exhibit__(RRP-3), Schedule 9, workpaper 2.
4. Please refer to Attachment 4 for the detailed calculation of the AFUDC referenced in DPS-447(2) for each of the projects listed.
5. Please refer to Attachment 5a for the estimated AFUDC included in the Total Cost of Ownership (TCO) log for Reference #1 and 5b for Reference # 3. The project referenced in item # 2 is in the Investment Request Summary (preliminary estimate) phase and a TCO log will be prepared as a part of the Research and Development phase. For item # 4, Corrosion and I&R Work is an initiative within the Gas Business Enablement Program. AFUDC was not calculated for individual program releases but was calculated at an overall program level. For FY19-FY21 the total GBE AFUDC was estimated at \$5,529,540 of which \$1,906,790 was related to Niagara Mohawk. Item #5, the Load and DER Forecasting (Acquisition of Remote Sensing Data - NY) relates to the purchase of data that would not incur AFUDC.

Name of Respondent:
Daniel J. DeMauro, Jr.

Date of Reply:
July 10, 2017

May rates as updated in June 2017



National Grid AFUDC Calculation Reviewer Checklist

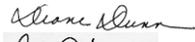
Instructions for Signature Page

Purpose: This checklist provides documentation that all necessary review procedures have been completed.

Procedures: Preparer is responsible for completing all listed procedures below. Reviewers are responsible to ensure all listed steps are completed prior to the determination as Final.

Sign-off: Preparer and reviewer sign-off is required once AFUDC rate calculation file is determined Final.

AFUDC Review Procedures	Status
In the beginning of the calendar year, reviewer receives the Mapping file for each company to ensure that the LTD, Preferred Stock and Common Equity amounts used in the AFUDC calculation are correct.	N/A
In the beginning of the calendar year, reviewer obtains the "Cost of Debt December 20XX" workbook from Treasury to ascertain that accurate rates are used for LTD and Preferred Stock in the calculation.	N/A
In the beginning of the calendar year, reviewer obtains the Common Equity Rate - average cost of capital per rate case as supplied by regulatory accounting to ensure that accurate rate is used in calculation. This is supplied by regulatory via email.	Completed
Each month, the reviewer will be provided with a summary of the average short term debt borrowing as created from a pivot table from data provided by Treasury on Money pool Balance for the past month. Reviewer verifies that correct STD amount is used in the calculation.	Completed
Reviewer receives the updated Short Term Debt rate schedule as provided by Treasury and ensure proper inclusion in the calculation.	Completed
Reviewer is provided with a copy of the PowerPlan Eligible CWIP report that calculates a two month average by adding beginning months eligible base plus one-half of current months additions.	Completed
Reviewer verifies that the two month Average CWIP balance is correctly linked to the calculation page	Completed
Reviewer verifies the clerical accuracy of the calculation for each Company.	Completed
Reviewer is given a copy of the reasonableness worksheet that compares calculated rates to prior month's rate. Any variance over 25 basis points is explained. This is done via email.	Completed

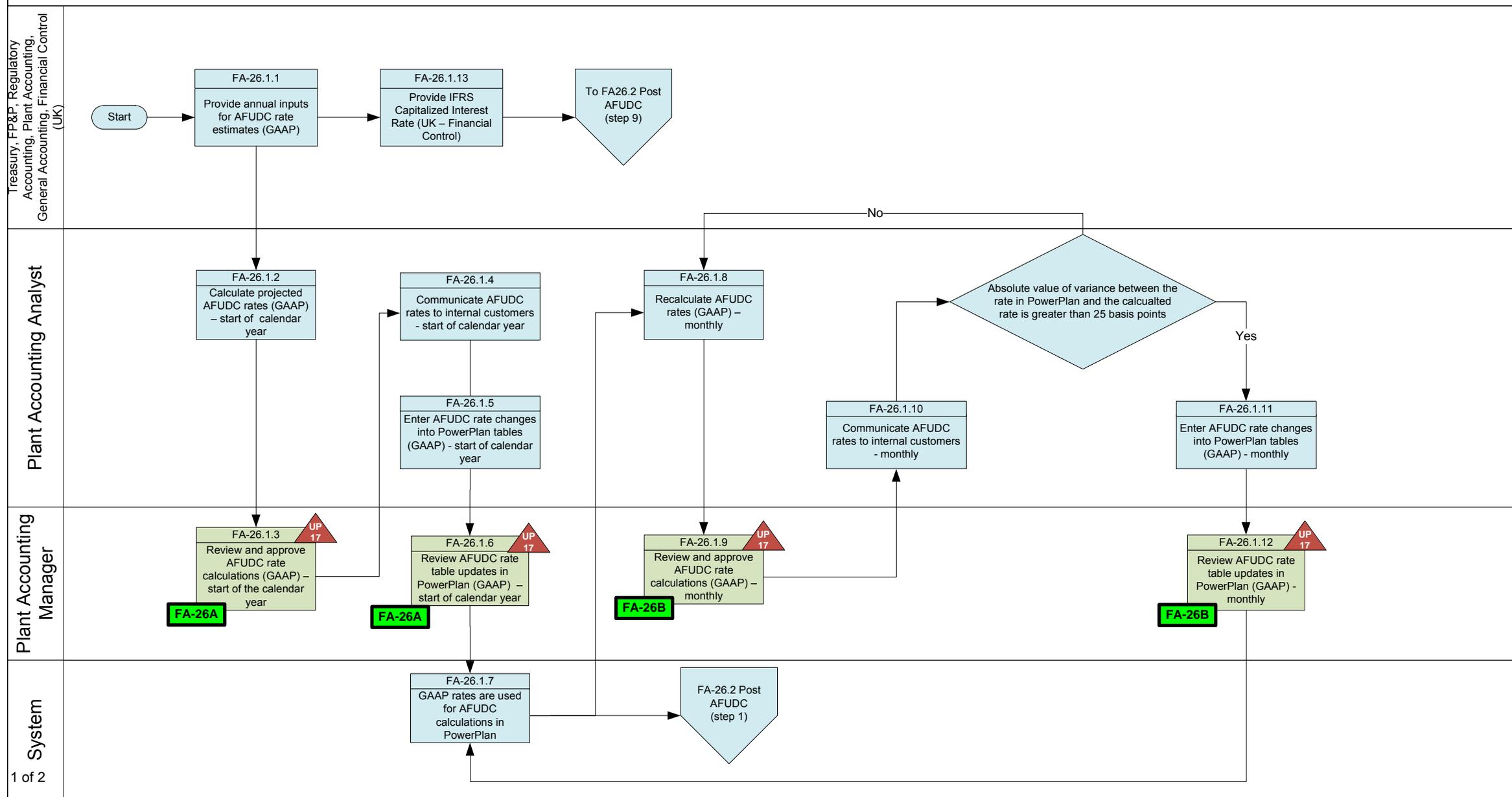
Sign-off			
	Name	Title	Date
Prepared By:	Diane Dunn		Analyst 6/16/2017
Reviewed By:	Julia Horan		Manager 6/16/2017

National Grid – Plant Accounting Process Map

Business Cycle: Acquire to Retire

Sub Process: FA-26.1 Develop AFUDC Rates

Objective: Develop and re-assess AFUDC rates

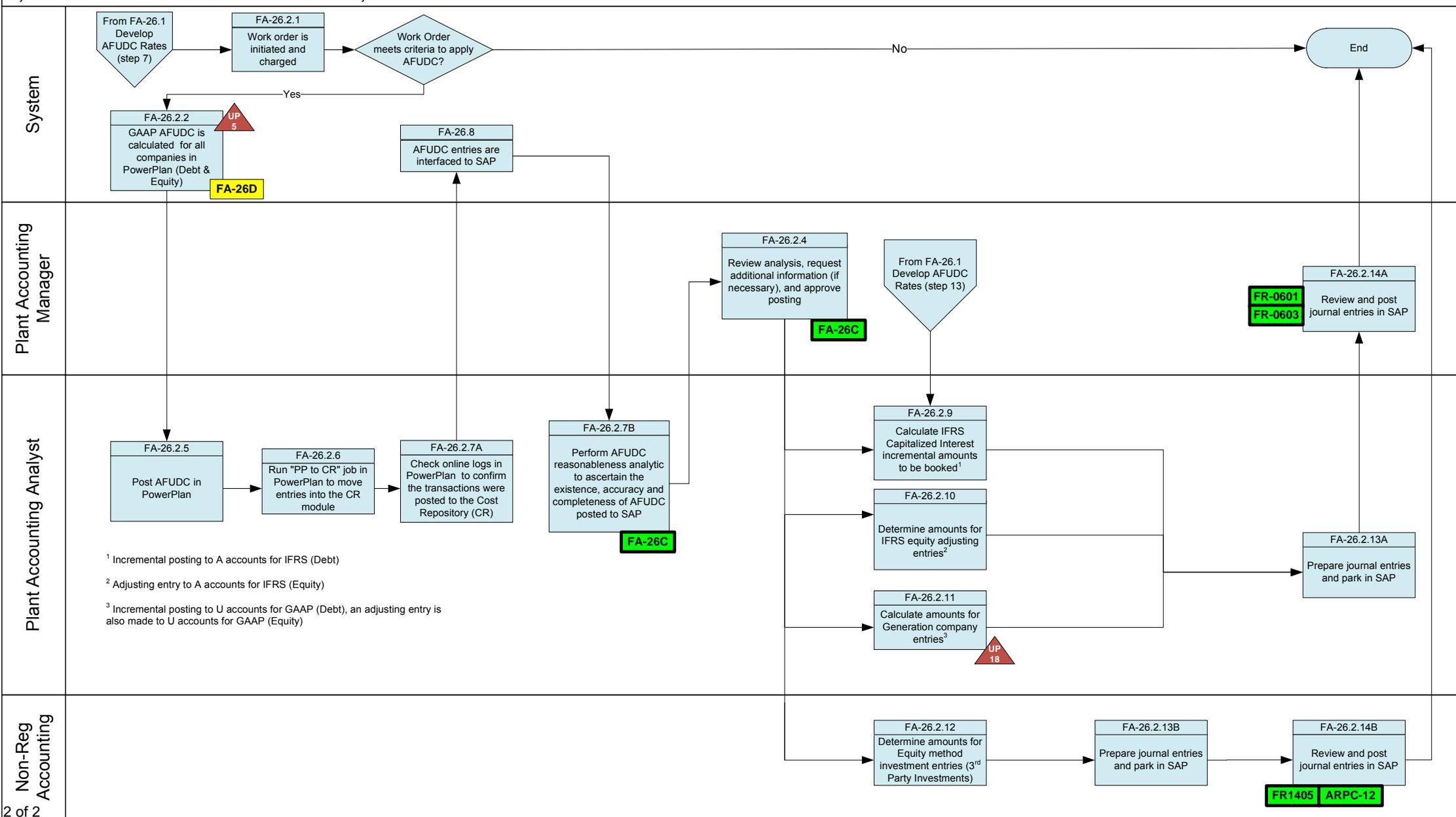


National Grid – Plant Accounting Process Map

Business Cycle: Acquire to Retire

Sub Process: FA-26.2 Post AFUDC

Objective: Post AFUDC to work orders and record IFRS and other adjustments



AFUDC RATES

Note: Rates come from the *PowerPlan Log History*. PowerPlan rates are updated periodically. Log history reflects changes only.
 Any month not listed has no change from last update.

<u>AFUDC Rates - NGUSA Service Company</u>							
AFUDC Type	Effective Date	Debt Account	Equity Account	Monthly Debt Rate	Monthly Equity Rate	Annual Debt Rate	Annual Equity Rate
5110-NGUSA Service Company	Jan-2017	C4320000 AFUDC-Debt	C4191000 Int Income-AFUDC	0.00111667	0.00517500	1.34%	6.21%
5110-NGUSA Service Company	May-2016	C4320000 AFUDC-Debt	C4191000 Int Income-AFUDC	0.00120833	0.00493333	1.45%	5.92%
5110-NGUSA Service Company	Feb-2016	C4320000 AFUDC-Debt	C4191000 Int Income-AFUDC	0.00000000	0.00812500	0.00%	9.75%
5110-NGUSA Service Company	Jan-2016	C4320000 AFUDC-Debt	C4191000 Int Income-AFUDC	0.00245520	0.00166376	2.95%	2.00%
5110-NGUSA Service Company	Jul-2015	C4320000 AFUDC-Debt	C4191000 Int Income-AFUDC	0.00130833	0.00467500	1.57%	5.61%
5110-NGUSA Service Company	Jan-2015	C4320000 AFUDC-Debt	C4191000 Int Income-AFUDC	0.00025000	0.00000000	0.30%	0.00%

<u>AFUDC Rates - Niagara Mohawk Power Corp</u>							
AFUDC Type	Effective Date	Debt Account	Equity Account	Monthly Debt Rate	Monthly Equity Rate	Annual Debt Rate	Annual Equity Rate
5210-Niagara Mohawk Power Corp	Jan-2017	C4320000 AFUDC-Debt	C4191000 Int Income-AFUDC	0.00140000	0.00425833	1.68%	5.11%
5210-Niagara Mohawk Power Corp	Jan-2016	C4320000 AFUDC-Debt	C4191000 Int Income-AFUDC	0.00142206	0.00415444	1.71%	4.99%
5210-Niagara Mohawk Power Corp	Dec-2015	C4320000 AFUDC-Debt	C4191000 Int Income-AFUDC	0.00138793	0.00410565	1.67%	4.93%
5210-Niagara Mohawk Power Corp	Jul-2015	C4320000 AFUDC-Debt	C4191000 Int Income-AFUDC	0.00146667	0.00390833	1.76%	4.69%
5210-Niagara Mohawk Power Corp	Jan-2015	C4320000 AFUDC-Debt	C4191000 Int Income-AFUDC	0.00149430	0.00383533	1.79%	4.60%

Query from PowerPlan

AFUDC - Top 50 Projects

Line	Investment Name	work_order_number	Equity - C4191000	Debt - C4320000	Total AFUDC
2	INVP 4172 - Cross Company Customer	90000164925	576,155.37	104,803.57	680,958.94
14	INVP 2927 US Desktop Refresh	90000150615	344,889.26	93,748.83	438,638.09
21	INVP3600B US Web Initiatives 2	90000142197	218,386.73	51,365.08	269,751.81
24	INVP2495H US CNI Frame Relay Replac	90000134425	51,526.19	49,637.22	101,163.41
27	INVP 4323 - Mainframe Upgrade	90000171825	44,799.90	2,584.56	47,384.46
28	INVP 1172 - AMAG Upgrades	90000112731	454,432.12	127,296.41	581,728.53
31	EHR1 - Payroll	90000148062	72,970.18	24,778.57	97,748.75
32	EHR1 - Finance	90000148060	135,862.13	46,790.43	182,652.56
33	EHR1 - Supply Chain	90000148059	112,880.73	39,197.96	152,078.69
35	EHR1 - PMO	90000148055	41,927.78	14,244.02	56,171.80
36	EHR1 - BPS	90000148063	56,973.86	19,794.31	76,768.17
37	DMS/OMS Replacement	90000098917	2,990,609.90	3,425,710.90	6,416,320.80
39	USFP R3 Finance	90000142411	-	7.47	7.47
41	INVP2940-GRC Enterprise Risk & Comp	90000109629	135,668.96	105,923.18	241,592.14
55	INVP2960C GridForce SaaS Phase 2	90000144051	-	1,427.11	1,427.11
59	INVP 2982b Identity & Access Mgt Pr	90000113826	21,284.08	38,746.32	60,030.40
61	USFP R3 Payroll	90000142385	-	13.13	13.13
62	USFP Release 3 - IT Delivery	90000142344	-	0.00	0.00
63	USFP R3 Supply Chain	90000142410	-	1.21	1.21
64	INVP 2577 GIS Consol Ph 2	90000108120	67,509.09	124,552.14	192,061.23
73	1642 - Radio Standardization Cons	90000099326	116,604.96	462,913.96	579,518.92
91	INVP 3103 Business Capture Software	90000106874	(0.00)	1,330.93	1,330.93
99	INVP 1356A US Retail Web Customer &	90000100058	-	323,446.41	323,446.41
105	Global Web Implementation	90000095326	0.00	591,334.63	591,334.63
118	USFP-PMO - R1	90000107539	-	829,371.90	829,371.90
119	USFP-Process & Design -R1	90000107540	-	476,832.65	476,832.65
120	USFP - Hardware & Software-DD	90000104657	-	174,612.18	174,612.18
121	USFP - Solution Architecture-DD	90000104656	-	248,319.77	248,319.77
122	USFP - PMO-DD	90000104645	-	485,477.37	485,477.37
128	USFP Test Ops	90000117358	-	69,202.09	69,202.09
129	USFP-Cutover -R1	90000107547	-	24,468.69	24,468.69
130	USFP-Reporting & Info - R1	90000107544	-	221,822.04	221,822.04
131	US Pre-BLUEPRINT STRATEGY PLAN	90000094157	-	314,850.80	314,850.80
132	USFP-Hardware & Software-R1	90000107551	-	449,179.46	449,179.46
133	USFP Test Finance	90000117364	-	66,477.87	66,477.87
134	USFP - Process & Design-DD	90000104646	-	1,872,945.42	1,872,945.42
134	INVP 3922 - Access Violation Mgmt	90000176039	51,022.69	12,497.09	63,519.78
142	USFP-Build & Unit Test -R1	90000107541	-	1,079,815.83	1,079,815.83
144	USFP-Data Strategy - R1	90000107543	-	403,312.06	403,312.06
145	USFP Test SS	90000117367	-	3,094.50	3,094.50
146	USFP-Testing -R1	90000107542	-	1,421,439.95	1,421,439.95
147	USFP-Tech Delivery - R1	90000107545	-	114,608.82	114,608.82
153	USFP - Build & Unit Test-DD	90000104647	-	261,804.78	261,804.78
154	USFP-Controls & Roles -R1	90000107546	-	211,056.60	211,056.60
159	PMO TEAM - DESIGN CAPEX	90000097837	-	157,730.97	157,730.97
162	IN 2330 ETRM Repl Nucleus-Gas Benef	90000106246	-	268,513.52	268,513.52
171	Smallworld/GIS Power On 4.0 Upgrade	90000104088	-	-	- (1)
197	FFA (NIMO)	90000108449	-	-	- (1)
223	OneNet	90000096379	-	56,867.61	56,867.61
232	INVP 3896 SMI Conversion Mobilizati	90000153520	152,504.59	23,150.61	175,655.20
<i>AFUDC Calculated on the Top 50 Projects</i>					<i>20,543,109.45</i>

(1) Project is a Bankers Leasing Buyback; thus, there are no AFUDC costs

90000107542	August 2011	1,235,774.21	0%	0.4835830%	-	5,975.99	5,975.99	
90000107542	September 2011	2,462,003.53	0%	0.4835830%	-	11,905.83	11,905.83	
90000107542	October 2011	3,920,914.25	0%	0.4835830%	-	18,960.87	18,960.87	
90000107542	November 2011	5,280,581.41	0%	0.4835830%	-	25,535.99	25,535.99	
90000107542	December 2011	9,089,484.22	0%	0.4835830%	-	43,955.20	43,955.20	
90000107542	January 2012	11,914,452.46	0%	0.4835830%	-	57,616.27	57,616.27	
90000107542	February 2012	14,370,000.05	0%	0.4835830%	-	69,490.88	69,490.88	
90000107542	March 2012	19,869,993.66	0%	0.4835830%	-	96,087.91	96,087.91	
90000107542	April 2012	19,298,140.20	0%	0.4835830%	-	93,322.53	93,322.53	
90000107542	May 2012	23,269,632.65	0%	0.4835830%	-	112,527.99	112,527.99	
90000107542	June 2012	26,437,768.50	0%	0.4835830%	-	127,848.55	127,848.55	
90000107542	July 2012	31,264,844.95	0%	0.4835830%	-	151,191.48	151,191.48	
90000107542	August 2012	35,566,811.87	0%	0.4835830%	-	171,995.06	171,995.06	
90000107542	September 2012	38,440,507.75	0%	0.4835830%	-	185,891.76	185,891.76	
90000107542	October 2012	44,759,248.13	0%	0.4835830%	-	216,448.11	216,448.11	
90000107542	November 2012	45,417,545.45	0%	0.4835830%	-	29,284.31	29,284.31	In Service Date 11/5/2012
90000107542 Total						1,421,439.95	1,421,439.95	

WO# 90000117367 - USFP-Test SS

manually pulled from PowerPlan 2023 report

Work Order Number	Date	(A) Eligible base	(B) Equity rate	(C) Debt rate	Equity		Debt		Total AFUDC	Comment
					(A)*(B) C4191000 - Int Income- AFUDC	(A)*(C) C4320000 - Allow Brwd Funds Dur Const-CR				
90000117367	April 2012	6,725.63	0%	0.4835830%	-	32.52	-	32.52		
90000117367	May 2012	31,618.84	0%	0.4835830%	-	152.90	-	152.90		
90000117367	June 2012	57,416.03	0%	0.4835830%	-	277.65	-	277.65		
90000117367	July 2012	77,691.74	0%	0.4835830%	-	375.70	-	375.70		
90000117367	August 2012	100,773.41	0%	0.4835830%	-	487.32	-	487.32		
90000117367	September 2012	140,358.06	0%	0.4835830%	-	678.75	-	678.75		
90000117367	October 2012	195,006.04	0%	0.4835830%	-	943.02	-	943.02		
90000117367	November 2012	227,425.54	0%	0.4835830%	-	146.64	-	146.64	In Service Date 11/5/2012	
90000117367 Total						3,094.50	3,094.50			

WO# 90000148059 - EHR1 - Supply Chain

manually pulled from PowerPlan 2023 report

Work Order Number	Date	(A) Eligible base	(B) Equity rate	(C) Debt rate	Equity		Debt		Total AFUDC	Comment
					(A)*(B) C4191000 - Int Income- AFUDC	(A)*(C) C4320000 - Allow Brwd Funds Dur Const-CR				
90000148059	December 2014	4,283.03	0%	0.0208330%	-	0.89	-	0.89		
90000148059	January 2015	8,566.06	0%	0.0250000%	-	2.14	-	2.14		
90000148059	February 2015	8,566.06	0%	0.0250000%	-	2.14	-	2.14		
90000148059	March 2015	8,566.06	0%	0.0250000%	-	2.14	-	2.14		
90000148059	September 2015	5,158,566.06	0.46750%	0.1308330%	24,116.30	6,749.11	-	30,865.41	Apr 2015-Aug 2015 No AFUDC Calculated - Failed Idle Months	
90000148059	October 2015	12,968,406.19	0.46750%	0.1308330%	60,627.30	16,966.95	-	77,594.25		
90000148059	November 2015	15,631,660.71	0.46750%	0.1308330%	73,078.01	20,451.37	-	93,529.38		
90000148059	December 2015	0.00	0.46750%	0.1308330%	(38,974.94)	(10,907.40)	-	(49,882.34)	in-service date 11/15/2012	
90000148059	April 2016	0.00	0.81250%	0.0000000%	51,445.37	2,290.26	-	53,735.63	includes input adjustments of Equity \$51,445.37, Debt \$2,290.26 related to FYE 2016 true-ups	
90000148059	September 2016	0.00	0.49333%	0.1208330%	57,411.31	(3,640.36)	-	53,770.95	includes input adjustment Equity \$57,411.31, Debt (\$3,640.36) related to FYE 2016 true-up.	
90000148059	October 2016	0.00	0.49333%	0.1208330%	(114,822.62)	7,280.72	-	(107,541.90)	Correction to Sept entry entered with signs reversed.	
90000148059 Total						112,880.73	39,197.96	152,078.69		

WO# 90000164925 - INVP 4172 - Cross Company Customer

manually pulled from
PowerPlan 2023 report

Work Order Number	Date	(A) Eligible base	(B) Equity rate	(C) Debt rate	Equity		Debt		Total AFUDC	Comment
					(A)*(B) C4191000 - Int Income- AFUDC	(A)*(C) C4320000 - Allow Brwd Funds Dur Const-CR				
90000164925	November 2015	1,446,500.28	0.46750%	0.1308330%	6,762.39		1,892.50		8,654.89	
90000164925	December 2015	5,834,004.23	0.46750%	0.1308330%	27,273.97		7,632.80		34,906.77	
90000164925	January 2016	9,223,894.40	0.16638%	0.2455200%	15,346.35		22,646.51		37,992.86	
90000164925	February 2016	10,002,925.28	0.81250%	0.0000000%	81,273.77				81,273.77	
90000164925	March 2016	10,842,039.93	0.81250%	0.0000000%	88,091.57				88,091.57	
90000164925	April 2016	11,601,002.94	0.81250%	0.0000000%	151,175.49		2,533.87		153,709.36	includes input adjustments of Equity \$56,917.34, Debt \$2,533.87 related to FYE 2016 true-ups
90000164925	May 2016	12,296,951.65	0.49333%	0.1208330%	60,664.92		14,858.78		75,523.70	
90000164925	June 2016	12,854,384.41	0.49333%	0.1208330%	63,414.92		15,532.34		78,947.26	
90000164925	July 2016	12,947,098.73	0.49333%	0.1208330%	63,872.31		15,644.37		79,516.68	
90000164925	August 2016	13,058,435.18	0.49333%	0.1208330%	64,421.57		15,778.90		80,200.47	
90000164925	September 2016	13,208,143.64	0.49333%	0.1208330%	80,893.83		228.36		81,122.19	in-service date 9/9/2016 and includes input adjustment Equity \$63,517.86, Debt (\$4,027.57) related to FYE 2016 true-up.
90000164925	October 2016	0.00	0.49333%	0.1208330%	(127,035.72)		8,055.14		(118,980.58)	Correction to Sept entry entered with signs reversed.
90000164925 Total					576,155.37		104,803.57		680,958.94	

Date of Request: July 12, 2017
Due Date: July 24, 2017

Request No. DPS-566 MP-11
NMPC Req. No. NM-1152

NIAGARA MOHAWK POWER CORPORATION d/b/a NATIONAL GRID
Case No. 17-E-0238 and 17-G-0239 –
Niagara Mohawk Power Corporation d/b/a National Grid – Electric and Gas Rates

Request for Information

FROM: DPS Staff, Michael Pasinella
TO: National Grid, Gas Infrastructure and Operations Panel
SUBJECT: **GAS BUSINESS ENABLEMENT**

Request:

In these interrogatories, all requests for data, workpapers or supporting calculations should be construed as requesting any Word, Excel, or other computer spreadsheet models in original electronic format with all formulae intact.

1. In justifying the expense of the Gas Business Enablement (GBE) program described in Exhibit__(GIOP-9) of your Pre-Filed Direct Testimony, why did the Panel not mention improvement to quality assurance and quality control that might result from GBE as a benefit?
2. NMPC's most recent management audit in Case 13-G-0009 contained recommendations related to workload or work flow management for the natural gas business. Explain how the Gas Repair Order – MWork Interface described on page 80 of your Pre-Filed Direct Testimony relates to those Recommendations.

Response:

1. Quality Assurance (QA) and Quality Control (QC) are critical functions for supporting safe and reliable gas operations, and Gas Business Enablement (GBE) will drive performance improvement in this important area. QA/QC promotes adherence to appropriate construction and operating standards by validating use of appropriate procedures in the field, monitoring proper use of equipment and materials, and reinforcing adherence to installation practices and procedures. GBE improvements such as an integrated enterprise asset management (EAM) system and field mobile solutions will enable greater visibility to field work activities as they are completed. This will allow the QA/QC function to audit operations, construction, and maintenance work as the

tasks are completed in the field. These real time inspections will supplement the Company's re-excavation activities (more commonly referred to as "re-dig" inspections). At the same time, GBE investments that improve accessibility of data and accuracy of data and record keeping are expected to facilitate material improvements (*i.e.*, reductions) in QA/QC findings.

The following GBE initiatives with expected in-service dates by the Rate Year will support improvements to QA/QC:

- Data Management Implementation – Improves accessibility of data, accuracy of data, and record-keeping.
- Risk Management (Tx Mains & Dx Mains) – Strengthens gas safety efforts and priorities, improves work order close-out process and provides enhanced asset information.
- Business Architecture Design – Key design decisions and business requirements for the EAM, scheduling, and mobility applications.
- Corrosion and I&R work – Increases visibility, replaces paper process.
- CU Governance & Library – Improves and drives standardization of materials utilization.
- Additional Integrity Management Modules – Enhances gas system safety and reliability.
- Data Remediation, GIS Upgrade / Migration & GIS Mobility – Improves compliance and strengthens gas safety efforts.
- Enable the Data Archival Process – Improves record keeping.

As described above, and detailed in Exhibit ___ (GIOP-9) of the Direct Testimony of the Gas Infrastructure and Operations Panel, these investments support improvements to quality assurance and quality control through initiatives that improve accessibility of data and accuracy of data and record keeping, and initiatives that provide field employees with electronic access to asset data and the ability to capture field data electronically through integrated EAM and field mobile platforms.

2. Prior to the initiation of GBE, the gas business has been pursuing efforts to support the recommendations in the gas management audit in Case 13-G-0009. In some cases, these activities are now viewed as tactical (*i.e.*, short term) solutions that are necessary to support improvements in business performance. As discussed below, the GBE Program fully addresses the recommendations to improve workload and work flow management cited in the management audit. The Gas Repair Order – Mwork interface was one of the tactical solutions that will address the recommendations in the management audit in the short-term. The proposed Gas Repair Order – MWork Interface is an interim solution to link the Company's field application (MWork) and the Gas Asset Management System (GAMS) with an electronic data capture system to generate Gas Repair Orders in electronic format. National Grid is evaluating, and open to further discussing with Staff, the value of pursuing this interim solution given the longer-term strategy with GBE.

The GAMS and MWork systems are at end of life so improvements are necessary to ensure that reliability is maintained on a long term basis. The GBE Program will replace the GAMS with a modern, more robust EAM platform. Similarly, a much more advanced field mobile solution that will be integrated with EAM will replace the MWork system. The EAM and field mobile solutions will be integrated allowing electronic field data capture, auto-generation of orders in EAM, and dispatching of orders to support compliance requirements. All details will be captured in EAM / Field Mobile solutions allowing for improved, accurate metrics to track work generated, in progress, and completed. Additionally, the data captured in the solutions will improve visibility for individual performance and productivity.

Name of Respondent:
Christopher Connolly

Date of Reply:
July 24, 2017

Date of Request: July 14, 2017
Due Date: July 24, 2017

Request No. DPS-602 MA-6
NMPC Req. No. NM-1191

NIAGARA MOHAWK POWER CORPORATION d/b/a NATIONAL GRID
Case No. 17-E-0238 and 17-G-0239 –
Niagara Mohawk Power Corporation d/b/a National Grid – Electric and Gas Rates

Request for Information

FROM: DPS Staff, Michael Augstell
TO: National Grid, Revenue Requirement Panel
SUBJECT: **GAS BUSINESS ENABLEMENT FINANCING**

Request:

In these interrogatories, all requests for data, workpapers, or supporting calculations should be construed as requesting any Word, Excel, or other computer spreadsheet models in original electronic format with all formulae intact.

Pages 33-37 of the Revenue Requirements Panel Corrections and Updates testimony discusses a third party financing option for its Gas Business Enablement program. The following relate to this proposal.

1. Provide all internal documentation, including executive memos and presentations, regarding this third party financing, as well as any other financing options considered by the Company.
2. Provide the Service Company accounting rules that dictate how upfront design and build GBE operating costs are charged to affiliates.
3. Provide information on your outside auditor's assessment of this third party financing option.

For questions 4 through 7 below, provide the analysis separately for NMPC, KEDNY and KEDLI and then in aggregate for all NY companies (NMPC, KEDNY and KEDLI).

4. Provide the calculation of the potential \$10M and \$35M savings, along with all supporting documentation. Provide the schedule by FY that shows when each company will

incur OPEX expense for each GBE program and when each GBE program will go into service (this may be detailed in the development of carrying costs).

5. Provide a sensitivity analysis showing the impact on potential savings at various interest rates. Include all calculations and workpapers supporting this analysis.
6. At what interest rate does the third party financing option and traditional financing option break even?
7. Provide the supporting files describing the assumptions for the total costs over the period and on a net present value basis of the projects costs.
8. Provide information describing the different interest rate options and terms for the financing option.
9. Provide the calculation of the \$15M revenue requirement reduction, for the RY and subsequent two data years.
10. Provide the cost analysis for the current costs included in the rate case. For the current cost estimates in the rate case, provide what interest rates were used.
11. With the third party financing option, will there be a liability recorded on the balance sheet? If so, would this liability be recorded at the Service Company or Operating Companies?
12. Describe the third party option fees or other financing costs that would be incurred.
13. How does the third party option affect the capitalization at the service company level?

Response:

1. Please see pages 66-74 of Attachment 5b to DPS-275 (IS-4) and Attachment 1. Attachment 1 contains confidential information. An unredacted, confidential version of the attachment has been provided separately. The Company will prepare a Request for Protected Status in accordance with the terms of the Ruling Adopting Protective Order.
2. GBE is being deployed across multiple jurisdictions and on a staggered schedule to mitigate execution risk. Existing service company accounting rules would initially allocate 100% of GBE capital and other costs to the first operating company using the system, regardless of future plans to deploy the system at other companies. Other operating companies would begin to incur GBE costs when the asset becomes used and useful for those operating companies.

Note, National Grid intends to pursue modified service company accounting treatment for the GBE program whereby an allocable share of the system development costs will be

charged to all operating companies as they begin using the system. The Company's rate filing already reflects this modified approach.

3. As explained in the Corrections and Updates Testimony of the Revenue Requirements Panel, National Grid is continuing to perform its due diligence on the feasibility and viability of the third-party financing approach. While National Grid has conducted significant initial diligence, the effort is still in the early stages of determining the viability of financing options, products, and providers. Accordingly, National Grid has not yet sought its outside auditor's assessment of the potential third party financing option.
4. Please see Attachment 2.
5. Please see Attachment 3. Please note the analysis provided uses the current range of indicative interest rates. The customer benefits analysis holds both the WACC and the interest rate constant at current rates under the assumption that ROE's would increase and/or decrease proportionally to variable interest rates. If National Grid decides to pursue the third party financing option, fixed versus variable interest rates will continue to be considered.
6. Please see Attachment 4.
7. Please see Attachment 3.
8. As explained in the response to Question 5, National Grid has been provided a range of indicative interest rates. National Grid has run a sensitivity analysis (Attachment 3) that considers the impact of various interest rate scenarios.
9. The Company's GBE OPEX and rent expense total for the Rate Year and Data Years included in the revenue requirement is \$31.465 million. Please refer to Exhibit___(GIOP-10) for OPEX costs and Exhibit___(RRP-3), Schedule 9 for service company rent expense. This was compared to the preliminary estimate of annual rent payments allocated to Niagara Mohawk under the third party financing option, which are estimated at \$14.293 million across the Rate and Data Years as shown in Attachment 2, line labeled 'Third Party Payment (net)'. The difference between the rate case and the estimated third party financing annual payments is \$17.172 million. Due to the volatility of interest rates and assumptions used in the developing the preliminary third party financing estimate, the Company stated in the Corrections and Updates testimony of the Revenue Requirements Panel that the revenue requirement for GBE could be reduced by \$15 million or more.
10. There are three areas where GBE costs are included in the revenue requirement. Please refer to Exhibit___(GIOP-10) for OPEX costs, Exhibit___(GIOP-11) for incremental run the business costs and Exhibit___(RRP-3), Schedule 9 for service company rent expense. Exhibit___(RRP-3), Schedule 9, page 7 of 9, Line 12 shows the GBE Service Company rent expense summary for the Rate Year and Data Years.

Please refer to Exhibit___(RRP-3), Workpapers to Exhibit RRP-3, Schedule 9, Workpaper 11, for the Service Company Pre-tax Weighted Return of 9.91% that was used in the Service Company rent expense calculation as shown in Exhibit___(RRP-3), Schedule 9.

11. Under the currently contemplated structure for the third party financing option, a liability is not expected to be recorded on the balance sheets of the operating companies. A liability is expected to be recorded at the parent company level.
12. As shown in Attachment 1, the current indicative pricing for the third party financing option includes a bank fee of approximately \$2.5 million. Additional legal and professional fees, as is are typically incurred for financing arrangements, are expected to be incurred if the third party financing option is ultimately pursued.
13. The third party option is not expected to affect the capitalization of the service company.

Name of Respondent:
Jacqueline Woodhouse
Pamela Viapiano
Charles DeRosa
Johnny Johnston

Date of Reply:
July 24, 2017

NPC SAVINGS as per GBE NY Deck v4

Assumptions						
Financial year	Total	Units	2017/18	2018/19	2019/20	2020/21
Time period			1	2	3	4
x Traditional OpCos CFs						
Traditional Payment (net)						
NMPC	(\$93,841)	\$'000	(\$4,754)	(\$12,342)	(\$11,546)	(\$9,832)
KEDNY	(\$190,399)	\$'000	(\$9,815)	(\$24,753)	(\$21,722)	(\$19,255)
KEDLI	(\$90,542)	\$'000	(\$4,580)	(\$11,696)	(\$10,356)	(\$9,637)
Total Traditional Payment (net)	(\$549,040)	\$'000	(\$28,149)	(\$71,835)	(\$64,972)	(\$56,707)
Discount factor	4.50%	%	0.96	0.92	0.88	0.84
Traditional Payment (NPC)						
NMPC Gas	(\$72,442)	\$'000	(\$4,549)	(\$11,302)	(\$10,118)	(\$8,245)
KEDNY	(\$146,412)	\$'000	(\$9,393)	(\$22,667)	(\$19,035)	(\$16,147)
KEDLI	(\$69,667)	\$'000	(\$4,382)	(\$10,711)	(\$9,075)	(\$8,081)
Total Traditional Payment (NPC)	(\$423,131)	\$'000	(\$26,937)	(\$65,781)	(\$56,935)	(\$47,552)
x Third Party OpCos CFs (NMPC, KEDNY and KEDLI shown below - line 56)						
Fixed project costs	(\$460,641)		(\$774)	(\$11,347)	(\$27,102)	(\$36,712)
Interest costs	(\$81,127)	\$'000	\$0	\$0	\$0	(\$11,905.5)
Third Party Payment (net)	(\$541,768)	\$'000	(\$774)	(\$11,347)	(\$27,102)	(\$48,617)
Third Party Payment (NPC)	(\$387,465)	\$'000	(\$741)	(\$10,391)	(\$23,749)	(\$40,768)
Delta	\$35,666	\$'000				

The financial institutions have provided indicative variable pricing in the range of 175bps to 210bps over the 6month LIBOR - the \$35m of savings is based on the lower bound 175bps and a static forward curve at todays rate (this 'static' pricing has not been offered by the banks but has been used as a scenario understanding that the traditional methodology models a static WACC in determining the return which is in fact variable). The scenarios may be switch below in cell C39

Scenario 1: Static lower bound:	\$35,666
Scenario 2: Forward upper bound:	\$10,053

x Third Party Interest Payments						
O/B		\$'000	\$0	\$86,202	\$246,330	\$342,073
Drawn	\$460,641	\$'000	\$86,976	\$168,741	\$115,032	\$69,679
Payment (By OpCo)	(\$541,768)	\$'000	(\$774)	(\$11,347)	(\$27,102)	(\$48,617)
Interest Rate Charged		%	3.2%	3.2%	3.2%	3.2%
Interest Charged	\$81,127	\$'000	\$0	\$2,734	\$7,814	\$10,851
C/B		\$'000	\$86,202	\$246,330	\$342,073	\$373,986
US 6m LIBOR		%	1.42%	1.71%	1.97%	2.16%
Static (lower bound)	1.75%	%	3.2%	3.2%	3.2%	3.2%
Forward Curve (upper bound)	2.10%	%	3.5%	3.8%	4.1%	4.3%

Change for scenario you wish to view --> 1-2 (Scenarios illustrated below)

Scenario 1

x Third Party NMPC CFs						
Fixed project costs	(\$77,515)	\$'000	(\$131)	(\$1,884)	(\$4,314)	(\$6,084)
Interest costs	(\$13,702)	\$'000	\$0	\$0	\$0	(\$2,011)
NMPC: Third Party Payment (net)	(\$91,217)	\$'000	(\$131)	(\$1,884)	(\$4,314)	(\$8,095)
NMPC: Third Party Payment (NPC)	(\$65,170)	\$'000	(\$125)	(\$1,726)	(\$3,780)	(\$6,788)
NMPC Rate Case						

x Third Party KEDNY CFs						
Fixed project costs	(\$159,150)	\$'000	(\$271)	(\$3,614)	(\$8,120)	(\$12,319)
Interest costs	(\$28,289)	\$'000	\$0	\$0	\$0	(\$4,151)
KEDNY: Third Party Payment (net)	(\$187,439)	\$'000	(\$271)	(\$3,614)	(\$8,120)	(\$16,471)
KEDNY: Third Party Payment (NPC)	(\$133,689)	\$'000	(\$260)	(\$3,309)	(\$7,116)	(\$13,812)

x Third Party KEDLI CFs						
Fixed project costs	(\$74,291)	\$'000	(\$127)	(\$1,528)	(\$3,237)	(\$6,507)
Interest costs	(\$13,199)	\$'000	\$0	\$0	\$0	(\$1,937)
KEDLI: Third Party Payment (net)	(\$87,490)	\$'000	(\$127)	(\$1,528)	(\$3,237)	(\$8,444)
KEDLI: Third Party Payment (NPC)	(\$62,375)	\$'000	(\$121)	(\$1,399)	(\$2,836)	(\$7,081)

2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33
5	6	7	8	9	10	11	12	13	14	15	16

(\$8,619)	(\$7,123)	(\$6,633)	(\$6,329)	(\$6,060)	(\$5,801)	(\$5,525)	(\$4,599)	(\$2,924)	(\$1,357)	(\$395)	
(\$17,411)	(\$14,761)	(\$13,732)	(\$13,100)	(\$12,545)	(\$12,011)	(\$11,441)	(\$9,650)	(\$6,411)	(\$2,975)	(\$816)	
(\$8,423)	(\$6,906)	(\$6,418)	(\$6,127)	(\$5,868)	(\$5,619)	(\$5,353)	(\$4,631)	(\$3,398)	(\$1,148)	(\$381)	
(\$50,248)	(\$42,196)	(\$39,282)	(\$37,485)	(\$35,892)	(\$34,361)	(\$32,726)	(\$27,398)	(\$17,570)	(\$7,877)	(\$2,341)	\$0
0.80	0.77	0.73	0.70	0.67	0.64	0.62	0.59	0.56	0.54	0.52	0.49

(\$6,916)	(\$5,470)	(\$4,874)	(\$4,450)	(\$4,078)	(\$3,736)	(\$3,405)	(\$2,712)	(\$1,650)	(\$733)	(\$204)	\$0
(\$13,971)	(\$11,335)	(\$10,091)	(\$9,212)	(\$8,442)	(\$7,734)	(\$7,050)	(\$5,690)	(\$3,617)	(\$1,607)	(\$422)	\$0
(\$6,759)	(\$5,303)	(\$4,716)	(\$4,309)	(\$3,949)	(\$3,618)	(\$3,299)	(\$2,731)	(\$1,918)	(\$620)	(\$197)	\$0
(\$40,322)	(\$32,402)	(\$28,866)	(\$26,359)	(\$24,152)	(\$22,126)	(\$20,166)	(\$16,155)	(\$9,914)	(\$4,253)	(\$1,210)	\$0

(\$43,068)	(\$45,955)	(\$46,072)	(\$46,072)	(\$46,072)	(\$46,072)	(\$45,298)	(\$34,709)	(\$18,916)	(\$9,355)	(\$3,004)	(\$117)
(\$12,918)	(\$12,110)	(\$10,668)	(\$9,173)	(\$7,678)	(\$6,184)	(\$4,689)	(\$3,218)	(\$2,084)	(\$396)	(\$99)	(\$4)
(\$55,985)	(\$58,066)	(\$56,740)	(\$55,245)	(\$53,750)	(\$52,255)	(\$49,986)	(\$37,927)	(\$21,000)	(\$9,750)	(\$3,103)	(\$120)
(\$44,926)	(\$44,588)	(\$41,694)	(\$38,847)	(\$36,169)	(\$33,649)	(\$30,802)	(\$22,364)	(\$11,849)	(\$5,265)	(\$1,603)	(\$59)

\$373,986	\$348,533	\$303,067	\$255,941	\$208,814	\$161,688	\$114,561	\$68,209	\$32,445	\$12,475	\$3,120	\$116
\$18,670	\$1,544	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
(\$55,985)	(\$58,066)	(\$56,740)	(\$55,245)	(\$53,750)	(\$52,255)	(\$49,986)	(\$37,927)	(\$21,000)	(\$9,750)	(\$3,103)	(\$120)
3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
\$11,863	\$11,056	\$9,613	\$8,119	\$6,624	\$5,129	\$3,634	\$2,164	\$1,029	\$396	\$99	\$4
\$348,533	\$303,067	\$255,941	\$208,814	\$161,688	\$114,561	\$68,209	\$32,445	\$12,475	\$3,120	\$116	(\$0)
2.30%	2.45%	2.55%	2.66%	2.73%	2.79%	2.83%	2.85%	2.83%	2.83%	2.83%	2.80%
3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
4.4%	4.5%	4.6%	4.8%	4.8%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%

(\$7,288)	(\$7,777)	(\$7,796)	(\$7,796)	(\$7,796)	(\$7,796)	(\$7,665)	(\$5,874)	(\$3,201)	(\$1,583)	(\$508)	(\$20)
(\$2,182)	(\$2,045)	(\$1,802)	(\$1,549)	(\$1,297)	(\$1,044)	(\$792)	(\$544)	(\$352)	(\$67)	(\$17)	(\$1)
(\$9,470)	(\$9,822)	(\$9,598)	(\$9,346)	(\$9,093)	(\$8,841)	(\$8,457)	(\$6,417)	(\$3,553)	(\$1,650)	(\$525)	(\$20)
(\$7,599)	(\$7,542)	(\$7,053)	(\$6,572)	(\$6,119)	(\$5,693)	(\$5,211)	(\$3,784)	(\$2,005)	(\$891)	(\$271)	(\$10)

(\$15,094)	(\$16,106)	(\$16,146)	(\$16,146)	(\$16,146)	(\$16,146)	(\$15,875)	(\$12,164)	(\$6,629)	(\$3,279)	(\$1,053)	(\$41)
(\$4,504)	(\$4,223)	(\$3,720)	(\$3,199)	(\$2,677)	(\$2,156)	(\$1,635)	(\$1,122)	(\$727)	(\$138)	(\$35)	(\$1)
(\$19,598)	(\$20,329)	(\$19,866)	(\$19,345)	(\$18,824)	(\$18,303)	(\$17,510)	(\$13,286)	(\$7,356)	(\$3,417)	(\$1,087)	(\$42)
(\$15,726)	(\$15,610)	(\$14,598)	(\$13,603)	(\$12,667)	(\$11,786)	(\$10,790)	(\$7,834)	(\$4,151)	(\$1,845)	(\$562)	(\$21)

(\$7,041)	(\$7,513)	(\$7,532)	(\$7,532)	(\$7,532)	(\$7,532)	(\$7,405)	(\$5,674)	(\$3,092)	(\$1,529)	(\$491)	(\$19)
(\$2,102)	(\$1,970)	(\$1,736)	(\$1,493)	(\$1,249)	(\$1,006)	(\$763)	(\$524)	(\$339)	(\$64)	(\$16)	(\$1)
(\$9,142)	(\$9,483)	(\$9,268)	(\$9,024)	(\$8,781)	(\$8,538)	(\$8,168)	(\$6,198)	(\$3,431)	(\$1,594)	(\$507)	(\$20)
(\$7,336)	(\$7,282)	(\$6,810)	(\$6,346)	(\$5,909)	(\$5,498)	(\$5,033)	(\$3,655)	(\$1,936)	(\$861)	(\$262)	(\$10)

NPC Interest rate sensitivity as per TPO Interest rate analysis v2

Assumptions							
Financial year	Total	Units	2017/18	2018/19	2019/20	2020/21	2021/22
Time period			1	2	3	4	5
Traditional OpCos CFs							
Traditional Payment (net)							
NMPC	(\$93,841)	\$'000	(\$4,754)	(\$12,342)	(\$11,546)	(\$9,832)	(\$8,619)
KEDNY	(\$190,399)	\$'000	(\$9,815)	(\$24,753)	(\$21,722)	(\$19,255)	(\$17,411)
KEDLI	(\$90,542)	\$'000	(\$4,580)	(\$11,696)	(\$10,356)	(\$9,637)	(\$8,423)
Traditional Payment (net)	(\$549,040)	\$'000	(\$28,149)	(\$71,835)	(\$64,972)	(\$56,707)	(\$50,248)
Discount factor	4.50%	%	0.96	0.92	0.88	0.84	0.80
Traditional Payment (NPC)							
NMPC Gas	(\$72,442)	\$'000	(\$4,549)	(\$11,302)	(\$10,118)	(\$8,245)	(\$6,916)
KEDNY	(\$146,412)	\$'000	(\$9,393)	(\$22,667)	(\$19,035)	(\$16,147)	(\$13,971)
KEDLI	(\$69,667)	\$'000	(\$4,382)	(\$10,711)	(\$9,075)	(\$8,081)	(\$6,759)
Traditional Payment (NPC)	(\$423,131)	\$'000	(\$26,937)	(\$65,781)	(\$56,935)	(\$47,552)	(\$40,322)
Third Party OpCos CFs (NMPC, KEDNY and KEDLI shown below - line 56)							
Fixed project costs	(\$460,641)		(\$774)	(\$11,347)	(\$27,102)	(\$36,712)	(\$43,068)
Interest costs	(\$83,092)	\$'000	\$0	\$0	(\$12,195.4)	(\$13,231)	
Third Party Payment (net)	(\$543,733)	\$'000	(\$774)	(\$11,347)	(\$27,102)	(\$48,907)	(\$56,298)
Third Party Payment (NPC)	(\$388,902)	\$'000	(\$741)	(\$10,391)	(\$23,749)	(\$41,012)	(\$45,177)
Third Party Payments							
Q/B		\$'000	\$0	\$86,202	\$246,394	\$342,325	\$374,212
Drawn	\$460,641	\$'000	\$86,976	\$168,741	\$115,032	\$69,679	\$18,670
Payment (By OpCo)	(\$543,733)	\$'000	(\$774)	(\$11,347)	(\$27,102)	(\$48,907)	(\$56,298)
Interest Rate Charged		%	3.2%	3.2%	3.2%	3.2%	3.2%
Interest Charged	\$83,092	\$'000	\$0	\$2,799	\$8,001	\$11,115	\$12,151
C/B		\$'000	\$86,202	\$246,394	\$342,325	\$374,212	\$348,735
US 6m LIBOR		%	1.42%	1.71%	1.97%	2.16%	2.30%
US 6m LIBOR + 50 bps	0.50%	%	1.9%	2.2%	2.5%	2.7%	2.8%
US 6m LIBOR - 50 bps	-0.50%	%	0.9%	1.2%	1.5%	1.7%	1.8%
Static	1.83%	%	3.2%	3.2%	3.2%	3.2%	3.2%
Forward Curve	1.83%	%	3.2%	3.5%	3.8%	4.0%	4.1%
Forward Curve + 50bps	1.83%	%	3.7%	4.0%	4.3%	4.5%	4.6%
Forward Curve - 50bps	1.83%	%	2.7%	3.0%	3.3%	3.5%	3.6%

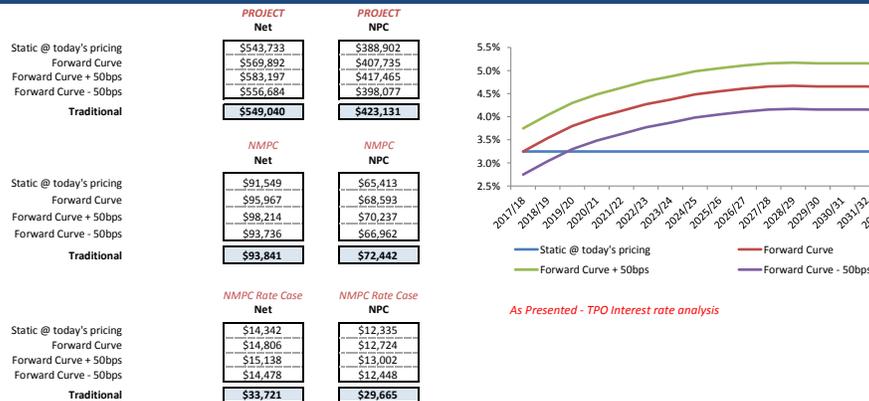
Change for scenario you wish to view --> 1-4 (Scenarios illustrated below)

Scenario	1
0.50%	
-0.50%	
1.83%	
1.83%	
1.83%	
1.83%	

The financial institutions have provided indicative variable pricing in the range of 175bps to 210bps over the 6month LIBOR - the 1.83% over the 6 month LIBOR is the mid point of this range

Traditional NMPC CFs							
Traditional Payment (net)							
	(\$93,841)	\$'000	(\$4,754)	(\$12,342)	(\$11,546)	(\$9,832)	(\$8,619)
Traditional Payment (NPC)							
	(\$72,442)	\$'000	(\$4,549)	(\$11,302)	(\$10,118)	(\$8,245)	(\$6,916)
Third Party NMPC CFs							
Fixed project costs	(\$77,515)	\$'000	(\$131)	(\$1,884)	(\$4,314)	(\$6,084)	(\$7,288)
Interest costs	16.89%	(\$14,034)	\$0	\$0	\$0	(\$2,060)	(\$2,235)
NMPC: Third Party Payment (net)	(\$91,549)	\$'000	(\$131)	(\$1,884)	(\$4,314)	(\$8,144)	(\$9,523)
NMPC: Third Party Payment (NPC)	(\$65,413)	\$'000	(\$125)	(\$1,726)	(\$3,780)	(\$6,829)	(\$7,642)
Third Party KEDNY CFs							
Fixed project costs	(\$159,150)	\$'000	(\$271)	(\$3,614)	(\$8,120)	(\$12,319)	(\$15,094)
Interest costs	34.87%	(\$28,974)	\$0	\$0	\$0	(\$4,253)	(\$4,614)
KEDNY: Third Party Payment (net)	(\$188,124)	\$'000	(\$271)	(\$3,614)	(\$8,120)	(\$16,572)	(\$19,707)
KEDNY: Third Party Payment (NPC)	(\$134,190)	\$'000	(\$260)	(\$3,309)	(\$7,116)	(\$13,897)	(\$15,814)
Third Party KEDLI CFs							
Fixed project costs	(\$74,291)	\$'000	(\$127)	(\$1,528)	(\$3,237)	(\$6,507)	(\$7,041)
Interest costs	16.27%	(\$13,519)	\$0	\$0	\$0	(\$1,984)	(\$2,153)
KEDLI: Third Party Payment (net)	(\$87,810)	\$'000	(\$127)	(\$1,528)	(\$3,237)	(\$8,491)	(\$9,193)
KEDLI: Third Party Payment (NPC)	\$0	\$'000	\$0	\$0	\$0	\$0	\$0

Data Tables - Presentation (F9 to refresh)



As Presented - TPO Interest rate analysis

2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33
6	7	8	9	10	11	12	13	14	15	16
(\$7,123)	(\$6,633)	(\$6,329)	(\$6,060)	(\$5,801)	(\$5,525)	(\$4,599)	(\$2,924)	(\$1,357)	(\$395)	
(\$14,761)	(\$13,732)	(\$13,100)	(\$12,545)	(\$12,011)	(\$11,441)	(\$9,650)	(\$6,411)	(\$2,975)	(\$816)	
(\$6,906)	(\$6,418)	(\$6,127)	(\$5,868)	(\$5,619)	(\$5,353)	(\$4,631)	(\$3,398)	(\$1,148)	(\$381)	
(\$42,196)	(\$39,282)	(\$37,485)	(\$35,892)	(\$34,361)	(\$32,726)	(\$27,398)	(\$17,570)	(\$7,877)	(\$2,341)	\$0
0.77	0.73	0.70	0.67	0.64	0.62	0.59	0.56	0.54	0.52	0.49
(\$5,470)	(\$4,874)	(\$4,450)	(\$4,078)	(\$3,736)	(\$3,405)	(\$2,712)	(\$1,650)	(\$733)	(\$204)	\$0
(\$11,335)	(\$10,091)	(\$9,212)	(\$8,442)	(\$7,734)	(\$7,050)	(\$5,690)	(\$3,617)	(\$1,607)	(\$422)	\$0
(\$5,303)	(\$4,716)	(\$4,309)	(\$3,949)	(\$3,618)	(\$3,299)	(\$2,731)	(\$1,918)	(\$620)	(\$197)	\$0
(\$32,402)	(\$28,866)	(\$26,359)	(\$24,152)	(\$22,126)	(\$20,166)	(\$16,155)	(\$9,914)	(\$4,253)	(\$1,210)	\$0
(\$45,955)	(\$46,072)	(\$46,072)	(\$46,072)	(\$46,072)	(\$45,298)	(\$34,709)	(\$18,916)	(\$9,355)	(\$3,004)	(\$117)
(\$12,404)	(\$10,926)	(\$9,395)	(\$7,864)	(\$6,333)	(\$4,802)	(\$3,296)	(\$2,134)	(\$405)	(\$101)	(\$4)
(\$58,359)	(\$56,998)	(\$55,467)	(\$53,936)	(\$52,405)	(\$50,100)	(\$38,005)	(\$21,050)	(\$9,760)	(\$3,105)	(\$120)
(\$44,813)	(\$41,884)	(\$39,004)	(\$36,294)	(\$33,745)	(\$30,872)	(\$22,410)	(\$11,878)	(\$5,270)	(\$1,605)	(\$60)
\$348,735	\$303,243	\$256,092	\$208,940	\$161,788	\$114,637	\$68,259	\$32,470	\$12,475	\$3,120	\$116
\$1,544	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
(\$58,359)	(\$56,998)	(\$55,467)	(\$53,936)	(\$52,405)	(\$50,100)	(\$38,005)	(\$21,050)	(\$9,760)	(\$3,105)	(\$120)
3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
\$11,324	\$9,846	\$8,315	\$6,784	\$5,253	\$3,722	\$2,216	\$1,054	\$405	\$101	\$4
\$303,243	\$256,092	\$208,940	\$161,788	\$114,637	\$68,259	\$32,470	\$12,475	\$3,120	\$116	\$0
2.45%	2.55%	2.66%	2.73%	2.79%	2.83%	2.85%	2.83%	2.83%	2.83%	2.80%
2.9%	3.0%	3.2%	3.2%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%
1.9%	2.0%	2.2%	2.2%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%
3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
4.3%	4.4%	4.5%	4.6%	4.6%	4.7%	4.7%	4.7%	4.7%	4.7%	4.6%
4.8%	4.9%	5.0%	5.1%	5.1%	5.2%	5.2%	5.2%	5.2%	5.2%	5.1%
3.8%	3.9%	4.0%	4.1%	4.1%	4.2%	4.2%	4.2%	4.2%	4.2%	4.1%

(\$7,123)	(\$6,633)	(\$6,329)	(\$6,060)	(\$5,801)	(\$5,525)	(\$4,599)	(\$2,924)	(\$1,357)	(\$395)	\$0
(\$5,470)	(\$4,874)	(\$4,450)	(\$4,078)	(\$3,736)	(\$3,405)	(\$2,712)	(\$1,650)	(\$733)	(\$204)	\$0
(\$7,777)	(\$7,796)	(\$7,796)	(\$7,796)	(\$7,796)	(\$7,665)	(\$5,874)	(\$3,201)	(\$1,583)	(\$508)	(\$20)
(\$2,095)	(\$1,845)	(\$1,587)	(\$1,328)	(\$1,070)	(\$811)	(\$557)	(\$360)	(\$68)	(\$17)	(\$1)
(\$9,872)	(\$9,642)	(\$9,383)	(\$9,125)	(\$8,866)	(\$8,477)	(\$6,430)	(\$3,561)	(\$1,651)	(\$525)	(\$20)
(\$7,580)	(\$7,085)	(\$6,598)	(\$6,140)	(\$5,709)	(\$5,223)	(\$3,792)	(\$2,010)	(\$892)	(\$272)	(\$10)
(\$16,106)	(\$16,146)	(\$16,146)	(\$16,146)	(\$16,146)	(\$15,875)	(\$12,164)	(\$6,629)	(\$3,279)	(\$1,053)	(\$41)
(\$4,325)	(\$3,810)	(\$3,276)	(\$2,742)	(\$2,208)	(\$1,675)	(\$1,149)	(\$744)	(\$341)	(\$95)	(\$1)
(\$20,431)	(\$19,957)	(\$19,423)	(\$18,889)	(\$18,355)	(\$17,550)	(\$13,314)	(\$7,373)	(\$3,420)	(\$1,088)	(\$42)
(\$15,689)	(\$14,665)	(\$13,658)	(\$12,710)	(\$11,819)	(\$10,814)	(\$7,851)	(\$4,160)	(\$1,847)	(\$562)	(\$21)
(\$7,513)	(\$7,532)	(\$7,532)	(\$7,532)	(\$7,532)	(\$7,405)	(\$5,674)	(\$3,092)	(\$1,529)	(\$491)	(\$19)
(\$2,018)	(\$1,778)	(\$1,529)	(\$1,280)	(\$1,030)	(\$781)	(\$536)	(\$347)	(\$66)	(\$16)	(\$1)
(\$9,531)	(\$9,310)	(\$9,060)	(\$8,811)	(\$8,562)	(\$8,187)	(\$6,211)	(\$3,439)	(\$1,595)	(\$508)	(\$20)
\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

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TPO Interest rate analysis

- Third Party financier pricing is still in negotiations, however based on the mid-point of the current indicative negotiations we have looked at the interest rate sensitivity.
- The tables on the right illustrate the Customer Costs of a "Net" basis (total costs over the period) and a "NPC" basis - The net present value of the projects costs
- Both the Net and NPC costs have been compared to the "Traditional" costs (the current costs included in the rate case)
- The analysis has been reviewed under the following scenarios:
 - Static at today's 6mth Libor (today's 6mth Libor + mid-point bank margin) - i.e. Fixed for project life
 - 6mth Libor forward curve + mid point bank margin - i.e. Variable for life of project
 - 6mth Libor forward curve plus 50bps + mid point bank margin - i.e. Variable for life of project
 - 6mth Libor forward curve less 50bps + mid point bank margin - i.e. Variable for life of project
- On the following slide a chart illustrating the various scenarios can be observed

Total GBE Customer Costs (\$'000)

	Net	NPC
Static @ today's pricing	\$543,733	\$388,902
Forward Curve	\$559,892	\$407,336
Forward Curve + 50bps	\$583,197	\$417,465
Forward Curve - 50bps	\$556,684	\$398,077
Traditional	\$449,040	\$473,131

NIMO GBE Customer Costs (\$'000)

	Net	NPC
Static @ today's pricing	\$91,549	\$85,413
Forward Curve	\$95,967	\$88,593
Forward Curve + 50bps	\$98,214	\$90,237
Forward Curve - 50bps	\$93,716	\$86,862
Traditional	\$93,841	\$92,442

NIMO (FY19 - FY21) GBE Customer Costs (\$'000)

	Net	NPC
Static @ today's pricing	\$14,342	\$12,335
Forward Curve	\$14,805	\$12,724
Forward Curve + 50bps	\$15,138	\$13,062
Forward Curve - 50bps	\$14,478	\$12,448
Traditional	\$13,721	\$12,665

2/1/23

NPC Breakeven

Assumptions						
Financial year	Total	Units	2017/18	2018/19	2019/20	2020/21
Time period			1	2	3	4
x Traditional OpCos CFs						
Traditional Payment (net)	(\$549,040)	\$'000	(\$28,149)	(\$71,835)	(\$64,972)	(\$56,707)
Discount factor	4.50%	%	0.96	0.92	0.88	0.84
Traditional Payment (NPC)	(\$423,131)	\$'000	(\$26,937)	(\$65,781)	(\$56,935)	(\$47,552)
x Third Party OpCos CFs						
Fixed project costs	(\$460,641)		(\$774)	(\$11,347)	(\$27,102)	(\$36,712)
Interest costs	(\$129,892)	\$'000	\$0	\$0	\$0	(\$19,118.0)
Third Party Payment (net)	(\$590,534)	\$'000	(\$774)	(\$11,347)	(\$27,102)	(\$55,830)
Third Party Payment (NPC)	(\$423,131)	\$'000	(\$741)	(\$10,391)	(\$23,749)	(\$46,817)
x Third Party Payments						
O/B		\$'000	\$0	\$86,202	\$247,913	\$348,261
Drawn	\$460,641	\$'000	\$86,976	\$168,741	\$115,032	\$69,679
Payment (By OpCo)	(\$590,533)	\$'000	(\$774)	(\$11,347)	(\$27,102)	(\$55,830)
Interest Rate Charged		%	5.0%	5.0%	5.0%	5.0%
Interest Charged	\$129,892	\$'000	\$0	\$4,318	\$12,418	\$17,444
C/B		\$'000	\$86,202	\$247,913	\$348,261	\$379,555
US 6m LIBOR		%	1.42%	1.71%	1.97%	2.16%
Static breakeven (359bps + current LIBOR - 142bps)	3.59%	%	5.0%	5.0%	5.0%	5.0%
Forward Curve breakeven (261bps + LIBOR)	2.61%	%	4.0%	4.3%	4.6%	4.8%

Change for scenario you wish to view --> 1-2
(Scenarios illustrated below)

Scenario 1

<u>2021/22</u>	<u>2022/23</u>	<u>2023/24</u>	<u>2024/25</u>	<u>2025/26</u>	<u>2026/27</u>	<u>2027/28</u>	<u>2028/29</u>	<u>2029/30</u>	<u>2030/31</u>	<u>2031/32</u>	<u>2032/33</u>
5	6	7	8	9	10	11	12	13	14	15	16
(\$50,248)	(\$42,196)	(\$39,282)	(\$37,485)	(\$35,892)	(\$34,361)	(\$32,726)	(\$27,398)	(\$17,570)	(\$7,877)	(\$2,341)	\$0
0.80	0.77	0.73	0.70	0.67	0.64	0.62	0.59	0.56	0.54	0.52	0.49
(\$40,322)	(\$32,402)	(\$28,866)	(\$26,359)	(\$24,152)	(\$22,126)	(\$20,166)	(\$16,155)	(\$9,914)	(\$4,253)	(\$1,210)	\$0
(\$43,068)	(\$45,955)	(\$46,072)	(\$46,072)	(\$46,072)	(\$46,072)	(\$45,298)	(\$34,709)	(\$18,916)	(\$9,355)	(\$3,004)	(\$117)
(\$20,686)	(\$19,380)	(\$17,071)	(\$14,680)	(\$12,288)	(\$9,897)	(\$7,505)	(\$5,152)	(\$3,330)	(\$625)	(\$156)	(\$6)
(\$63,753)	(\$65,335)	(\$63,143)	(\$60,751)	(\$58,360)	(\$55,968)	(\$52,803)	(\$39,861)	(\$22,245)	(\$9,979)	(\$3,160)	(\$122)
(\$51,159)	(\$50,170)	(\$46,399)	(\$42,719)	(\$39,271)	(\$36,039)	(\$32,537)	(\$23,505)	(\$12,552)	(\$5,389)	(\$1,633)	(\$61)
\$379,555	\$353,484	\$307,399	\$259,654	\$211,908	\$164,163	\$116,418	\$69,446	\$33,064	\$12,475	\$3,120	\$116
\$18,670	\$1,544	\$0	\$0	\$0	\$0						
(\$63,753)	(\$65,335)	(\$63,143)	(\$60,751)	(\$58,360)	(\$55,968)	(\$52,803)	(\$39,861)	(\$22,245)	(\$9,979)	(\$3,160)	(\$122)
5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
\$19,012	\$17,706	\$15,398	\$13,006	\$10,614	\$8,223	\$5,831	\$3,479	\$1,656	\$625	\$156	\$6
\$353,484	\$307,399	\$259,654	\$211,908	\$164,163	\$116,418	\$69,446	\$33,064	\$12,475	\$3,120	\$116	\$0
2.30%	2.45%	2.55%	2.66%	2.73%	2.79%	2.83%	2.85%	2.83%	2.83%	2.83%	2.80%
5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
4.9%	5.1%	5.2%	5.3%	5.3%	5.4%	5.4%	5.5%	5.4%	5.4%	5.4%	5.4%

Date of Request: July 20, 2017
Due Date: July 31, 2017

Request No. DPS-633 AAM-34
NMPC Req. No. NM-1253

NIAGARA MOHAWK POWER CORPORATION d/b/a NATIONAL GRID
Case No. 17-E-0238 and 17-G-0239 –
Niagara Mohawk Power Corporation d/b/a National Grid – Electric and Gas Rates

Request for Information

FROM: DPS Staff, Allison Manz
TO: National Grid, Information Services Panel
SUBJECT: **IS OPEX AND RTB**

Request:

In these interrogatories, all requests for workpapers or supporting calculations should be construed as requesting any Word, Excel, or other computer spreadsheet models in original electronic format with all formulae intact.

1. For each project listed in Exhibit__(ISP-3), state what phase the project is in (i.e., pre-startup, startup, requirements and design).
2. For each project listed in Exhibit__(ISP-3), state which supporting documents have been prepared and approved (i.e., IRS document, Partial Sanction or Sanction).
3. Provide the most recent forecast of costs, both capital and operating, for each of the projects listed in Exhibit__(ISP-3).

Response:

1. Please see Attachment 1.
2. Please see Attachment 1. For the Gas Business Enablement (GBE) Program, there is a single Partial Sanction paper, which encompasses all projects listed in Exhibit__(ISP-3). The GBE Sanction paper was submitted as Attachment 5 to DPS-275 (IS-4) SUPPLEMENTAL. As approved by the GBE Steering Group and the US Senior Executive Sanctioning Committee, additional Partial Sanctioning papers will be submitted approximately annually for continued sanctioning of the project

3.

IS Projects

The Company provided the most recent forecast of June 2017 for IS projects (excluding the Gas Business Enablement Program as noted below and in Attachment 1). As noted in previous responses, IS reviews project forecasts on a monthly basis as part its budgeting process. Project forecasts are adjusted monthly taking into consideration changing project conditions such as expanded scope and increased complexity. The forecasts for all projects in the pre-startup phase on Attachment 1 remain unchanged from those originally provided in Exhibit_(ISP-3). The final page of Attachment 1 provides an updated forecast for all in-flight projects that are listed on Exhibit _ (ISP-3). The Company is currently forecasting an increase of \$4.4M of capital costs over what was included in Exhibit _ (ISP-3). The Company does not plan to seek recovery of these costs and will instead look for opportunities to bring the overall cost of the IS Plan in line with Exhibits __ (ISP-3), (ISP-7), and (ISP-8) of the Company's initial filing.

Gas Business Enablement Program

As noted in Attachment 1, there is no updated forecast for the Gas Business Enablement Program beyond that included in the Company's initial rate filing. The capital and operating costs for the Gas Business Enablement Program included in Exhibit __ (ISP-3) and Exhibit __ (GIOP-10), respectively, reflect the roadmap for the GBE Program developed as a result of the strategic assessment and design performed for the GBE Program.

Name of Respondent:

Thomas Gill

Date of Reply:

July 31, 2017

Niagara Mohawk Power Corporation d/b/a National Grid
ISP-3 Information Services (IS) Capital Projects

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Amortization Period	June 2017 Forecast		Project Phase	Supporting Documentation	
						ISP-3				
						Total US CapEx Spend	Total Costs through FY21			
		CapEx	OpEx (incl RTB)							
In-flight projects										
INVP 3614D1 Ent Network Security	Cyber Security	3614D1	G020	6/30/17	84	\$9,478,590	\$10,999,177	\$1,600,445	Implementation	Full Sanction
INVP 3614B7 CNI Network Security	Cyber Security	3614B7	G020	12/31/17	84	\$4,829,586	\$4,738,207	\$529,820	Implementation	Full Sanction
INVP 3614E4 US CNI Security I&E	Cyber Security	3614E4	G020	12/31/17	84	\$1,207,053	\$1,365,558	\$279,308	Implementation	Full Sanction
INVP 4045 Double Pole Mgmt DB	FY18 Plan	4045	G198	2/18/17	84	\$482,153	\$432,455	\$363,840	Implementation	Full Sanction
INVP 4373 Contingent Labor Admin Replacement	FY18 Plan	4373	G020	2/20/17	84	\$250,692	\$259,667	\$18,501	Implementation	Full Sanction
INVP 3955 EJ Ward Upgrade	FY18 Plan	3955	G235	2/28/17	84	\$646,004	\$662,190	\$146,481	Implementation	Full Sanction
INVP 4188 Aging System Stabilize	FY18 Plan	4188	G148	3/31/17	84	\$782,710	\$1,465,467	\$562,461	Development	Full Sanction
INVP 4280 US VSTIG Bandwidth Ph2	FY18 Plan	4280	G020	3/31/17	84	\$1,998,645	\$2,074,174	\$16,839	Closure/ In-Production	Full Sanction
INVP 4307 US Win 7 Refresh Ph 3	FY18 Plan	4307	G020	3/31/17	84	\$11,562,999	\$13,133,973	\$699,297	Closure/ In-Production	Full Sanction
INVP 4364 Wireless Network	FY18 Plan	4364	G020	3/31/17	84	\$2,303,959	\$2,180,320	\$268,863	Implementation	Full Sanction
S005242 M112 Systemic Improvement	FY18 Plan	N/A	G020	3/31/17	120	\$8,000,000	\$8,355,000	\$0	Closure/ In-Production	Reference DPS-541
INVP 4289 US Network Improvement	FY18 Plan	4289	G020	3/31/17	84	\$978,717	\$1,195,547	\$56,036	Implementation	Full Sanction
INVP 2577C ArcFM Software Upgrade	FY18 Plan	2577C	G112	4/7/17	84	\$2,087,188	\$2,022,295	\$612,709	Implementation	Full Sanction
INVP 4631 Box Enablement	FY18 Plan	4631	G020	4/30/17	84	\$254,000	\$32,532	\$196,910	Implementation	Full Sanction
INVP 4170 Time Transformation	FY18 Plan	4170	G020	5/1/17	84	\$3,917,000	\$2,529,359	\$1,541,281	Implementation	Full Sanction
INVP 4420 US CNI OMSFocalPoint Infrastructure Upgrade	FY18 Plan	4420	G198	5/1/17	84	\$1,366,563	\$711,225	\$82,680	Design	Full Sanction
INVP 4274 VSTIG Hardware Refresh	FY18 Plan	4274	G020	5/31/17	84	\$608,000	\$381,470	\$39,101	Design	Full Sanction
INVP 4464 Data Visualization	FY18 Plan	4464	G020	7/31/17	84	\$4,440,000	\$7,510,364	\$312,095	Requirements	Full Sanction
INVP 4461 Unix51 Interface Migration	FY18 Plan	4461	G020	9/1/17	84	\$1,386,701	\$458,525	\$80,081	Implementation	Partial Sanction
INVP 4287 Active Directory Upgrade	FY18 Plan	4287	G020	9/30/17	84	\$804,825	\$469,583	\$116,667	Start-up	IRS
INVP 4408 Doc Mgmt Systems Replacement Delivery	FY18 Plan	4408	G149	11/1/17	84	\$3,617,542	\$5,233,908	\$2,814,070	Design	Partial Sanction
INVP 3486 US MDS-Itron Enterprise Edition (IEE)	FY18 Plan	3486	G186	3/31/18	84	\$670,943	\$1,035,859	\$176,170	Development	Partial Sanction
INVP 4390 Plastic Fusion II	FY18 Plan	4390	G207	3/31/18	84	\$506,000	\$456,000	\$100,438	Start-up	IRS
INVP 4397 Ariba TLS and CI Update	FY18 Plan	4397	G020	3/31/18	120	\$1,462,000	\$1,425,275	\$311,425	Development	Full Sanction
Call Center Customer Contact Center/SDC Technology Upgrade Implement Solution	FY18 Plan	3932	C175	8/31/18	84	\$27,724,719	\$27,724,719	\$1,504,111	Requirements	Full Sanction
INVP 4398 Storms/ISched Upgrade	FY18 Plan	4398	G160	12/15/18	84	\$9,955,867	\$9,674,263	\$2,370,096	Development	Full Sanction
INVP 3737 US CNI GMS SCADA Upgrade &	FY18 Plan	3737	C210	3/31/20	84	\$25,930,291	\$21,342,368	\$5,276,307	Development	Partial Sanction
INVP 3882 NYS Pipeline Safety CMS	Other Mandates	3882	G207	3/17/17	84	\$1,308,000	\$1,673,447	\$221,814	Implementation	Full Sanction
INVP 3851 Consolidated Voice Recorder for US Electric Control Rooms	Other Mandates	3851	G181	3/31/17	84	\$1,234,000	\$1,377,237	\$2,536		
Physical Security Replacements - FY17	Physical Security	N/A	G020	3/31/17	84	\$906,050	\$1,469,156	\$0	Closure/ In-Production	IRS
Physical Security Replacements - FY18	Physical Security	N/A	G020	3/31/18	84	\$950,000	\$950,000	\$0	Reference DPS-115	Reference DPS-115
All NIMO Physical Security Replacements - FY18	Physical Security	N/A	G114	3/31/18	84	\$490,000	\$490,000	\$0	Reference DPS-115	Reference DPS-115
Physical Security Replacements - FY19	Physical Security	N/A	G020	3/31/19	84	\$825,000	\$825,000	\$0	Reference DPS-115	Reference DPS-115
All NIMO Physical Security Replacements - FY19	Physical Security	N/A	G114	3/31/19	84	\$275,000	\$275,000	\$0	Reference DPS-115	Reference DPS-115
Physical Security Replacements - FY20	Physical Security	N/A	G020	3/31/20	84	\$835,000	\$835,000	\$0	Reference DPS-115	Reference DPS-115
All NIMO Physical Security Replacements - FY20	Physical Security	N/A	G114	3/31/20	84	\$282,000	\$282,000	\$0	Reference DPS-115	Reference DPS-115
Physical Security Replacements - FY21	Physical Security	N/A	G020	3/31/21	84	\$860,000	\$860,000	\$0	Reference DPS-115	Reference DPS-115
All NIMO Physical Security Replacements - FY21	Physical Security	N/A	G114	3/31/21	84	\$290,000	\$290,000	\$0	Reference DPS-115	Reference DPS-115
INVP 4451 Gas Transportation System Phase II	PSC Mandate	4451	G225	5/31/17	84	\$1,629,117	\$1,199,131	\$467,642	Closure/ In-Production	Full Sanction
INVP 4347 NYC Leave on for Landlord Program	PSC Mandate	4347	5220G	7/31/17	84	\$870,095	\$1,089,524	\$213,137	Requirements	Full Sanction
INVP 4124 Auto Remote Net Meter	PSC Mandate	4124	C198	8/31/17	84	\$3,584,165	\$3,227,856	\$770,204	Development	Full Sanction
INVP 3839A NY Retail Access Ph2	PSC Mandate	3839A	C170	10/31/17	84	\$5,356,231	\$5,091,165	\$786,713	Development	Full Sanction
INVP 4411AB Distributed Generation Portal	PSC Mandate	4411A+B	C198	11/30/17	84	\$3,347,611	\$4,078,786	\$2,400,732	Closure/ In-Production	Full Sanction
INVP 4383 NY Community Choice Aggregation	PSC Mandate	4383	C170	12/31/17	84	\$551,447	\$580,482	\$262,919	Design	Partial Sanction
INVP 4448 Low Income Order CRIS	PSC Mandate	4448	5220G	12/31/17	84	\$2,207,590	\$3,443,968	\$736,958	Requirements	Partial Sanction
INVP 4448 Low Income Order CSS	PSC Mandate	4448	C195	12/31/17	84	\$2,489,410	\$3,882,780	\$831,042	Requirements	Partial Sanction
INVP 4411C New Electric Connections	PSC Mandate	4411C	C198	4/30/18	84	\$698,000	\$851,000	\$135,000	Pre Start-up	Partial Sanction
INVP 4411D New Gas Connections	PSC Mandate	4411D	C210	10/31/18	84	\$896,000	\$896,000	\$0	Pre Start-up	Partial Sanction

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Amortization Period	ISP-3		June 2017 Forecast		Project Phase	Supporting Documentation
						Total US CapEx Spend		CapEx	OpEx (incl RTB)		
Planned Projects											
Cloud Security	Cyber Security	3683B	3683	5/1/17	84		\$1,460,000	\$1,460,000	\$292,000	Pre Start-up	IRS
Risk Based Authentication - 2FA token alternative	Cyber Security	3683X2	G020	6/1/17	84		\$235,080	\$235,080	\$112,120	Pre Start-up	IRS
Threat Behavior Modeling	Cyber Security	3683X15	G020	8/1/17	84		\$800,000	\$800,000	\$171,500	Pre Start-up	IRS
Identity & Access Management :Role Base Access Management (RBAC)	Cyber Security	3683X5	G020	10/1/17	84		\$1,650,000	\$1,650,000	\$641,450	Pre Start-up	IRS
Enhanced DLP Gateway and Endpoint	Cyber Security	3683X8	G020	12/1/17	84		\$2,238,480	\$2,238,480	\$408,500	Pre Start-up	IRS
US CNI Intrusion Detection/Prevention Phase 1	Cyber Security	3683X1	G020	3/31/18	84		\$550,000	\$550,000	\$255,288	Pre Start-up	IRS
Identity & Access Management: Fine Grain Access Management	Cyber Security	3683X5	G020	3/31/18	84		\$1,650,000	\$1,650,000	\$556,000	Pre Start-up	IRS
vStig Scaling Upgrades	Cyber Security	3683X12	G020	8/1/18	84		\$1,000,000	\$1,000,000	\$1,300,000	Pre Start-up	IRS
IT/OT Discovery and Implementation Phase 1	Cyber Security	3683X11	G020	10/1/18	84		\$5,500,000	\$5,500,000	\$1,416,700	Pre Start-up	IRS
Security Research Lab	Cyber Security	3683X14	G020	10/1/18	84		\$325,000	\$325,000	\$65,000	Pre Start-up	IRS
US CNI Security Enhancements Phase 1	Cyber Security	3683X6	G020	11/1/18	84		\$1,650,000	\$1,650,000	\$650,000	Pre Start-up	IRS
Identity & Access Management: Privileged Access Management	Cyber Security	3683X5	G020	3/31/19	84		\$1,740,000	\$1,740,000	\$977,600	Pre Start-up	IRS
Domain Based Security Phase 1	Cyber Security	3683X13	G020	3/31/19	84		\$800,000	\$800,000	\$1,050,000	Pre Start-up	IRS
Security Incident Event Management Phase 4	Cyber Security	3683X4	G020	5/1/19	84		\$1,266,300	\$1,266,300	\$121,100	Pre Start-up	IRS
Big Data Security Analytics Phase 1	Cyber Security	3683X7	G020	5/1/19	84		\$4,621,552	\$4,621,552	\$583,150	Pre Start-up	IRS
US CNI Intrusion Detection/Prevention Phase 2	Cyber Security	3683X1	G020	3/31/20	84		\$800,000	\$800,000	\$180,000	Pre Start-up	IRS
Identity & Access Management: Shared Area Access Management	Cyber Security	3683X5	G020	3/31/20	84		\$1,740,000	\$1,740,000	\$904,960	Pre Start-up	IRS
Security Incident Event Management Phase 5	Cyber Security	3683X4	G020	5/1/20	84		\$733,150	\$733,150	\$20,000	Pre Start-up	IRS
Domain Based Security Phase 2	Cyber Security	3683X13	G020	3/31/21	84		\$6,000,000	\$6,000,000	\$350,000	Pre Start-up	IRS
Security Incident Event Management (SIEM) 6	Cyber Security	3683X4	G020	5/1/21	84		\$733,150	\$733,150	\$28,900	Pre Start-up	IRS
Big Data Security Analytics - Phase 2	Cyber Security	3683X7	G020	5/1/21	84		\$5,776,940	\$5,776,940	\$294,200	Pre Start-up	IRS
IT/OT Discovery and Implementation: Phase 2	Cyber Security	3683X13	G020	10/1/21	84		\$7,000,000	\$7,000,000	\$1,083,300	Pre Start-up	IRS
US CNI Security Enhancements - Phase 2	Cyber Security	3683X6	G020	11/1/21	84		\$3,960,000	\$3,960,000	\$100,000	Pre Start-up	IRS
Data Visualization	Cyber Security	3683X16	G020	12/1/21	84		\$1,000,000	\$1,000,000	\$100,000	Pre Start-up	IRS
HANA License Costs	FY18 Plan	4649	G020	3/31/17	84		\$3,500,000	\$3,500,000	\$167,978	Closure/ In-Production	Full Sanction
Microsoft ELA Renewal	FY18 Plan	4642	G020	3/31/17	84		\$1,900,000	\$1,900,000	\$4,195	Closure/ In-Production	Full Sanction
Mobile Device Refresh - FY17	FY18 Plan	4671	G020	3/31/17	84		\$4,546,000	\$4,546,000	\$0	Closure/ In-Production	Full Sanction
Zscaler	FY18 Plan	4681	G020	3/31/17	84		\$2,100,000	\$2,100,000	\$222,793	Start-up	IRS
US Video Conferencing upgrade for RW	FY18 Plan	4632	G020	6/1/17	84		\$1,330,000	\$1,330,000	-\$77,615	Implementation	IRS
Hix D/C Improvement Server Refresh	FY18 Plan	4676	G020	7/1/17	84		\$1,000,000	\$1,000,000	\$282,595	Design	IRS
Mobility - (MDM) Mobile Device	FY18 Plan	3430	G020	7/31/17	84		\$1,162,000	\$1,162,000	\$80,170	Development	Full Sanction
Changes to ACIS for PMCC Civil Vendor Billing	FY18 Plan	4487	G186	8/2/17	84		\$382,000	\$382,000	\$164,000	Pre Start-up	IRS
US Control-Gas System Operating Procedure (SOP) Upgrade	FY18 Plan	4480	G210	10/2/17	84		\$542,000	\$542,000	\$233,000	Pre Start-up	IRS
Enterprise Labs	FY18 Plan	4693	G020	10/30/17	84		\$668,000	\$668,000	\$21,103	Development	Full Sanction
Cascade Electric Application Upgrade Project	FY18 Plan	3986	G198	10/31/17	84		\$375,000	\$375,000	\$161,000	Pre Start-up	IRS
WiFi for Fleet Services Diagnostic Laptops	FY18 Plan	3956	G352	11/1/17	84		\$838,000	\$838,000	\$82,068	Pre Start-up	Full Sanction
Gas Service Database - UNY	FY18 Plan	3949	5210G	12/1/17	84		\$325,000	\$325,000	\$100,000	Start-up	IRS
Gas Service Database - DNY (LI and NYC)	FY18 Plan	3948	G225	12/4/17	84		\$300,000	\$300,000	\$100,000	Start-up	IRS
Substation Monitoring-DobleARMS	FY18 Plan	3982	G381	1/1/18	84		\$622,000	\$622,000	\$266,000	Start-up	IRS
Gas Capital Investment Planning Tool	FY18 Plan	4466	G210	1/17/18	84		\$572,000	\$572,000	\$245,000	Pre Start-up	IRS
Computapole Enhancements to Support Inspection Types	FY18 Plan	4462	G186	3/1/18	84		\$450,000	\$450,000	\$75,000	Start-up	IRS
Travel & Expense Management (T&E) and Global Master Service Provider	FY18 Plan	4578	G020	3/1/18	84		\$1,232,000	\$1,232,000	\$1,560,000	Pre Start-up	IRS
Ageing System Stabilization/Upgrades - FY18	FY18 Plan	4389	G148	3/15/18	84		\$1,500,000	\$1,500,000	\$1,300,000	Pre Start-up	IRS
US Mobile Device Refresh	FY18 Plan	4395	G020	3/31/18	84		\$5,000,000	\$5,000,000	\$334,495	Implementation	Full Sanction
US SAP: Infrastructure Landscape	FY18 Plan	4348	G020	3/31/18	84		\$4,603,000	\$4,603,000	\$233,000	Pre Start-up	Partial Sanction
US CNI Tech Services-Network Equipment Lifecycle Replacements	FY18 Plan	4570	G186	3/31/18	84		\$250,000	\$250,000	\$0	Requirements	Full Sanction
US CNI-EMS Lifecycle Hardware and Software Upgrade	FY18 Plan	4568	U186	3/31/18	84		\$13,348,000	\$13,348,000	\$415,000	Requirements	IRS
Network Transformation Completion - CEMS	FY18 Plan	4647	G020	3/31/18	84		\$250,000	\$250,000	\$0	Requirements	IRS
Application monitoring, Network/IDS, Operations monitoring	FY18 Plan	4677	G020	3/31/18	84		\$750,000	\$750,000	\$11,288	Implementation	IRS
Aged Printer refresh	FY18 Plan	4689	G020	3/31/18	84		\$50,000	\$50,000	\$566	Project deferred	IRS
RSA Token refresh	FY18 Plan	4683	G020	3/31/18	84		\$200,000	\$200,000	\$501,329	Start-up	IRS
Acquisition of Remote Sensing Data - Mass	FY18 Plan	4670	C310	3/31/18	84		\$4,112,000	\$4,112,000	\$0	Closure/ In-Production	Full Sanction
INVP4449 - EPA File	FY18 Plan	4449	C170	3/31/18	84		\$700,000	\$700,000	\$157,642	Requirements	IRS
Informatica Upgrade/Microstrategy Replacement Program	FY18 Plan	4469	G020	5/1/18	84		\$3,516,000	\$3,516,000	\$766,524	Requirements	IRS
US MDS-Energy Accounting System (EAS) migration to Wholesale Settlement Application (WSA)	FY18 Plan	4481	G186	10/1/18	84		\$2,160,000	\$2,160,000	\$926,000	Start-up	IRS
General Ledger Interface CRIS SAP	FY18 Plan	4486	C343	3/1/19	84		\$1,200,000	\$1,200,000	\$208,655	Requirements	IRS

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Amortization Period	ISP-3	June 2017 Forecast		Project Phase	Supporting Documentation
						Total US CapEx Spend	CapEx	OpEx (incl RTB)		
STORMS Capital Cost Estimates	FY18 Plan	4467	G148	3/1/19	84	\$776,000	\$776,000	\$194,000	Pre Start-up	IRS
CRIS Data Archival	FY18 Plan	4485	C343	3/31/19	84	\$1,300,000	\$1,300,000	\$450,000	Pre Start-up	IRS
US CNI Tech Services-Network Equipment Lifecycle Replacements	FY18 Plan	4570	G186	3/31/19	84	\$250,000	\$250,000	\$0	Design	Full Sanction
Inventory Management Handheld Devices	FY18 Plan		G020	3/31/19	84	\$75,000	\$75,000	\$0	Closure/ In-Production	Invoice
Customer Bill Redesign	FY18 Plan	4704Q	H173	3/31/19	84	\$2,108,147	\$2,108,147	\$217,000	Pre Start-up	IRS
Cisco Prime	FY18 Plan	4679	G020	3/31/21	84	\$648,000	\$648,000	\$73,566	Pre Start-up	IRS
Contractor Management Modernization	FY18 Plan	4151	G327	10/15/21	84	\$5,910,000	\$5,910,000	\$5,330,000	Pre Start-up	IRS
Risk Management (Tx Mains & Dx Mains)	GBE- Asset Management		G210	12/1/17	120	\$2,110,800	*	*	Pre-Startup	Partial Sanction
AM Program Leadership-1	GBE- Asset Management		G210	3/1/18	120	\$277,124	*	*	Start-up	Partial Sanction
Enhancements	GBE- Asset Management		G210	12/1/18	120	\$2,660,875	*	*	Pre-Startup	Partial Sanction
Additional IM Modules	GBE- Asset Management		G210	2/1/19	120	\$716,840	*	*	Pre-Startup	Partial Sanction
AM Program Leadership-2	GBE- Asset Management		G210	3/1/19	120	\$398,676	*	*	Pre-Startup	Partial Sanction
Data Remediation, GIS Upgrade/ Migration & GIS Mobility	GBE- Asset Management		G210	3/1/19	120	\$11,311,759	*	*	Start-up	Partial Sanction
EAM-FIN Integration	GBE- Asset Management		G210	6/1/19	120	\$1,778,102	*	*	Pre-Startup	Partial Sanction
Integrity Management Integrations	GBE- Asset Management		G210	10/1/19	120	\$1,088,112	*	*	Pre-Startup	Partial Sanction
AM Program Leadership-3	GBE- Asset Management		G210	3/1/20	120	\$408,336	*	*	Pre-Startup	Partial Sanction
Design (GWD), Estimating (CU), & Mobility	GBE- Asset Management		G210	9/1/20	120	\$9,851,109	*	*	Pre-Startup	Partial Sanction
Asset Analytics Integration	GBE- Asset Management		G210	12/1/20	120	\$1,764,202	*	*	Pre-Startup	Partial Sanction
GIS (GWD/CU) - PPM Integration	GBE- Asset Management		G210	12/1/20	120	\$844,849	*	*	Pre-Startup	Partial Sanction
GIS-EAM Integration	GBE- Asset Management		G210	12/2/20	120	\$7,818,756	*	*	Pre-Startup	Partial Sanction
AM Program Leadership-4	GBE- Asset Management		G210	3/1/21	120	\$103,929	*	*	Pre-Startup	Partial Sanction
Use Case No.1 - Asset Risk	GBE- Asset Management		G210	3/1/21	120	\$3,591,031	*	*	Pre-Startup	Partial Sanction
Complex Design (CAD) & Estimating (ESW)	GBE- Asset Management		G210	3/1/21	120	\$2,389,087	*	*	Pre-Startup	Partial Sanction
Program Learning Management-1	GBE- Business Enablement		G210	3/1/18	120	\$117,297	*	*	Pre-Startup	Partial Sanction
Program Transformational Change Office-1	GBE- Business Enablement		G210	3/1/18	120	\$689,043	*	*	Pre-Startup	Partial Sanction
Program Business Sustainment-1	GBE- Business Enablement		G210	3/1/19	120	\$69,617	*	*	Pre-Startup	Partial Sanction
Program Learning Management-2	GBE- Business Enablement		G210	3/1/19	120	\$130,211	*	*	Pre-Startup	Partial Sanction
Program Transformational Change Office -2	GBE- Business Enablement		G210	3/1/19	120	\$1,516,310	*	*	Pre-Startup	Partial Sanction
Program Learning Management-3	GBE- Business Enablement		G210	3/1/20	120	\$173,060	*	*	Pre-Startup	Partial Sanction
Program Transformational Change Office-3	GBE- Business Enablement		G210	3/1/20	120	\$368,704	*	*	Pre-Startup	Partial Sanction
Program Business Sustainment-2	GBE- Business Enablement		G210	3/1/21	120	\$221,771	*	*	Pre-Startup	Partial Sanction
Program Learning Management-4	GBE- Business Enablement		G210	3/1/21	120	\$195,721	*	*	Pre-Startup	Partial Sanction
Program Transformational Change Office-4	GBE- Business Enablement		G210	3/1/21	120	\$169,648	*	*	Pre-Startup	Partial Sanction
Customer Experience Program Leadership-1	GBE- Customer Engagement		G210	3/1/19	120	\$260,229	*	*	Start-up	Partial Sanction
CxT Portal & Channel Management	GBE- Customer Engagement		G210	6/1/19	120	\$11,875,000	*	*	Pre-Startup	Partial Sanction
Customer Interaction - First Release	GBE- Customer Engagement		G210	10/1/19	120	\$4,796,546	*	*	Pre-Startup	Partial Sanction
Employee Support Interaction - First Release	GBE- Customer Engagement		G210	10/1/19	120	\$7,954,131	*	*	Pre-Startup	Partial Sanction
Customer Experience Program Leadership-2	GBE- Customer Engagement		G210	3/1/20	120	\$266,277	*	*	Pre-Startup	Partial Sanction
CRM / Contact Center	GBE- Customer Engagement		G210	6/1/20	120	\$19,000,000	*	*	Pre-Startup	Partial Sanction
Large Commercial & Landlord Interaction	GBE- Customer Engagement		G210	7/1/20	120	\$1,446,508	*	*	Pre-Startup	Partial Sanction
Employee Support Interaction - Second Release	GBE- Customer Engagement		G210	7/1/20	120	\$292,791	*	*	Pre-Startup	Partial Sanction
Customer Interaction - Second Release	GBE- Customer Engagement		G210	1/1/21	120	\$2,010,254	*	*	Pre-Startup	Partial Sanction
Customer Experience Program Leadership-3	GBE- Customer Engagement		G210	3/1/21	120	\$203,177	*	*	Pre-Startup	Partial Sanction
Data Management Implementation (Quality & Cleansing)	GBE- Data Management		G210	12/1/17	120	\$11,100,000	*	*	Pre-Startup	Partial Sanction
Data Management & Governance Program Leadership-1	GBE- Data Management		G210	3/1/18	120	\$58,890	*	*	Start-up	Partial Sanction
Enable the Data Archive Process	GBE- Data Management		G210	3/1/19	120	\$2,179,480	*	*	Pre-Startup	Partial Sanction
Data Management & Governance Program Leadership-2	GBE- Data Management		G210	3/1/19	120	\$87,954	*	*	Pre-Startup	Partial Sanction
Data Management & Governance Program Leadership-3	GBE- Data Management		G210	3/1/20	120	\$89,713	*	*	Pre-Startup	Partial Sanction
Powerplan Remediation	GBE- Information Services Enabling		G210	11/1/17	120	\$6,080,111	*	*	Development and Implementation	Partial Sanction
Comprehensive Integration Services (Enhancements)	GBE- Information Services Enabling		G210	12/1/17	120	\$78,624	*	*	Requirements and Design	Partial Sanction
Application (Environment) Infrastructure	GBE- Information Services Enabling		G210	12/1/17	120	\$2,174,410	*	*	Requirements and Design	Partial Sanction
Development Operations & BPA Enablement-1	GBE- Information Services Enabling		G210	3/1/18	120	\$2,903,920	*	*	Pre-Startup	Partial Sanction
SAP and Application Integration Development- Release 1-1	GBE- Information Services Enabling		G210	3/1/18	120	\$4,765,187	*	*	Pre-Startup	Partial Sanction
Mobility CoE & End-User Computing-1	GBE- Information Services Enabling		G210	3/1/18	120	\$604,790	*	*	Pre-Startup	Partial Sanction
Operations/System Monitoring	GBE- Information Services Enabling		G210	8/1/18	120	\$1,057,768	*	*	Pre-Startup	Partial Sanction
Development Operations & BPA Enablement-2	GBE- Information Services Enabling		G210	3/1/19	120	\$2,562,011	*	*	Requirements and Design	Partial Sanction
SAP and Application Integration Development- Release 1-2	GBE- Information Services Enabling		G210	3/1/19	120	\$4,548,168	*	*	Pre-Startup	Partial Sanction
SAP and Application Integration Development- Release 2-1	GBE- Information Services Enabling		G210	3/1/19	120	\$5,055,712	*	*	Pre-Startup	Partial Sanction
Mobility CoE & End-User Computing-2	GBE- Information Services Enabling		G210	3/1/19	120	\$920,536	*	*	Pre-Startup	Partial Sanction

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Amortization Period	ISP-3		June 2017 Forecast		Project Phase	Supporting
						Total US CapEx Spend		CapEx	OpEx (incl RTB)		
Development Operations & BPA Enablement-3	GBE- Information Services Enabling		G210	3/1/20	120	\$2,164,144		*	*	Pre-Startup	Documentation
SAP and Application Integration Development- Release 1-3	GBE- Information Services Enabling		G210	3/1/20	120	\$600,000		*	*	Pre-Startup	Partial Sanction
SAP and Application Integration Development- Release 2-2	GBE- Information Services Enabling		G210	3/1/20	120	\$4,397,065		*	*	Pre-Startup	Partial Sanction
SAP and Application Integration Development- Release 3-1	GBE- Information Services Enabling		G210	3/1/20	120	\$85,915		*	*	Pre-Startup	Partial Sanction
Mobility CoE & End-User Computing-3	GBE- Information Services Enabling		G210	3/1/20	120	\$1,031,843		*	*	Pre-Startup	Partial Sanction
Test Automation Implementation	GBE- Information Services Enabling		G210	12/1/20	120	\$2,577,052		*	*	Pre-Startup	Partial Sanction
Development Operations & BPA Enablement-4	GBE- Information Services Enabling		G210	3/1/21	120	\$2,176,436		*	*	Startup	Partial Sanction
SAP and Application Integration Development- Release 1-4	GBE- Information Services Enabling		G210	3/1/21	120	\$600,000		*	*	Pre-Startup	Partial Sanction
SAP and Application Integration Development- Release 3-2	GBE- Information Services Enabling		G210	3/1/21	120	\$2,326,606		*	*	Pre-Startup	Partial Sanction
Mobility CoE & End-User Computing-4	GBE- Information Services Enabling		G210	3/1/21	120	\$952,793		*	*	Pre-Startup	Partial Sanction
Portfolio Management Leadership-1	GBE- Portfolio Office		G210	3/1/18	120	\$1,645,919		*	*	Start-up	Partial Sanction
Solution Architects & Agile Coaches-1	GBE- Portfolio Office		G210	3/1/18	120	\$1,958,277		*	*	Start-up	Partial Sanction
Portfolio Management Leadership-2	GBE- Portfolio Office		G210	3/1/19	120	\$2,144,482		*	*	Pre-Startup	Partial Sanction
Solution Architects & Agile Coaches-2	GBE- Portfolio Office		G210	3/1/19	120	\$3,964,632		*	*	Pre-Startup	Partial Sanction
Portfolio Management Leadership-3	GBE- Portfolio Office		G210	3/1/20	120	\$2,161,221		*	*	Pre-Startup	Partial Sanction
Solution Architects & Agile Coaches-3	GBE- Portfolio Office		G210	3/1/20	120	\$2,824,290		*	*	Pre-Startup	Partial Sanction
Portfolio Management Leadership-4	GBE- Portfolio Office		G210	3/1/21	120	\$1,855,901		*	*	Pre-Startup	Partial Sanction
Regulatory/ Compliance	GBE- Regulatory and Compliance		G210	9/1/19	120	\$3,000,000		*	*	Startup	Partial Sanction
Supply Chain Program Leadership	GBE- Supply Chain		G210	3/1/19	120	\$565,045		*	*	Pre-Startup	Partial Sanction
Supply Chain Program Leadership	GBE- Supply Chain		G210	3/1/20	120	\$235,258		*	*	Pre-Startup	Partial Sanction
Business Architecture Design	GBE- Work Management		G210	12/1/17	120	\$3,004,085		*	*	Start-up	Partial Sanction
WMFE Program Leadership-1	GBE- Work Management		G210	3/1/18	120	\$234,013		*	*	Start-up	Partial Sanction
Corrosion and I&R Work	GBE- Work Management		G210	7/1/18	120	\$26,479,653		*	*	Pre-Startup	Partial Sanction
CU Governance & Library - process	GBE- Work Management		G210	11/1/18	120	\$1,658,439		*	*	Pre-Startup	Partial Sanction
WMFE Program Leadership-2	GBE- Work Management		G210	3/1/19	120	\$563,692		*	*	Pre-Startup	Partial Sanction
Company Driven Work: Collections and non-Appointment Offs - Gas	GBE- Work Management		G210	10/1/19	120	\$5,310,645		*	*	Pre-Startup	Partial Sanction
Company Driven Work: Collections and non-Appointment Offs- Electric	GBE- Work Management		G198	10/1/19	120	\$2,859,577		*	*	Pre-Startup	Partial Sanction
Customer, Leak Investigation & Inspections - Gas	GBE- Work Management		G210	10/1/19	120	\$20,374,438		*	*	Pre-Startup	Partial Sanction
Customer, Leak Investigation & Inspections - Electric	GBE- Work Management		G198	10/1/19	120	\$10,970,850		*	*	Startup	Partial Sanction
WMFE Program Leadership-3	GBE- Work Management		G210	3/1/20	120	\$595,004		*	*	Pre-Startup	Partial Sanction
PowerPlan Integration & Enhancements	GBE- Work Management		G210	6/1/20	120	\$1,946,867		*	*	Pre-Startup	Partial Sanction
Construction Work & Leak Repair	GBE- Work Management		G210	9/1/20	120	\$19,718,534		*	*	Pre-Startup	Partial Sanction
WMFE Program Leadership-4	GBE- Work Management		G210	3/1/21	120	\$155,062		*	*	Pre-Startup	Partial Sanction
Work Forecasting & Planning - solution	GBE- Work Management		G210	5/1/21	120	\$1,708,505		*	*	Pre-Startup	Partial Sanction
Core Projects & Program Management	GBE- Work Management		G210	6/1/21	120	\$3,134,061		*	*	Pre-Startup	Partial Sanction
WMFE Optimization	GBE- Work Management		G210	3/1/22	120	\$3,331,402		*	*	Pre-Startup	Partial Sanction
Customer Experience Transformation-Communication Preference Management	Growth Play Book-CXT	4750	C175	3/31/19	84	\$2,000,000		2,000,000	1,065,000	Development and Implementation	IRS
Customer Experience Transformation-MyAccount Portal	Growth Play Book-CXT	4427	C175	6/1/19	84	\$8,500,000		8,500,000	1,900,000	Pre-Startup	IRS
Governance Risk & Compliance (GRC) Optimization/Upgrade	Growth Play Book-Finance	4222	G020	3/1/19	84	\$1,540,000		1,540,000	136,176	Design	Partial Sanction
US SAP: Business Planning	Growth Play Book-Finance	4217	G020	3/31/19	84	\$4,643,000		4,643,000	229,025	Design	IRS
US SAP: FERC on Hana (FOH)	Growth Play Book-Finance	4563	G020	3/31/19	84	\$1,315,000		1,315,000	-	Pre-Startup	IRS
DRMS for C&I Demand Response	NY REV/grid modernization		5210E	5/1/17	36	\$3,429,633		3,429,633	-	Pre-Startup	IRS
Load and DER Forecasting (Acquisition of Remote Sensing Data - NY)	NY REV/grid modernization	4729	C113	3/31/18	84	\$8,632,000		8,632,000	-	Closure/ In-Production	Full Sanction
Plant Information Historian	NY REV/grid modernization	4704K	G198	9/30/18	84	\$11,427,818		11,427,818	3,766,537	Pre-Startup	IRS
E-Commerce Marketplace	NY REV/grid modernization	4704D	C113	3/31/19	84	\$915,837		915,837	271,779	Pre-Startup	IRS
AMI - Telecoms	NY REV/grid modernization	4704I	5210E	3/31/19	84	\$1,580,151		1,580,151	302,940	Pre-Startup	IRS
DG IOAP Tactical (Phase 2)	NY REV/grid modernization	4704P	5210E	3/31/19	84	\$1,764,000		1,764,000	461,000	Pre-Startup	IRS
AMI - CSS Enhancements	NY REV/grid modernization	4704A	C113	3/31/20	84	\$8,075,538		8,075,538	8,661,847	Pre-Startup	IRS
Green Button Connect	NY REV/grid modernization	4704C	C113	3/31/20	84	\$3,072,759		3,072,759	1,510,761	Pre-Startup	IRS
AMI - Telecoms	NY REV/grid modernization	4704I	5210E	3/31/20	84	\$1,409,719		1,409,719	2,712,076	Pre-Startup	IRS
Outdoor Lighting Inventory Portal	NY REV/grid modernization	4704O	5210E	3/31/20	84	\$1,600,000		1,600,000	500,000	Pre-Startup	IRS
DRMS for C&I Demand Response (Renewal)	NY REV/grid modernization		5210E	5/1/20	12	\$1,200,000		1,200,000	-	Pre-Startup	IRS
DSP - DG IOAP	NY REV/grid modernization	4704F	5210E	9/30/20	84	\$14,835,271		14,835,271	4,267,014	Pre-Startup	IRS
Grid MOD - ABB/ADMS & D-SCADA	NY REV/grid modernization	4704G	5210E	3/31/21	84	\$29,229,298		29,229,298	2,494,372	Pre-Startup	IRS

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Amortization Period	ISP-3	June 2017 Forecast		Project Phase	Supporting Documentation
						Total US CapEx Spend	CapEx	OpEx (incl RTB)		
AMI - Telecoms	NY REV/grid modernization	4704I	5210E	3/31/21	84	\$1,962,336	1,962,336	4,219,042	Pre-Startup	IRS
AMI - Enterprise Service Bus & API Integration	NY REV/grid modernization	4704J	C113	3/31/21	84	\$4,946,371	4,946,371	1,941,965	Pre-Startup	IRS
AMI - Enterprise Service Bus & API Integration	NY REV/grid modernization	4704J	5210E	3/31/21	84	\$11,009,664	11,009,664	4,322,749	Pre-Startup	IRS
AMI - Info Mgt & Advanced Analytics	NY REV/grid modernization	4704L	C113	3/31/21	84	\$3,378,822	3,378,822	703,596	Pre-Startup	IRS
AMI - Info Mgt & Advanced Analytics	NY REV/grid modernization	4704L	5210E	3/31/21	84	\$16,496,601	16,496,601	3,435,201	Pre-Startup	IRS
IS-Cloud Computing & Data Lake	NY REV/grid modernization	4704M	C113	3/31/21	84	\$1,178,236	1,178,236	279,572	Pre-Startup	IRS
IS-Cloud Computing & Data Lake	NY REV/grid modernization	4704M	5210E	3/31/21	84	\$5,752,565	5,752,565	1,364,965	Pre-Startup	IRS
Cyber Security	NY REV/grid modernization	4704N	C113	3/31/21	84	\$11,541,052	11,541,052	7,191,076	Pre-Startup	IRS
Cyber Security	NY REV/grid modernization	4704N	5210E	3/31/21	84	\$17,311,579	17,311,579	10,786,611	Pre-Startup	IRS
Annual HR & Payroll Mandatory Service Pack Upgrade (HRSP) - FY18	Other Mandates	4400	G020	12/31/17	84	\$1,126,000	1,126,000	379,554	Development and Implementation	IRS
Regulatory Mandates - FY18	Other Mandates		G020	3/31/18	84	\$5,071,622	5,071,622	2,000,000	Reference DPS-513	IRS
US Control-Gas Electronic Bulletin Board (EBB) Upgrade	Other Mandates	4479	G210	5/1/18	84	\$3,000,000	3,000,000	1,286,000	Startup	IRS
Regulatory Mandates - FY19	Other Mandates		G020	3/31/19	84	\$18,595,000	18,595,000	6,000,000	Pre-Startup	IRS
Regulatory Mandates - FY20	Other Mandates		G020	3/31/20	84	\$20,000,000	20,000,000	6,000,000	Pre-Startup	IRS
Regulatory Mandates - FY21	Other Mandates		G020	3/31/21	84	\$20,000,000	20,000,000	6,000,000	Pre-Startup	IRS
CPE Buyback	Tech. Modernization	4684	G020	3/31/17	84	\$5,140,000	5,140,000	4,011	Closure/ In-Production	Full Sanction
Active Directory Improvements	Tech. Modernization	4489	G020	11/30/17	84	\$275,000	275,000	275,000	Startup	IRS
Application Performance Management (APM)	Tech. Modernization	4490	G020	1/31/18	84	\$375,000	375,000	111,111	Pre-Startup	IRS
RAS/VPN Re-Platform/Mobile	Tech. Modernization	4269	G020	3/16/18	84	\$600,000	600,000	19,998	Startup	IRS
US Network Programme	Tech. Modernization	4496	G020	3/31/18	84	\$3,025,000	3,025,000	535,000	Pre-Startup	IRS
US VSTIG Programme	Tech. Modernization	4498	G020	3/31/18	84	\$2,700,000	2,700,000	370,000	Pre-Startup	IRS
US Wireless Programme	Tech. Modernization	4499	G020	3/31/18	84	\$1,950,000	1,950,000	306,000	Pre-Startup	IRS
Monitoring and Alerting	Tech. Modernization	4493	G020	3/31/18	84	\$450,000	450,000	225,000	Pre-Startup	IRS
RSA Re-platform	Tech. Modernization	4270	G020	3/31/18	84	\$280,000	280,000	815,554	Pre-Startup	IRS
Cloud Broker - Hybrid Enablement	Tech. Modernization	3899	G020	3/31/18	84	\$250,000	250,000	551,167	Implementation	IRS
Office 2010 Upgrade	Tech. Modernization	4265	G020	3/31/18	84	\$800,000	800,000	-	Pre-Startup	IRS
Citrix Infrastructure Upgrade (Xenapp and NetScaler)	Tech. Modernization	4279	G020	3/31/18	84	\$500,000	500,000	277,143	Pre-Startup	IRS
Business Innovation Projects 1	Tech. Modernization	4707	G020	3/31/18	84	\$3,368,613	3,368,613	673,723	Pre-Startup	IRS
Data Security	Tech. Modernization	4710	G020	3/31/18	84	\$1,575,000	1,575,000	-	Pre-Startup	IRS
Orchestration and Self Service	Tech. Modernization	4726	G020	3/31/18	84	\$750,000	750,000	1,750,000	Pre-Startup	IRS
Virtual Desktop - DaaS	Tech. Modernization	4727	G020	3/31/18	84	\$550,000	550,000	1,087,500	Pre-Startup	IRS
SCI connections	Tech. Modernization	4495	G020	3/31/18	84	\$100,000	100,000	355,556	Startup	IRS
US SAP: Dynamic Storage Tiering	Tech. Modernization	4560	G020	7/5/18	84	\$1,355,000	1,355,000	464,000	Pre-Startup	IRS
ICE Replacement	Tech. Modernization	4491	G020	10/31/18	84	\$3,316,000	3,316,000	2,288,500	Implementation	Full Sanction
US Network Programme	Tech. Modernization	4496	G020	3/31/19	84	\$2,075,000	2,075,000	745,000	Pre-Startup	IRS
US VSTIG Programme	Tech. Modernization	4498	G020	3/31/19	84	\$1,700,000	1,700,000	190,000	Pre-Startup	IRS
US Wireless Programme	Tech. Modernization	4499	G020	3/31/19	84	\$1,500,000	1,500,000	205,000	Pre-Startup	IRS
Data Visualisation Expansion	Tech. Modernization	4606	G020	3/31/19	84	\$2,800,000	2,800,000	910,000	Startup	IRS
US SAP: Business Warehouse (BW) Consolidation to HANA Enterprise Cloud (HEC)	Tech. Modernization	4562	G020	3/31/19	84	\$2,366,000	2,366,000	810,000	Pre-Startup	IRS
Monitoring and Alerting	Tech. Modernization	4493	G020	3/31/19	84	\$1,000,000	1,000,000	125,000	Pre-Startup	IRS
MWORK and Netmotion Risk Avoidance	Tech. Modernization	4725	G020	3/31/19	84	\$500,000	500,000	20,000	Pre-Startup	IRS
Improving End User Experience- Cloud based DMZ Service Platform	Tech. Modernization	4723	G020	3/31/19	84	\$300,000	300,000	50,000	Pre-Startup	IRS
Mobile Broadband POC	Tech. Modernization	POC	G020	3/31/19	84	\$100,000	100,000	20,000	Pre-Startup	IRS
FY19 Edge Projects	Tech. Modernization	4717	G020	3/31/19	84	\$1,000,000	1,000,000	-	Pre-Startup	IRS
FY19 Network Projects	Tech. Modernization	4718	G020	3/31/19	84	\$1,000,000	1,000,000	-	Pre-Startup	IRS
Digital Asset Management (DAM)	Tech. Modernization	4711	G020	3/31/19	84	\$500,000	500,000	-	Closure/ In-Production	IRS
Business Innovation Projects 1	Tech. Modernization	4707	G020	3/31/19	84	\$3,973,236	3,973,236	100,000	Pre-Startup	IRS
Business Innovation Projects 2	Tech. Modernization	4708	G020	3/31/19	84	\$3,368,613	3,368,613	673,723	Pre-Startup	IRS
Business Innovation Projects 3	Tech. Modernization	4728	G020	3/31/19	84	\$3,368,613	3,368,613	673,723	Pre-Startup	IRS
EU, network, and data center strategy	Tech. Modernization	4715	G020	3/31/19	84	\$1,542,858	1,542,858	1,271,429	Pre-Startup	IRS
Data Security	Tech. Modernization	4710	G020	3/31/19	84	\$1,575,000	1,575,000	2,394,000	Pre-Startup	IRS
FY19 Data Centre Projects	Tech. Modernization	4716	G020	3/31/19	84	\$2,000,000	2,000,000	250,000	Pre-Startup	IRS
1327 Interfaces - 523 FTS, 340 RDX, 245 MQSI, 253 JCAPS, 44 PM4D, 7 VB	Tech. Modernization	4706	G020	3/31/19	84	\$3,300,000	3,300,000	20,000	Pre-Startup	IRS

Investment Name	Programs	INVP #	Bill Pool	In Service Date	Amortization Period	June 2017 Forecast		Project Phase	Supporting Documentation	
						ISP-3	Total Costs through FY21			
						Total US CapEx Spend	CapEx	OpEx (incl RTB)		
US Video Conference Programme	Tech. Modernization	4497	G020	6/1/19	84	\$1,650,000	1,650,000	770,000	Pre-Startup	IRS
IS Tools	Tech. Modernization	4513	G020	3/24/20	84	\$400,000	400,000	400,000	Pre-Startup	IRS
US SAP: Enhancement Pack 9 Upgrade	Tech. Modernization	4564	G020	3/31/20	84	\$8,821,000	8,821,000	3,019,000	Pre-Startup	IRS
US Network Programme	Tech. Modernization	4496	G020	3/31/20	84	\$1,575,000	1,575,000	655,000	Pre-Startup	IRS
US VSTIG Programme	Tech. Modernization	4498	G020	3/31/20	84	\$700,000	700,000	120,000	Pre-Startup	IRS
US Wireless Programme	Tech. Modernization	4499	G020	3/31/20	84	\$1,500,000	1,500,000	155,000	Pre-Startup	IRS
Monitoring and Alerting	Tech. Modernization	4493	G020	3/31/20	84	\$1,000,000	1,000,000	75,000	Pre-Startup	IRS
Service Now - Release 3	Tech. Modernization	4261	G020	3/31/20	84	\$3,400,000	3,400,000	620,000	Pre-Startup	IRS
FY20 Edge Projects	Tech. Modernization	4720	G020	3/31/20	84	\$2,000,000	2,000,000	1,000,000	Pre-Startup	IRS
FY20 Network Projects	Tech. Modernization	4721	G020	3/31/20	84	\$4,000,000	4,000,000	-	Pre-Startup	IRS
EMM Licenses	Tech. Modernization	4713	G020	3/31/20	84	\$1,320,000	1,320,000	-	Pre-Startup	IRS
Business Innovation Projects 2	Tech. Modernization	4708	G020	3/31/20	84	\$3,973,236	3,973,236	100,000	Pre-Startup	IRS
Business Innovation Projects 3	Tech. Modernization	4728	G020	3/31/20	84	\$3,979,236	3,979,236	100,000	Pre-Startup	IRS
Data Security	Tech. Modernization	4710	G020	3/31/20	84	\$1,575,000	1,575,000	2,394,000	Pre-Startup	IRS
Hardware and Software Upgrades	Tech. Modernization	4722	G020	3/31/20	84	\$7,500,000	7,500,000	1,200,000	Pre-Startup	IRS
Data Centre Consolidation efforts	Tech. Modernization	4709	G020	3/31/20	84	\$3,500,000	3,500,000	1,000,000	Pre-Startup	IRS
FY20 Data Centre Projects	Tech. Modernization	4719	G020	3/31/20	84	\$4,000,000	4,000,000	500,000	Pre-Startup	IRS
Enterprise Data Management Platform	Tech. Modernization	4582	G020	6/1/20	84	\$4,730,000	4,730,000	1,350,000	Pre-Startup	IRS
Business Innovation Projects 2	Tech. Modernization	4708	G020	3/31/21	84	\$4,491,484	4,491,484	100,000	Pre-Startup	IRS
Business Innovation Projects 3	Tech. Modernization	4728	G020	3/31/21	84	\$4,491,484	4,491,484	100,000	Pre-Startup	IRS

* There is no updated forecast for the Gas Business Enablement Program beyond that included in the Company's initial rate filing. The capital and operating costs for the Gas Business Enablement Program included in Exhibit __ (ISP-3) and Exhibit __ (GIOP-10), respectively, reflect the roadmap for the GBE Program developed as a result of the strategic assessment and design performed for the Program

Total Per ISP-3	935,841,359	
Less: GBE projects	(282,448,859)	
Total	653,392,500	657,792,054
Variance	\$	4,399,554

Niagara Mohawk Power Corporation d/b/a National Grid
ISP-3 Information Services (IS) Capital Projects

Investment Name	Programs	INVP #	Inception To Date + FY18	FY19 CAPEX	FY20 CAPEX	FY21 CAPEX	June 2017 Forecast		Project Phase	Supporting Documentation	
							ISP-3 Total US CapEx Spend	Total Costs through FY21 CapEx OpEx (incl RTB)			
In-flight projects											
INVP 3614D1 Ent Network Security	Cyber Security	3614D1	9,478,590	-	-	-	\$9,478,590	\$10,999,177	\$1,600,445	Implementation	Full Sanction
INVP 3614B7 CNI Network Security	Cyber Security	3614B7	4,829,586	-	-	-	\$4,829,586	\$4,738,207	\$529,820	Implementation	Full Sanction
INVP 3614E4 US CNI Security I&E	Cyber Security	3614E4	1,207,045	-	-	-	\$1,207,045	\$1,365,558	\$279,308	Implementation	Full Sanction
INVP 4045 Double Pole Mgmt DB	FY18 Plan	4045	482,153	-	-	-	\$482,153	\$432,455	\$363,840	Implementation	Full Sanction
INVP 4373 Contingent Labor Admin Replacement	FY18 Plan	4373	250,692	-	-	-	\$250,692	\$259,667	\$18,501	Implementation	Full Sanction
INVP 3955 EJ Ward Upgrade	FY18 Plan	3955	646,004	-	-	-	\$646,004	\$662,190	\$146,481	Implementation	Full Sanction
INVP 4188 Aging System Stabilize	FY18 Plan	4188	782,710	-	-	-	\$782,710	\$1,465,467	\$562,461	Development	Full Sanction
INVP 4280 US VSTIG Bandwidth Ph2	FY18 Plan	4280	1,998,645	-	-	-	\$1,998,645	\$2,074,174	\$16,839	Closure/ In-Production	Full Sanction
INVP 4307 US Win 7 Refresh Ph 3	FY18 Plan	4307	11,562,999	-	-	-	\$11,562,999	\$13,133,973	\$699,297	Closure/ In-Production	Full Sanction
INVP 4364 Wireless Network	FY18 Plan	4364	2,303,959	-	-	-	\$2,303,959	\$2,180,320	\$268,863	Implementation	Full Sanction
S005242 M112 Systemic Improvement	FY18 Plan	N/A	8,000,000	-	-	-	\$8,000,000	\$8,355,000	\$0	Closure/ In-Production	Reference DPS-541
INVP 4289 US Network Improvement	FY18 Plan	4289	978,717	-	-	-	\$978,717	\$1,195,547	\$56,036	Implementation	Full Sanction
INVP 2577C ArcFM Software Upgrade	FY18 Plan	2577C	2,087,188	-	-	-	\$2,087,188	\$2,022,295	\$612,709	Implementation	Full Sanction
INVP 4631 Box Enablement	FY18 Plan	4631	254,000	-	-	-	\$254,000	\$32,532	\$196,910	Implementation	Full Sanction
INVP 4170 Time Transformation	FY18 Plan	4170	3,917,000	-	-	-	\$3,917,000	\$2,529,359	\$1,541,281	Implementation	Full Sanction
INVP 4420 US CNI OMSFocalPoint Infrastructure Upgrade	FY18 Plan	4420	1,366,563	-	-	-	\$1,366,563	\$711,225	\$82,680	Design	Full Sanction
INVP 4274 VSTIG Hardware Refresh	FY18 Plan	4274	608,000	-	-	-	\$608,000	\$381,470	\$39,101	Design	Full Sanction
INVP 4464 Data Visualization	FY18 Plan	4464	4,440,000	-	-	-	\$4,440,000	\$7,510,364	\$312,095	Requirements	Full Sanction
INVP 4461 Unix51 Interface Migration	FY18 Plan	4461	1,386,701	-	-	-	\$1,386,701	\$458,525	\$80,081	Implementation	Partial Sanction
INVP 4287 Active Directory Upgrade	FY18 Plan	4287	804,825	-	-	-	\$804,825	\$469,583	\$116,667	Start-up	IRS
INVP 4408 Doc Mgmt Systems Replacement Delivery	FY18 Plan	4408	3,617,542	-	-	-	\$3,617,542	\$5,233,908	\$2,814,070	Design	Partial Sanction
INVP 3486 US MDS-Iron Enterprise Edition (IEE)	FY18 Plan	3486	670,943	-	-	-	\$670,943	\$1,035,859	\$176,170	Development	Partial Sanction
INVP 4390 Plastic Fusion II	FY18 Plan	4390	506,000	-	-	-	\$506,000	\$456,000	\$100,438	Start-up	IRS
INVP 4397 Ariba TLS and CI Update	FY18 Plan	4397	1,462,000	-	-	-	\$1,462,000	\$1,425,275	\$311,425	Development	Full Sanction
Call Center Customer Contact Center/SDC Technology Upgrade Implement Solution	FY18 Plan	3932	24,205,719	3,519,000	-	-	\$27,724,719	\$27,724,719	\$1,504,111	Requirements	Full Sanction
INVP 4398 Storms/ISched Upgrade	FY18 Plan	4398	9,523,867	432,000	-	-	\$9,955,867	\$9,674,263	\$2,370,096	Development	Full Sanction
INVP 3737 US CNI GMS SCADA Upgrade &	FY18 Plan	3737	16,555,091	6,354,200	3,021,000	-	\$25,930,291	\$21,342,368	\$5,276,307	Development	Partial Sanction
INVP 3882 NYS Pipeline Safety CMS	Other Mandates	3882	1,308,000	-	-	-	\$1,308,000	\$1,673,447	\$221,814	Implementation	Full Sanction
INVP 3851 Consolidated Voice Recorder for US Electric Control Rooms	Other Mandates	3851	1,234,000	-	-	-	\$1,234,000	\$1,377,237	\$2,536	Closure/ In-Production	IRS
Physical Security Replacements - FY17	Physical Security	N/A	906,050	-	-	-	\$906,050	\$1,469,156	\$0	Reference DPS-115	Reference DPS-115
Physical Security Replacements - FY18	Physical Security	N/A	950,000	-	-	-	\$950,000	\$950,000	\$0	Reference DPS-115	Reference DPS-115
All NIMO Physical Security Replacements - FY18	Physical Security	N/A	490,000	-	-	-	\$490,000	\$490,000	\$0	Reference DPS-115	Reference DPS-115
Physical Security Replacements - FY19	Physical Security	N/A	-	825,000	-	-	\$825,000	\$825,000	\$0	Reference DPS-115	Reference DPS-115
All NIMO Physical Security Replacements - FY19	Physical Security	N/A	-	275,000	-	-	\$275,000	\$275,000	\$0	Reference DPS-115	Reference DPS-115
Physical Security Replacements - FY20	Physical Security	N/A	-	-	835,000	-	\$835,000	\$835,000	\$0	Reference DPS-115	Reference DPS-115
All NIMO Physical Security Replacements - FY20	Physical Security	N/A	-	-	282,000	-	\$282,000	\$282,000	\$0	Reference DPS-115	Reference DPS-115
Physical Security Replacements - FY21	Physical Security	N/A	-	-	-	860,000	\$860,000	\$860,000	\$0	Reference DPS-115	Reference DPS-115
All NIMO Physical Security Replacements - FY21	Physical Security	N/A	-	-	-	290,000	\$290,000	\$290,000	\$0	Reference DPS-115	Reference DPS-115
INVP 4451 Gas Transportation System Phase II	PSC Mandate	4451	1,629,117	-	-	-	\$1,629,117	\$1,199,131	\$467,642	Closure/ In-Production	Full Sanction
INVP 4347 NYC Leave on for Landlord Program	PSC Mandate	4347	870,095	-	-	-	\$870,095	\$1,089,524	\$213,137	Requirements	Full Sanction
INVP 4124 Auto Remote Net Meter	PSC Mandate	4124	3,584,165	-	-	-	\$3,584,165	\$3,227,856	\$770,204	Development	Full Sanction
INVP 3839A NY Retail Access Ph2	PSC Mandate	3839A	5,356,231	-	-	-	\$5,356,231	\$5,091,165	\$786,713	Development	Full Sanction
INVP 4411AB Distributed Generation Portal	PSC Mandate	4411A+B	3,347,611	-	-	-	\$3,347,611	\$4,078,786	\$2,400,732	Closure/ In-Production	Full Sanction
INVP 4383 NY Community Choice Aggregation	PSC Mandate	4383	551,447	-	-	-	\$551,447	\$580,482	\$262,919	Design	Partial Sanction
INVP 4448 Low Income Order CRIS	PSC Mandate	4448	2,207,590	-	-	-	\$2,207,590	\$3,443,968	\$736,958	Requirements	Partial Sanction
INVP 4448 Low Income Order CSS	PSC Mandate	4448	2,489,410	-	-	-	\$2,489,410	\$3,882,780	\$831,042	Requirements	Partial Sanction
INVP 4411C New Electric Connections	PSC Mandate	4411C	698,000	-	-	-	\$698,000	\$851,000	\$135,000	Pre Start-up	Partial Sanction
INVP 4411D New Gas Connections	PSC Mandate	4411D	36,000	860,000	-	-	\$896,000	\$896,000	\$0	Pre Start-up	Partial Sanction

Investment Name	Programs	INVP #	Inception To Date + FY18	FY19 CAPEX	FY20 CAPEX	FY21 CAPEX	ISP-3		June 2017 Forecast		Project Phase	Supporting Documentation
							Total US CapEx Spend	Total Costs through FY21	CapEx	OpEx (incl RTB)		
Planned Projects												
Cloud Security	Cyber Security	3683B	1,460,000	-	-	-	\$1,460,000	\$1,460,000	\$292,000	Pre Start-up	IRS	
Risk Based Authentication - 2FA token alternative	Cyber Security	3683X2	235,080	-	-	-	\$235,080	\$235,080	\$112,120	Pre Start-up	IRS	
Threat Behavior Modeling	Cyber Security	3683X15	800,000	-	-	-	\$800,000	\$800,000	\$171,500	Pre Start-up	IRS	
Identity & Access Management :Role Base Access Management (RBAC)	Cyber Security	3683X5	1,650,000	-	-	-	\$1,650,000	\$1,650,000	\$641,450	Pre Start-up	IRS	
Enhanced DLP Gateway and Endpoint	Cyber Security	3683X8	2,238,480	-	-	-	\$2,238,480	\$2,238,480	\$408,500	Pre Start-up	IRS	
US CNI Intrusion Detection/Prevention Phase 1	Cyber Security	3683X1	550,000	-	-	-	\$550,000	\$550,000	\$255,288	Pre Start-up	IRS	
Identity & Access Management: Fine Grain Access Management	Cyber Security	3683X5	1,650,000	-	-	-	\$1,650,000	\$1,650,000	\$556,000	Pre Start-up	IRS	
vStig Scaling Upgrades	Cyber Security	3683X12	1,000,000	-	-	-	\$1,000,000	\$1,000,000	\$1,300,000	Pre Start-up	IRS	
IT/OT Discovery and Implementation Phase 1	Cyber Security	3683X11	3,300,000	2,200,000	-	-	\$5,500,000	\$5,500,000	\$1,416,700	Pre Start-up	IRS	
Security Research Lab	Cyber Security	3683X1	325,000	-	-	-	\$325,000	\$325,000	\$65,000	Pre Start-up	IRS	
US CNI Security Enhancements Phase 1	Cyber Security	3683X6	1,650,000	-	-	-	\$1,650,000	\$1,650,000	\$650,000	Pre Start-up	IRS	
Identity & Access Management: Privileged Access Management	Cyber Security	3683X5	-	1,740,000	-	-	\$1,740,000	\$1,740,000	\$977,600	Pre Start-up	IRS	
Domain Based Security Phase 1	Cyber Security	3683X13	-	800,000	-	-	\$800,000	\$800,000	\$1,050,000	Pre Start-up	IRS	
Security Incident Event Management Phase 4	Cyber Security	3683X4	633,150	633,150	-	-	\$1,266,300	\$1,266,300	\$121,100	Pre Start-up	IRS	
Big Data Security Analytics Phase 1	Cyber Security	3683X7	2,310,776	2,310,776	-	-	\$4,621,552	\$4,621,552	\$583,150	Pre Start-up	IRS	
US CNI Intrusion Detection/Prevention Phase 2	Cyber Security	3683X1	-	300,000	500,000	-	\$800,000	\$800,000	\$180,000	Pre Start-up	IRS	
Identity & Access Management: Shared Area Access Management	Cyber Security	3683X5	-	-	1,740,000	-	\$1,740,000	\$1,740,000	\$904,960	Pre Start-up	IRS	
Security Incident Event Management Phase 5	Cyber Security	3683X4	-	-	733,150	-	\$733,150	\$733,150	\$20,000	Pre Start-up	IRS	
Domain Based Security Phase 2	Cyber Security	3683X13	-	-	3,000,000	3,000,000	\$6,000,000	\$6,000,000	\$350,000	Pre Start-up	IRS	
Security Incident Event Management (SIEM) 6	Cyber Security	3683X4	-	-	733,150	-	\$733,150	\$733,150	\$28,900	Pre Start-up	IRS	
Big Data Security Analytics - Phase 2	Cyber Security	3683X7	-	-	3,466,164	2,310,776	\$5,776,940	\$5,776,940	\$294,200	Pre Start-up	IRS	
IT/OT Discovery and Implementation: Phase 2	Cyber Security	3683X13	-	-	3,769,230	3,230,770	\$7,000,000	\$7,000,000	\$1,083,300	Pre Start-up	IRS	
US CNI Security Enhancements - Phase 2	Cyber Security	3683X6	-	-	2,640,000	1,320,000	\$3,960,000	\$3,960,000	\$100,000	Pre Start-up	IRS	
Data Visualization	Cyber Security	3683X16	-	-	1,000,000	-	\$1,000,000	\$1,000,000	\$100,000	Pre Start-up	IRS	
HANA License Costs	FY18 Plan	4649	3,500,000	-	-	-	\$3,500,000	\$3,500,000	\$167,978	Closure/ In-Production	Full Sanction	
Microsoft ELA Renewal	FY18 Plan	4642	1,900,000	-	-	-	\$1,900,000	\$1,900,000	\$4,195	Closure/ In-Production	Full Sanction	
Mobile Device Refresh - FY17	FY18 Plan	4671	4,546,000	-	-	-	\$4,546,000	\$4,546,000	\$0	Closure/ In-Production	Full Sanction	
Zscaler	FY18 Plan	4681	2,100,000	-	-	-	\$2,100,000	\$2,100,000	\$222,793	Start-up	IRS	
US Video Conferencing upgrade for RW	FY18 Plan	4632	1,330,000	-	-	-	\$1,330,000	\$1,330,000	-\$77,615	Implementation	IRS	
Hix D/C Improvement Server Refresh	FY18 Plan	4676	1,000,000	-	-	-	\$1,000,000	\$1,000,000	\$282,595	Design	IRS	
Mobility - (MDM) Mobile Device	FY18 Plan	3430	1,162,000	-	-	-	\$1,162,000	\$1,162,000	\$80,170	Development	Full Sanction	
Changes to ACIS for PMCC Civil Vendor Billing	FY18 Plan	4487	382,000	-	-	-	\$382,000	\$382,000	\$164,000	Pre Start-up	IRS	
US Control-Gas System Operating Procedure (SOP) Upgrade	FY18 Plan	4480	542,000	-	-	-	\$542,000	\$542,000	\$233,000	Pre Start-up	IRS	
Enterprise Labs	FY18 Plan	4693	668,000	-	-	-	\$668,000	\$668,000	\$21,103	Development	Full Sanction	
Cascade Electric Application Upgrade Project	FY18 Plan	3986	375,000	-	-	-	\$375,000	\$375,000	\$161,000	Pre Start-up	IRS	
WiFi for Fleet Services Diagnostic Laptops	FY18 Plan	3956	838,000	-	-	-	\$838,000	\$838,000	\$82,068	Pre Start-up	Full Sanction	
Gas Service Database - UNY	FY18 Plan	3949	325,000	-	-	-	\$325,000	\$325,000	\$100,000	Start-up	IRS	
Gas Service Database - DNY (LI and NYC)	FY18 Plan	3948	300,000	-	-	-	\$300,000	\$300,000	\$100,000	Start-up	IRS	
Substation Monitoring-DobleARMS	FY18 Plan	3982	622,000	-	-	-	\$622,000	\$622,000	\$266,000	Start-up	IRS	
Gas Capital Investment Planning Tool	FY18 Plan	4466	572,000	-	-	-	\$572,000	\$572,000	\$245,000	Pre Start-up	IRS	
Computapole Enhancements to Support Inspection Types	FY18 Plan	4462	450,000	-	-	-	\$450,000	\$450,000	\$75,000	Start-up	IRS	
Travel & Expense Management (T&E) and Global Master Service Provider	FY18 Plan	4578	1,232,000	-	-	-	\$1,232,000	\$1,232,000	\$1,560,000	Pre Start-up	IRS	
Ageing System Stabilization/Upgrades - FY18	FY18 Plan	4389	1,500,000	-	-	-	\$1,500,000	\$1,500,000	\$1,300,000	Pre Start-up	IRS	
US Mobile Device Refresh	FY18 Plan	4395	5,000,000	-	-	-	\$5,000,000	\$5,000,000	\$334,495	Implementation	Full Sanction	
US SAP: Infrastructure Landscape	FY18 Plan	4348	4,603,000	-	-	-	\$4,603,000	\$4,603,000	\$233,000	Pre Start-up	Partial Sanction	
US CNI Tech Services-Network Equipment Lifecycle Replacements	FY18 Plan	4570	250,000	-	-	-	\$250,000	\$250,000	\$0	Requirements	Full Sanction	
US CNI-EMS Lifecycle Hardware and Software Upgrade	FY18 Plan	4568	13,348,000	-	-	-	\$13,348,000	\$13,348,000	\$415,000	Requirements	IRS	
Network Transformation Completion - CEMS	FY18 Plan	4647	250,000	-	-	-	\$250,000	\$250,000	\$0	Requirements	IRS	
Application monitoring, Network/IDS, Operations monitoring	FY18 Plan	4677	750,000	-	-	-	\$750,000	\$750,000	\$11,288	Implementation	IRS	
Aged Printer refresh	FY18 Plan	4689	50,000	-	-	-	\$50,000	\$50,000	\$566	Project deferred	IRS	
RSA Token refresh	FY18 Plan	4683	200,000	-	-	-	\$200,000	\$200,000	\$501,329	Start-up	IRS	
Acquisition of Remote Sensing Data - Mass	FY18 Plan	4670	4,112,000	-	-	-	\$4,112,000	\$4,112,000	\$0	Closure/ In-Production	Full Sanction	
INVP4449 - EPA File	FY18 Plan	4449	700,000	-	-	-	\$700,000	\$700,000	\$157,642	Requirements	IRS	
Informatica Upgrade/Microstrategy Replacement Program	FY18 Plan	4469	3,287,000	229,000	-	-	\$3,516,000	\$3,516,000	\$766,524	Requirements	IRS	
US MDS-Energy Accounting System (EAS) migration to Wholesale Settlement Application (WSA)	FY18 Plan	4481	1,543,000	617,000	-	-	\$2,160,000	\$2,160,000	\$926,000	Start-up	IRS	
General Ledger Interface CRIS SAP	FY18 Plan	4486	900,000	300,000	-	-	\$1,200,000	\$1,200,000	\$208,655	Requirements	IRS	
STORMS Capital Cost Estimates	FY18 Plan	4467	-	776,000	-	-	\$776,000	\$776,000	\$194,000	Pre Start-up	IRS	
CRIS Data Archival	FY18 Plan	4485	800,000	500,000	-	-	\$1,300,000	\$1,300,000	\$450,000	Pre Start-up	IRS	
US CNI Tech Services-Network Equipment Lifecycle Replacements	FY18 Plan	4570	-	250,000	-	-	\$250,000	\$250,000	\$0	Design	Full Sanction	

Investment Name	Programs	INV#	Inception To Date + FY18	FY19 CAPEX	FY20 CAPEX	FY21 CAPEX	ISP-3		June 2017 Forecast		Project Phase	Supporting Documentation
							Total US CapEx Spend	CapEx	OpEx (incl RTB)			
Inventory Management Handheld Devices	FY18 Plan		75,000	-	-	-	\$75,000	\$75,000	\$0	Closure/ In-Production	Invoice	
Customer Bill Redesign	FY18 Plan	4704Q	175,679	1,932,468	-	-	\$2,108,147	\$2,108,147	\$217,000	Pre-Start-up	IRS	
Cisco Prime	FY18 Plan	4679	-	216,000	216,000	216,000	\$648,000	\$648,000	\$73,566	Pre-Start-up	IRS	
Contractor Management Modernization	FY18 Plan	4151	-	750,000	3,000,000	2,160,000	\$5,910,000	\$5,910,000	\$5,330,000	Pre-Start-up	IRS	
Risk Management (Tx Mains & Dx Mains)	GBE- Asset Management		2,110,800	-	-	-	\$2,110,800	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
AM Program Leadership-1	GBE- Asset Management		277,124	-	-	-	\$277,124	*See Note 1	*See Note 1	Start-up	Partial Sanction	
Enhancements	GBE- Asset Management		2,059,930	600,945	-	-	\$2,660,875	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Additional IM Modules	GBE- Asset Management		-	604,233	112,606	-	\$716,840	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
AM Program Leadership-2	GBE- Asset Management		-	398,676	-	-	\$398,676	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Data Remediation, GIS Upgrade/ Migration & GIS Mobility	GBE- Asset Management		2,426,395	5,983,122	2,902,242	-	\$11,311,759	*See Note 1	*See Note 1	Start-up	Partial Sanction	
EAM-FIN Integration	GBE- Asset Management		-	979,407	798,695	-	\$1,778,102	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Integrity Management Integrations	GBE- Asset Management		-	371,868	716,243	-	\$1,088,112	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
AM Program Leadership-3	GBE- Asset Management		-	-	408,336	-	\$408,336	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Design (GWD), Estimating (CU), & Mobility	GBE- Asset Management		-	1,729,295	4,920,570	3,201,244	\$9,851,109	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Asset Analytics Integration	GBE- Asset Management		-	-	-	1,764,202	\$1,764,202	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
GIS (GWD/CU) - PPM Integration	GBE- Asset Management		-	-	-	844,849	\$844,849	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
GIS-EAM Integration	GBE- Asset Management		-	1,250,000	3,282,424	-	\$7,818,756	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
AM Program Leadership-4	GBE- Asset Management		-	-	-	103,929	\$103,929	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Use Case No.1 - Asset Risk	GBE- Asset Management		-	-	-	3,591,031	\$3,591,031	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Complex Design (CAD) & Estimating (ESW)	GBE- Asset Management		-	-	-	2,389,087	\$2,389,087	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Program Learning Management-1	GBE- Business Enablement		117,297	-	-	-	\$117,297	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Program Transformational Change Office-1	GBE- Business Enablement		689,043	-	-	-	\$689,043	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Program Business Sustainment-1	GBE- Business Enablement		-	69,617	-	-	\$69,617	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Program Learning Management-2	GBE- Business Enablement		-	130,211	-	-	\$130,211	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Program Transformational Change Office -2	GBE- Business Enablement		-	1,516,310	-	-	\$1,516,310	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Program Learning Management-3	GBE- Business Enablement		-	-	173,060	-	\$173,060	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Program Transformational Change Office-3	GBE- Business Enablement		-	-	368,704	-	\$368,704	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Program Business Sustainment-2	GBE- Business Enablement		-	-	-	221,771	\$221,771	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Program Learning Management-4	GBE- Business Enablement		-	-	-	195,721	\$195,721	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Program Transformational Change Office-4	GBE- Business Enablement		-	-	-	169,648	\$169,648	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Customer Experience Program Leadership-1	GBE- Customer Engagement		-	260,229	-	-	\$260,229	*See Note 1	*See Note 1	Start-up	Partial Sanction	
CxT Portal & Channel Management	GBE- Customer Engagement		-	6,679,688	5,195,313	-	\$11,875,000	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Customer Interaction - First Release	GBE- Customer Engagement		-	1,780,471	3,016,074	-	\$4,796,546	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Employee Support Interaction - First Release	GBE- Customer Engagement		-	3,871,396	4,082,735	-	\$7,954,131	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Customer Experience Program Leadership-2	GBE- Customer Engagement		-	266,277	-	-	\$266,277	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
CRM/ Contact Center	GBE- Customer Engagement		-	15,200,000	3,800,000	-	\$19,000,000	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Large Commercial & Landlord Interaction	GBE- Customer Engagement		-	15,723	19,653	1,411,132	\$1,446,508	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Employee Support Interaction - Second Release	GBE- Customer Engagement		-	-	-	292,791	\$292,791	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Customer Interaction - Second Release	GBE- Customer Engagement		-	-	-	2,010,254	\$2,010,254	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Customer Experience Program Leadership-3	GBE- Customer Engagement		-	-	-	203,177	\$203,177	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Data Management Implementation (Quality & Cleansing)	GBE- Data Management		11,100,000	-	-	-	\$11,100,000	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Data Management & Governance Program Leadership-1	GBE- Data Management		58,890	-	-	-	\$58,890	*See Note 1	*See Note 1	Start-up	Partial Sanction	
Enable the Data Archive Process	GBE- Data Management		-	2,111,916	67,564	-	\$2,179,480	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Data Management & Governance Program Leadership-2	GBE- Data Management		-	87,954	-	-	\$87,954	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Data Management & Governance Program Leadership-3	GBE- Data Management		-	-	89,713	-	\$89,713	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Powerplan Remediation	GBE- Information Services Enabling		6,080,111	-	-	-	\$6,080,111	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Comprehensive Integration Services (Enhancements)	GBE- Information Services Enabling		78,624	-	-	-	\$78,624	*See Note 1	*See Note 1	Requirements and Design	Partial Sanction	
Application (Environment) Infrastructure	GBE- Information Services Enabling		2,174,410	-	-	-	\$2,174,410	*See Note 1	*See Note 1	Requirements and Design	Partial Sanction	
Development Operations & BPA Enablement-1	GBE- Information Services Enabling		2,903,920	-	-	-	\$2,903,920	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
SAP and Application Integration Development- Release 1-1	GBE- Information Services Enabling		4,765,187	-	-	-	\$4,765,187	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Mobility CoE & End-User Computing-1	GBE- Information Services Enabling		604,790	-	-	-	\$604,790	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Operations/System Monitoring	GBE- Information Services Enabling		500,000	557,768	-	-	\$1,057,768	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Development Operations & BPA Enablement-2	GBE- Information Services Enabling		-	2,562,011	-	-	\$2,562,011	*See Note 1	*See Note 1	Requirements and Design	Partial Sanction	
SAP and Application Integration Development- Release 1-2	GBE- Information Services Enabling		-	4,548,168	-	-	\$4,548,168	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
SAP and Application Integration Development- Release 2-1	GBE- Information Services Enabling		-	5,055,712	-	-	\$5,055,712	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Mobility CoE & End-User Computing-2	GBE- Information Services Enabling		-	920,536	-	-	\$920,536	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Development Operations & BPA Enablement-3	GBE- Information Services Enabling		-	-	2,164,144	-	\$2,164,144	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
SAP and Application Integration Development- Release 1-3	GBE- Information Services Enabling		-	-	600,000	-	\$600,000	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
SAP and Application Integration Development- Release 2-2	GBE- Information Services Enabling		-	-	4,397,065	-	\$4,397,065	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
SAP and Application Integration Development- Release 3-1	GBE- Information Services Enabling		-	-	85,915	-	\$85,915	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Mobility CoE & End-User Computing-3	GBE- Information Services Enabling		-	-	1,031,843	-	\$1,031,843	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	
Test Automation Implementation	GBE- Information Services Enabling		490,509	1,034,882	763,643	288,018	\$2,577,052	*See Note 1	*See Note 1	Pre-Start-up	Partial Sanction	

Investment Name	Programs	INVP #	Inception To Date + FY18	FY19 CAPEX	FY20 CAPEX	FY21 CAPEX	ISP-3		June 2017 Forecast		Project Phase	Supporting Documentation
							Total US CapEx Spend	CapEx	OpEx (incl RTB)			
Development Operations & BPA Enablement-4	GBE- Information Services Enabling		-	-	-	2,176,436	\$2,176,436	*See Note 1	*See Note 1	Startup	Partial Sanction	
SAP and Application Integration Development- Release 1-4	GBE- Information Services Enabling		-	-	-	600,000	\$600,000	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
SAP and Application Integration Development- Release 3-2	GBE- Information Services Enabling		-	-	-	2,326,606	\$2,326,606	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
Mobility CoE & End-User Computing-4	GBE- Information Services Enabling		-	-	-	952,793	\$952,793	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
Portfolio Management Leadership-1	GBE- Portfolio Office		1,645,919	-	-	-	\$1,645,919	*See Note 1	*See Note 1	Start-up	Partial Sanction	
Solution Architects & Agile Coaches-1	GBE- Portfolio Office		1,958,277	-	-	-	\$1,958,277	*See Note 1	*See Note 1	Start-up	Partial Sanction	
Portfolio Management Leadership-2	GBE- Portfolio Office		-	2,144,482	-	-	\$2,144,482	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
Solution Architects & Agile Coaches-2	GBE- Portfolio Office		-	3,964,632	-	-	\$3,964,632	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
Portfolio Management Leadership-3	GBE- Portfolio Office		-	-	2,161,221	-	\$2,161,221	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
Solution Architects & Agile Coaches-3	GBE- Portfolio Office		-	-	2,824,290	-	\$2,824,290	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
Portfolio Management Leadership-4	GBE- Portfolio Office		-	-	-	1,855,901	\$1,855,901	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
Regulatory/ Compliance	GBE- Regulatory and Compliance		750,000	1,500,000	750,000	-	\$3,000,000	*See Note 1	*See Note 1	Startup	Partial Sanction	
Supply Chain Program Leadership	GBE- Supply Chain		-	565,045	-	-	\$565,045	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
Supply Chain Program Leadership	GBE- Supply Chain		-	-	235,258	-	\$235,258	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
Business Architecture Design	GBE- Work Management		3,004,085	-	-	-	\$3,004,085	*See Note 1	*See Note 1	Start-up	Partial Sanction	
WMFE Program Leadership-1	GBE- Work Management		234,013	-	-	-	\$234,013	*See Note 1	*See Note 1	Start-up	Partial Sanction	
Corrosion and I&R Work	GBE- Work Management		7,001,291	17,676,960	1,801,402	-	\$26,479,653	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
CU Governance & Library - process	GBE- Work Management		-	1,658,439	-	-	\$1,658,439	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
WMFE Program Leadership-2	GBE- Work Management		-	563,692	-	-	\$563,692	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
Company Driven Work: Collections and non-Appointment Offs - Gas	GBE- Work Management		2,366,407	1,773,327	1,170,911	-	\$5,310,645	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
Company Driven Work: Collections and non-Appointment Offs- Electric	GBE- Work Management		1,274,219	954,868	630,490	-	\$2,859,577	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
Customer, Leak Investigation & Inspections - Gas	GBE- Work Management		1,191,154	8,895,256	10,288,028	-	\$20,374,438	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
Customer, Leak Investigation & Inspections - Electric	GBE- Work Management		641,390	4,789,753	5,539,707	-	\$10,970,850	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
WMFE Program Leadership-3	GBE- Work Management		-	-	595,004	-	\$595,004	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
PowerPlan Integration & Enhancements	GBE- Work Management		-	-	915,441	1,031,426	\$1,946,867	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
Construction Work & Leak Repair	GBE- Work Management		-	1,832,544	7,167,604	10,718,386	\$19,718,534	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
WMFE Program Leadership-4	GBE- Work Management		-	-	-	155,062	\$155,062	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
Work Forecasting & Planning - solution	GBE- Work Management		-	-	-	1,708,505	\$1,708,505	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
Core Projects & Program Management	GBE- Work Management		-	-	-	3,134,061	\$3,134,061	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
WMFE Optimization	GBE- Work Management		-	-	346,828	2,984,574	\$3,331,402	*See Note 1	*See Note 1	Pre-Startup	Partial Sanction	
Customer Experience Transformation-Communication Preference Management	Growth Play Book-CXT	4750	1,200,000	800,000	-	-	\$2,000,000	2,000,000	1,065,000	Development and Implementation	IRS	
Customer Experience Transformation-MyAccount Portal	Growth Play Book-CXT	4427	1,000,000	6,000,000	1,500,000	-	\$8,500,000	8,500,000	1,900,000	Pre-Startup	IRS	
Governance Risk & Compliance (GRC) Optimization/Upgrade	Growth Play Book-Finance	4222	-	1,540,000	-	-	\$1,540,000	1,540,000	136,176	Design	Partial Sanction	
US SAP: Business Planning	Growth Play Book-Finance	4217	-	4,643,000	-	-	\$4,643,000	4,643,000	229,025	Design	IRS	
US SAP: FERC on Hana (FOH)	Growth Play Book-Finance	4563	-	1,315,000	-	-	\$1,315,000	1,315,000	-	Pre-Startup	IRS	
DRMS for C&I Demand Response	NY REV/grid modernization		3,429,633	-	-	-	\$3,429,633	3,429,633	-	Pre-Startup	IRS	
Load and DER Forecasting (Acquisition of Remote Sensing Data - NY)	NY REV/grid modernization	4729	8,632,000	-	-	-	\$8,632,000	8,632,000	-	Closure/ In-Production	Full Sanction	
Plant Information Historian	NY REV/grid modernization	4704K	-	11,427,818	-	-	\$11,427,818	11,427,818	3,766,537	Pre-Startup	IRS	
E-Commerce Marketplace	NY REV/grid modernization	4704D	-	915,837	-	-	\$915,837	915,837	271,779	Pre-Startup	IRS	
AMI - Telecoms	NY REV/grid modernization	4704I	-	1,580,151	-	-	\$1,580,151	1,580,151	302,940	Pre-Startup	IRS	
DG IOAP Tactical (Phase 2)	NY REV/grid modernization	4704P	-	1,764,000	-	-	\$1,764,000	1,764,000	461,000	Pre-Startup	IRS	
AMI - CSS Enhancements	NY REV/grid modernization	4704A	-	5,319,147	2,756,391	-	\$8,075,538	8,075,538	8,661,847	Pre-Startup	IRS	
Green Button Connect	NY REV/grid modernization	4704C	-	-	3,072,759	-	\$3,072,759	3,072,759	1,510,761	Pre-Startup	IRS	
AMI - Telecoms	NY REV/grid modernization	4704I	-	-	1,409,719	-	\$1,409,719	1,409,719	2,712,076	Pre-Startup	IRS	
Outdoor Lighting Inventory Portal	NY REV/grid modernization	4704O	-	500,000	1,100,000	-	\$1,600,000	1,600,000	500,000	Pre-Startup	IRS	
DRMS for C&I Demand Response (Renewal)	NY REV/grid modernization		-	-	-	1,200,000	\$1,200,000	1,200,000	-	Pre-Startup	IRS	
DSP - DG IOAP	NY REV/grid modernization	4704F	-	9,120,628	5,714,643	-	\$14,835,271	14,835,271	4,267,014	Pre-Startup	IRS	
Grid MOD - ABB/ADMS & D-SCADA	NY REV/grid modernization	4704G	-	9,345,188	12,966,609	6,917,501	\$29,229,298	29,229,298	2,494,372	Pre-Startup	IRS	
AMI - Telecoms	NY REV/grid modernization	4704I	-	-	-	1,962,336	\$1,962,336	1,962,336	4,219,042	Pre-Startup	IRS	
AMI - Enterprise Service Bus & API Integration	NY REV/grid modernization	4704J	-	1,690,216	2,765,398	490,757	\$4,946,371	4,946,371	1,941,965	Pre-Startup	IRS	
AMI - Enterprise Service Bus & API Integration	NY REV/grid modernization	4704J	-	3,762,093	6,155,240	1,092,330	\$11,009,664	11,009,664	4,322,749	Pre-Startup	IRS	
AMI - Info Mgt & Advanced Analytics	NY REV/grid modernization	4704L	-	1,720,346	1,009,376	649,100	\$3,378,822	3,378,822	703,596	Pre-Startup	IRS	
AMI - Info Mgt & Advanced Analytics	NY REV/grid modernization	4704L	-	8,399,335	4,928,129	3,169,136	\$16,496,601	16,496,601	3,435,201	Pre-Startup	IRS	
IS-Cloud Computing & Data Lake	NY REV/grid modernization	4704M	-	432,445	311,985	433,806	\$1,178,236	1,178,236	279,572	Pre-Startup	IRS	
IS-Cloud Computing & Data Lake	NY REV/grid modernization	4704M	-	2,111,349	1,523,222	2,117,995	\$5,752,565	5,752,565	1,364,965	Pre-Startup	IRS	
Cyber Security	NY REV/grid modernization	4704N	-	6,514,334	3,195,298	1,831,420	\$11,541,052	11,541,052	7,191,076	Pre-Startup	IRS	
Cyber Security	NY REV/grid modernization	4704N	-	9,771,502	4,792,946	2,747,131	\$17,311,579	17,311,579	10,786,611	Pre-Startup	IRS	

Investment Name	Programs	INV#	Inception To Date + FY18	FY19 CAPEX	FY20 CAPEX	FY21 CAPEX	June 2017 Forecast		Project Phase	Supporting Documentation	
							ISP-3 Total US CapEx Spend	Total Costs through FY21 CapEx OpEx (incl RTB)			
Annual HR & Payroll Mandatory Service Pack Upgrade (HRSP) - FY18	Other Mandates	4400	1,126,000	-	-	-	\$1,126,000	1,126,000	379,554	Development and Implementation	IRS
Regulatory Mandates - FY18	Other Mandates		5,071,622	-	-	-	\$5,071,622	5,071,622	2,000,000	Reference DPS-513	IRS
US Control-Gas Electronic Bulletin Board (EBB) Upgrade	Other Mandates	4479	2,455,000	545,000	-	-	\$3,000,000	3,000,000	1,286,000	Startup	IRS
Regulatory Mandates - FY19	Other Mandates		-	18,595,000	-	-	\$18,595,000	18,595,000	6,000,000	Pre-Startup	IRS
Regulatory Mandates - FY20	Other Mandates		-	-	20,000,000	-	\$20,000,000	20,000,000	6,000,000	Pre-Startup	IRS
Regulatory Mandates - FY21	Other Mandates		-	-	-	20,000,000	\$20,000,000	20,000,000	6,000,000	Pre-Startup	IRS
CPE Buyback	Tech. Modernization	4684	5,140,000	-	-	-	\$5,140,000	5,140,000	4,011	Closure/ In-Production	Full Sanction
Active Directory Improvements	Tech. Modernization	4489	275,000	-	-	-	\$275,000	275,000	275,000	Startup	IRS
Application Performance Management (APM)	Tech. Modernization	4490	375,000	-	-	-	\$375,000	375,000	111,111	Pre-Startup	IRS
RAS/VPN Re-Platform/Mobile	Tech. Modernization	4269	600,000	-	-	-	\$600,000	600,000	19,998	Startup	IRS
US Network Programme	Tech. Modernization	4496	3,025,000	-	-	-	\$3,025,000	3,025,000	535,000	Pre-Startup	IRS
US VSTIG Programme	Tech. Modernization	4498	2,700,000	-	-	-	\$2,700,000	2,700,000	370,000	Pre-Startup	IRS
US Wireless Programme	Tech. Modernization	4499	1,950,000	-	-	-	\$1,950,000	1,950,000	306,000	Pre-Startup	IRS
Monitoring and Alerting	Tech. Modernization	4493	450,000	-	-	-	\$450,000	450,000	225,000	Pre-Startup	IRS
RSA Re-platform	Tech. Modernization	4270	280,000	-	-	-	\$280,000	280,000	815,554	Pre-Startup	IRS
Cloud Broker - Hybrid Enablement	Tech. Modernization	3899	250,000	-	-	-	\$250,000	250,000	551,167	Implementation	IRS
Office 2010 Upgrade	Tech. Modernization	4265	800,000	-	-	-	\$800,000	800,000	-	Pre-Startup	IRS
Citrix Infrastructure Upgrade (Xenapp and NetScaler)	Tech. Modernization	4279	500,000	-	-	-	\$500,000	500,000	277,143	Pre-Startup	IRS
Business Innovation Projects 1	Tech. Modernization	4707	3,368,613	-	-	-	\$3,368,613	3,368,613	673,723	Pre-Startup	IRS
Data Security	Tech. Modernization	4710	1,575,000	-	-	-	\$1,575,000	1,575,000	-	Pre-Startup	IRS
Orchestration and Self Service	Tech. Modernization	4726	750,000	-	-	-	\$750,000	750,000	1,750,000	Pre-Startup	IRS
Virtual Desktop - DaaS	Tech. Modernization	4727	550,000	-	-	-	\$550,000	550,000	1,087,500	Pre-Startup	IRS
SCI connections	Tech. Modernization	4495	100,000	-	-	-	\$100,000	100,000	355,556	Startup	IRS
US SAP: Dynamic Storage Tiering	Tech. Modernization	4560	-	1,355,000	-	-	\$1,355,000	1,355,000	464,000	Pre-Startup	IRS
ICE Replacement	Tech. Modernization	4491	3,316,000	-	-	-	\$3,316,000	3,316,000	2,288,500	Implementation	Full Sanction
US Network Programme	Tech. Modernization	4496	-	2,075,000	-	-	\$2,075,000	2,075,000	745,000	Pre-Startup	IRS
US VSTIG Programme	Tech. Modernization	4498	-	1,700,000	-	-	\$1,700,000	1,700,000	190,000	Pre-Startup	IRS
US Wireless Programme	Tech. Modernization	4499	-	1,500,000	-	-	\$1,500,000	1,500,000	205,000	Pre-Startup	IRS
Data Visualisation Expansion	Tech. Modernization	4606	1,000,000	1,800,000	-	-	\$2,800,000	2,800,000	910,000	Startup	IRS
US SAP: Business Warehouse (BW) Consolidation to HANA Enterprise Cloud (HEC)	Tech. Modernization	4562	-	2,366,000	-	-	\$2,366,000	2,366,000	810,000	Pre-Startup	IRS
Monitoring and Alerting	Tech. Modernization	4493	-	1,000,000	-	-	\$1,000,000	1,000,000	125,000	Pre-Startup	IRS
MWORK and Netmotion Risk Avoidance	Tech. Modernization	4725	-	500,000	-	-	\$500,000	500,000	20,000	Pre-Startup	IRS
Improving End User Experience- Cloud based DMZ Service Platform	Tech. Modernization	4723	-	300,000	-	-	\$300,000	300,000	50,000	Pre-Startup	IRS
Mobile Broadband POC	Tech. Modernization	POC	-	100,000	-	-	\$100,000	100,000	20,000	Pre-Startup	IRS
FY19 Edge Projects	Tech. Modernization	4717	-	1,000,000	-	-	\$1,000,000	1,000,000	-	Pre-Startup	IRS
FY19 Network Projects	Tech. Modernization	4718	-	1,000,000	-	-	\$1,000,000	1,000,000	-	Pre-Startup	IRS
Digital Asset Management (DAM)	Tech. Modernization	4711	-	500,000	-	-	\$500,000	500,000	-	Closure/ In-Production	IRS
Business Innovation Projects 1	Tech. Modernization	4707	-	3,973,236	-	-	\$3,973,236	3,973,236	100,000	Pre-Startup	IRS
Business Innovation Projects 2	Tech. Modernization	4708	-	3,368,613	-	-	\$3,368,613	3,368,613	673,723	Pre-Startup	IRS
Business Innovation Projects 3	Tech. Modernization	4728	-	3,368,613	-	-	\$3,368,613	3,368,613	673,723	Pre-Startup	IRS
EUC, network, and data center strategy	Tech. Modernization	4715	771,429	771,429	-	-	\$1,542,858	1,542,858	1,271,429	Pre-Startup	IRS
Data Security	Tech. Modernization	4710	-	1,575,000	-	-	\$1,575,000	1,575,000	2,394,000	Pre-Startup	IRS
FY19 Data Centre Projects	Tech. Modernization	4716	-	2,000,000	-	-	\$2,000,000	2,000,000	250,000	Pre-Startup	IRS
1327 Interfaces - 523 FTS, 340 RDX, 245 MQSI, 253 JCAPS, 44 PM4D, 7 VB	Tech. Modernization	4706	2,600,000	700,000	-	-	\$3,300,000	3,300,000	20,000	Pre-Startup	IRS

Investment Name	Programs	INVP #	Inception To Date + FY18	FY19 CAPEX	FY20 CAPEX	FY21 CAPEX	June 2017 Forecast		Project Phase	Supporting Documentation	
							ISP-3 Total US CapEx Spend	Total Costs through FY21 CapEx OpEx (incl RTB)			
US Video Conference Programme	Tech. Modernization	4497	200,000	1,350,000	100,000	-	\$1,650,000	1,650,000	770,000	Pre-Startup	IRS
IS Tools	Tech. Modernization	4513	-	200,000	200,000	-	\$400,000	400,000	400,000	Pre-Startup	IRS
US SAP: Enhancement Pack 9 Upgrade	Tech. Modernization	4564	-	3,493,000	5,328,000	-	\$8,821,000	8,821,000	3,019,000	Pre-Startup	IRS
US Network Programme	Tech. Modernization	4496	-	-	1,575,000	-	\$1,575,000	1,575,000	655,000	Pre-Startup	IRS
US VSTIG Programme	Tech. Modernization	4498	-	-	700,000	-	\$700,000	700,000	120,000	Pre-Startup	IRS
US Wireless Programme	Tech. Modernization	4499	-	-	1,500,000	-	\$1,500,000	1,500,000	155,000	Pre-Startup	IRS
Monitoring and Alerting	Tech. Modernization	4493	-	-	1,000,000	-	\$1,000,000	1,000,000	75,000	Pre-Startup	IRS
Service Now - Release 3	Tech. Modernization	4261	400,000	1,500,000	1,500,000	-	\$3,400,000	3,400,000	620,000	Pre-Startup	IRS
FY20 Edge Projects	Tech. Modernization	4720	-	-	2,000,000	-	\$2,000,000	2,000,000	1,000,000	Pre-Startup	IRS
FY20 Network Projects	Tech. Modernization	4721	-	-	4,000,000	-	\$4,000,000	4,000,000	-	Pre-Startup	IRS
EMM Licenses	Tech. Modernization	4713	-	660,000	660,000	-	\$1,320,000	1,320,000	-	Pre-Startup	IRS
Business Innovation Projects 2	Tech. Modernization	4708	-	-	3,973,236	-	\$3,973,236	3,973,236	100,000	Pre-Startup	IRS
Business Innovation Projects 3	Tech. Modernization	4728	-	-	3,979,236	-	\$3,979,236	3,979,236	100,000	Pre-Startup	IRS
Data Security	Tech. Modernization	4710	-	-	1,575,000	-	\$1,575,000	1,575,000	2,394,000	Pre-Startup	IRS
Hardware and Software Upgrades	Tech. Modernization	4722	500,000	6,000,000	1,000,000	-	\$7,500,000	7,500,000	1,200,000	Pre-Startup	IRS
Data Centre Consolidation efforts	Tech. Modernization	4709	2,000,000	1,000,000	500,000	-	\$3,500,000	3,500,000	1,000,000	Pre-Startup	IRS
FY20 Data Centre Projects	Tech. Modernization	4719	-	-	4,000,000	-	\$4,000,000	4,000,000	500,000	Pre-Startup	IRS
Enterprise Data Management Platform	Tech. Modernization	4582	-	2,500,000	1,230,000	1,000,000	\$4,730,000	4,730,000	1,350,000	Pre-Startup	IRS
Business Innovation Projects 2	Tech. Modernization	4708	-	-	-	4,491,484	\$4,491,484	4,491,484	100,000	Pre-Startup	IRS
Business Innovation Projects 3	Tech. Modernization	4728	-	-	-	4,491,484	\$4,491,484	4,491,484	100,000	Pre-Startup	IRS

* Note 1: There is no updated forecast for the Gas Business Enablement Program beyond that included in the Company's initial rate filing. The capital and operating costs for the Gas Business Enablement Program included in Exhibit __ (ISP-3) and Exhibit __ (GIOP-10), respectively, reflect the roadmap for the GBE Program developed as a result of the strategic assessment and design performed for the Program

Total ISP-3
Less GBE (no change in forecast)

935,841,359
(282,448,859)

653,392,500 **657,792,054**

Variance \$ **4,399,554**

Date of Request: July 20, 2017
Due Date: July 31, 2017

Request No. DPS-643 MP-20
NMPC Req. No. NM-1263

NIAGARA MOHAWK POWER CORPORATION d/b/a NATIONAL GRID
Case No. 17-E-0238 and 17-G-0239 –
Niagara Mohawk Power Corporation d/b/a National Grid – Electric and Gas Rates

Request for Information

FROM: DPS Staff, Michael Pasinella
TO: National Grid, Gas Infrastructure and Operations Panel
SUBJECT: ***GAS BUSINESS ENABLEMENT***

Request:

In these interrogatories, all requests for data, workpapers or supporting calculations should be construed as requesting any Word, Excel, or other computer spreadsheet models in original electronic format with all formulae intact.

1. For each of the previous five calendar years, 2012 through 2016, identify each safety metric violation and, if applicable, each IS program used to manage the task to ensure compliance.
2. For each of the IS programs listed in response to the preceding question, identify the converted IS program included in Gas Business Enablement that will either (i) supersede the currently utilized IS program, or (ii) be newly developed to manage the task to ensure compliance.
3. When will each converted IS program included in Gas Business Enablement and identified in response to DPS-643(2) be placed into service?
4. Explain the forecast of avoided negative revenue adjustments presented in Exhibit__ (GIOP-12), Schedule 1, Page 2, by year, and how and when each converted IS program included in Gas Business Enablement produces the benefit.

Response:

1. Please see Attachment 1 for the safety metric violations in calendar years 2012 – 2015. Please note the 2016 operations and records audit findings have not yet been finalized. The attachment includes the IS program used to manage compliance. Note that in the majority of cases, the Company relies on a paper system, as indicated in Attachment 1. Attachment 1 also identifies the GBE component systems that will be used in the future state to manage compliance. An analysis was performed for 2012-2016 records audit years to determine those areas where mobile applications could be used to promote regulatory compliance where code violations were assessed. Mobile applications can replace the current paper based processes that are used by the Company for Gas Repair Orders, Gas Facility Data Reports, Leak Investigation Report Forms, and Warning Tags. User prompts and programming logic can help ensure that all steps are followed in accordance with procedures and data is correctly entered and recorded. The electronic data can then be transferred to the Company’s Enterprise Asset Management System, Customer Service System, & Mobility System for follow up remediation and work management.
2. Please see Attachment 1.
3. Implementation of both Mobility (Salesforce) and Enterprise Asset Management System (Maximo) will occur in October 2018. This will coincide with the implementation of the Scheduling and Dispatch System. The solution delivered in October 2018 will provide the capability to perform preventative maintenance/inspection work in the Corrosion and Instrumentation and Regulation areas as well as Customer Meter Services, call center, and account management for up-to-date information on high bill complaints, collections orders, mobile capture of credit card payments. Scheduling, Mobility, Dispatch and Enterprise Asset Management Systems will then be enhanced to include Customer Meter Services work such as meter assets and customer appointments in October 2019.
4. The Company is committed to enhancing gas safety compliance to further protect our customers and employees and improving the results of gas safety audits by implementing systems that will drive continuous improvements by (i) enhancing scheduling and work management, (ii) promoting compliance with applicable regulations and procedures in the field, and (iii) maintaining electronic records that can be easily produced and audited by both the Company and Staff. In the short term, interim processes have been put in place to address non-compliance conditions and prevent them from recurring. As a long term, sustainable solution, the Company has identified GBE investments that will have a significant positive impact on safety and compliance. The forecast shown in Exhibit__ (GIOP-12) reflects the anticipated impact of the systems and the specific capabilities being delivered in each calendar year along with the number of employees receiving the capabilities. By implementing parts of the solution for Corrosion and I&R Work and Company Driven Work: Collections and non-Appointment Offs in 2019, the Corrosion, Instrumentation and Regulation, Customer Meter Services, Call Center and Account Management areas of the business will see significant automation of data recording, validation of entries, and improved work management capabilities. As the program progresses through years 2019 and 2020, the number of employees and business areas that will see scheduling and dispatching, data collection, and overall work management

improvements as the result of less reliance on paper forms and manual/interim processes will increase. Because different business departments will receive the capabilities of the systems on a rolling basis, the forecast presented in Exhibit __ (GIOP-12), Schedule 1, Page 1 and Page 2, reflects the gradual rollout of the implemented solutions to increasing numbers of users beginning FY19 until the solutions are fully embedded by FY23.

Name of Respondent:
Johnny Johnston

Date of Reply:
July 31, 2017

Code Section	2012		2013		2014		2015		2016		Current System	GBE System	Comments
	Violations	Occ's											
Leaks (255.801-831)	16	40	21	23	24	52	22	33	12	31	Paper	Enterprise Asset Mgmt (Maximo) Mobility (Salesforce)	Mobile applications can help reduce leak classification errors, changes in grade, schedule follow up surveillance, prevent unacceptable repair methods, and log leaks found by company
Maintenance (255.701-757)	18	49	24	80	28	184	29	382	22	165	Paper	Enterprise Asset Mgmt (Maximo) Mobility (Salesforce)	Mobile applications will improve the largely paper-based processes: Leak surveys - Clerical data entry errors Inactive service disconnect - Auto generate due date CI Encroachments - Calculate length of replacement. Regulator inspections - Mandatory field for buried valve inspection. Regulator Station Inspection - Addressed in Cascade System Service Regulator - Mandatory fields for vent inspections
Operations (255.601-631)	17	32	22	47	13	49	16	74	11	49	Paper	Enterprise Asset Mgmt (Maximo) Mobility (Salesforce)	Failure to follow company procedures. Paper Gas Repair Orders not found or retained for six years and repairs not scheduled. Mobile app can correct in on automated basis.
Piping Beyond Meter (261.1-65)	4	15	18	24	46	220	19	53	20	63	MWORK CSS	Customer Mgmt (Salesforce) Mobility (Salesforce)	Mobile application can prevent warning tag errors in classification and auto generate letter notification to building owners when tags issued for apartment buildings. MWork Enhancement made for HEFPA notification
Corrosion Control (255.451-491)	2	11	3	13	2	29	10	95	11	30	Paper	Enterprise Asset Mgmt (Maximo) Mobility (Salesforce)	GFDR paper form conversion to mobile application can require mandated field for internal inspection and inspection for extent of external corrosion.
Total	57	147	88	187	113	534	96	637	76	338			

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