

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

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over multiple sanctions, with the GBE Steering Group providing oversight of the program's progress.

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

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
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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)

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Reliability Environment Health & Safety Not Policy Driven

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.

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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	9.097	0.729	184.698
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.

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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
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

2 Decisions

<p>The Senior Executive Sanctioning Committee (SESC) at a meeting held on May 30, 2017.</p> <p>(a) APPROVED the investment of \$84.5M and a tolerance of 10% for the purposes of Gas Business Enablement in FY18.</p> <p>(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.</p> <p>(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.</p> <p>(d) NOTED that Johnny Johnston has the approved financial delegation to undertake the activities stated in (a).</p>

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

3 Sanction Paper Detail

Title:	Gas Business Enablement	Sanction Paper #:	USSC-17-222
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Author:	Wayne S. Watkins / Kenneth C. Healy	Sponsor:	Johnny Johnston-SVP Gas Business Enablement
Utility Service:	Gas	Project Manager:	Kenneth C. Healy

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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.

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.

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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 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.

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- 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 business and IS teams work more collaboratively in short-cycle scrums to prioritize functionality and get to a minimum viable product (MVP). This is

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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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SM	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



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costs were significantly higher and would take longer to implement due to the complexity.

3.7 Safety, Environmental and Project Planning Issues

N/A

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability		Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
		Cost	Schedule	Cost	Schedule	Cost	Schedule				
1	Mis-alignment / lack of integration and coordination between programs	3	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	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	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

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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.
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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



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3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spent (\$M)	Prior Yrs	Current Planning Horizon						Total
					2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6+	
4572	Gas Business Enablement	+- 13%	0.000	86,504	(104,639)	73,693	47,613	10,332	0,815	237,092	
			CapEx	25,400	27,972	(64,102)	41,339	21,317	9,087	0,729	164,688
			OpEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total			25,400	84,476	(168,741)	115,032	68,930	19,419	1,944	478,264	
Total Project Sanction			0.000	86,504	(104,639)	73,693	47,613	10,332	0,815	237,092	
			CapEx	25,400	27,972	(64,102)	41,339	21,317	9,087	0,729	164,688
			OpEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	25,400	84,476	(168,741)	115,032	68,930	19,419	1,944	478,264

3.11.2 Project Budget Summary Table

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		2017/18	2018/19	2019/20	2020/21	2021/22	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
		2017/18	2018/19	2019/20	2020/21	2021/22	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.

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3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

N/A

3.11.4.2 NPV Assumptions and Calculations

N/A

3.11.5 Additional Impacts

N/A

3.12 Statements of Support

3.12.1 Supporters

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

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

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3.12.2 Reviewers

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

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

4 Appendices

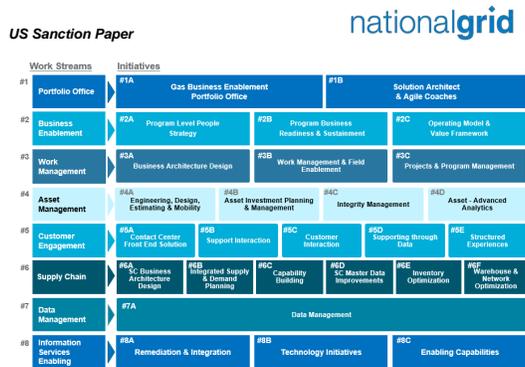
4.1 Sanction Request Breakdown by Project

SM	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.

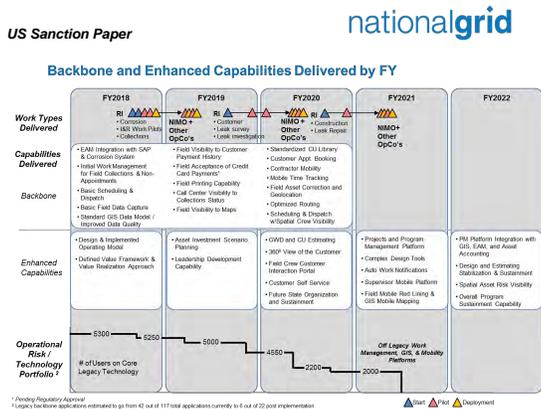
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4.3 High Level Roadmap of Capabilities to be delivered over five years

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.

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4.4 Benefits Detail

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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:

Enhanced Capabilities	Value Drivers	Example Metrics ¹	Aspirational Ann. Benefit (M\$)
<i>Enterprise</i>			
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 case 	<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 Material stock-outs 	\$18.4
Supply Chain	<ul style="list-style-type: none"> Reduced cases project delays Reduced material spend Reduced inventory carrying costs 	<ul style="list-style-type: none"> 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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Norfolk Southern Power Corporation d/b/a National Grid
Gas Business Establishment (GBE)
Total Benefits Forecasted as a Result of GBE Implementation
For Fiscal Years Ending March 31, 2019 through 2027

Initiative Description	Benefit Description	Benefit Type	12-Months								
			Ending March 31, 2019	Ending March 31, 2020	Ending March 31, 2021	Ending March 31, 2022	Ending March 31, 2023	Ending March 31, 2024	Ending March 31, 2025	Ending March 31, 2026	Ending March 31, 2027
Asset - Advanced Analytics	Reduction - Reduction in O&M via APM	Type I	\$0	\$0	\$13,750	\$123,750	\$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	Critical / 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	\$642,130	\$906,536	\$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 Cleaning / Scrubbing Effort - Analysis	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 Fee 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	\$53,899	\$643,238	\$643,238	\$643,238	\$643,238	\$643,238	\$643,238
Integrated Supply & Demand Planning	Improved Project Delivery - Connection	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 & Work Management	Reduced Compliance and Gas Safety Penalties - CMS Collection Jobs -	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	Reduction in Mileage - CMS Collection Jobs -	Type II	\$0	\$0	\$0	\$0	\$117,384	\$165,718	\$165,718	\$165,718	\$165,718
Work Management & Field Enablement	Reduction in Travel Time - CMS Planned Jobs -	Type II	\$0	\$0	\$0	\$0	\$561,142	\$792,200	\$792,200	\$792,200	\$792,200
Work Management & Field Enablement	Reduction in Available Time via AutoDispatch - CMS Planned Jobs -	Type II	\$0	\$202,349	\$269,798	\$269,798	\$269,798	\$269,798	\$269,798	\$269,798	\$269,798
Work Management & Field Enablement	Reduction in Mileage - CMS Planned Jobs -	Type II	\$0	\$83,430	\$111,240	\$111,240	\$111,240	\$111,240	\$111,240	\$111,240	\$111,240
Work Management & Field Enablement	Reduction in Travel Time - CMS Planned Jobs -	Type II	\$0	\$252,363	\$336,484	\$336,484	\$336,484	\$336,484	\$336,484	\$336,484	\$336,484
Work Management & Field Enablement	Reduction in UTCs - CMS Planned Jobs -	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 Summaries	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 Communication	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:			\$1,893,663	\$7,772,492	\$24,998,128	\$38,674,982	\$36,394,237	\$39,615,248	\$39,615,248	\$39,615,248	\$39,615,248

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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	\$ 4.1	\$ 12.0	\$ 8.0	\$ 5.1	\$ 1.8	\$ 0.1	\$ 29.7
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	\$ 166.7	\$ 115.0	\$ 68.9	\$ 19.4	\$ 1.5	\$ 481.1

Operational Expenditure

Operating Company	FY18	FY19	FY20	FY21	FY22	FY23	Total
Niagara Mohawk Power Corp. - Gas	\$ 4.7	\$ 10.7	\$ 6.9	\$ 3.6	\$ 1.3	\$ 0.1	\$ 27.6
KeySpan Energy Delivery New York	\$ 9.7	\$ 22.2	\$ 14.2	\$ 7.4	\$ 3.1	\$ 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	\$ 0.3	\$ 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.	\$ 0.0	\$ 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	\$ 65.5	\$ 124.6	\$ 73.7	\$ 47.6	\$ 10.9	\$ 0.8	\$ 233.6

4.6 NPV Summary

N/A

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4.7 Customer Outreach Plan

N/A

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Context

Due to the size and scale of Gas Business Enablement (GBE), and the rate filing and recovery process, it was deemed prudent to sanction GBE by annual partial sanctions that would allow monitoring of the program and ensure in light of progress and regulatory filings that the roadmap continues to make sense.

- ¹ In May 2017, SESC sanctioned FY18 for \$84.6M against a total roadmap spend of \$478M including spend in FY17.
- ² The program is on track with its activities for FY18. PSC staff supported program in NIMO case and being filed in MA and RI in November.
- ³ This paper is looking for sanction for FY19 costs. These are in line with the roadmap presented in May 2017.
- ⁴ It is anticipated there will be future sanctions for the remaining years in the roadmap.

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Gas Business Enablement (GBE) [nationalgrid](#)
Program Scope

The Gas Business Enablement (GBE) Program has been designed to reduce risk, drive a step change in performance in the US gas business, and create a platform for the future.

It is a comprehensive portfolio of programs looking at people, process and technology across all jurisdictions. Although focused on gas initially, the work will be able to be leveraged by the electric business. The proposed GBE solution includes:

- 1. standardizing and simplifying operational processes into new asset, work management, and mobility systems.
- 2. deploying enhanced capabilities focused on customer engagement, asset and work management, and data quality.
- 3. refining the operating model and creating a value framework to embed and sustain a culture of accountability and compliance.

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Implementation Approach

- 1 Leverage standard industry technology packages.
- 2 Development of the core backbone solution first with incremental enhanced capabilities to follow.
- 3 Phased approach based on geography and work type. For example, Rhode Island -- ISR. This will enable quicker initial deployments and avoid a 'big bang' approach.
- 4 Use of agile development techniques, where appropriate, to shorten implementation time to get to initial functionality quicker, on-going learning, and prioritized enhancements.
- 5 Use of the cloud, where appropriate, to achieve faster deployment, fewer legacy infrastructure upgrades, reduced risk of obsolescence, greater scalability, and enhanced security.

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Accomplishments Since Last Sanction

- Completed competitive procurement process for key vendors, and firmed up cost forecast with fixed price contracts.
- Refreshed Capex / Opex splits with Plant Accounting based on activities tied to new contracts –moving over \$20M from Opex to Capex.
- Program mobilized with more than 200 resources on-boarded.
- On track to deliver Portfolio Anchor 1 – Minimum Viable Products (MVPs) for I&R, Corrosion and Collections in Rhode Island by March 2018.
- On budget against our FY18 funding sanction.
- Received feedback in NMPC rate case DPS Staff testimony supporting the option selected for GBE, but with Staff concerns about our ability to deliver on time and on budget.

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Latest roadmap showing the key capabilities and Portfolio Anchors: nationalgrid

Portfolio Anchor (PA)	FY				
	2018	2019	2020	2021	2022
PA 1
PA 2
PA 3
PA 4
PA 5
PA 6

Note: The table above is a simplified representation of the detailed roadmap provided in the image. The actual image contains a complex grid with numerous rows and columns, each representing a specific portfolio anchor and its performance metrics over time.

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Financials - Costs

- This paper requests sanction of Gas Business Enablement (GBE - INV#6572) in the amount of 233.2 million, which includes the FY18 phase of the program (\$56.6 Capex, \$28.0 Opex, \$0.0 Removal) and the FY19 phase of the program (\$113.3 Capex, \$55.4 Opex, \$0.0 Removal).
- In May 2018, the SESC
 - Approved the FY18 GBE funding of \$84.5 million.
 - Endorsed the proposed \$416 million anticipated roadmap, with an incremental \$0.1,000 million contingency. There has been no change to this amount since the May 2018 sanction.
 - Endorsed the annual sanctioning approach, which will include periodic reviews of program progress, observations, and funding requirements, and annual formal periodic sanctions for funding approval.
- Note the RTB impact of \$17.676 million in FY22 (per annum) for an estimated 5 years. RTB impact begins in FY19 at \$7,105 million and increases through FY22 to \$17.676 million. There has been no change to this amount since the May 2017 sanction.

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Financials - Benefits

Program Benefits

- The primary benefit of GBE is a reduction in operational risk by replacing aging information systems which are at or nearing end of life and establishing standardized business processes across the various operating companies.
- The core system will also drive a broad range of benefits, including improvements in gas safety and compliance, customer engagement and operational effectiveness.
- Estimated total potential Type I and Type II quantifiable financial benefits of \$39.615 million are anticipated once fully embedded (by FY24). The benefits remain consistent with the prior sanction.

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Requests:

- ❖ APPROVE the investment of \$253.2M (note that this includes the previous partial sanction of \$54.5 million in May 2017) and a tolerance of 10% for the purposes of Gas Business Enablement in FY19, (in line with the existing roadmap).
- ❖ APPROVE the Run the Business (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.
- ❖ APPROVE that Johnny Johnston, Senior Vice President, on an exception basis, is delegated the authority to execute the Amended and Restated System Integration Services Agreement with PricewaterhouseCoopers Advisory Services LLC for the support of the GBE Program for the estimated term of the GBE Program.

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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:	September 25, 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 the second of five planned partial sanctions of INVP 4572 for Gas Business Enablement (GBE). This paper requests partial sanction in the amount of \$253.3 million (note that this amount includes the previous partial sanction of \$84.5 million in May 2017), with a tolerance of +/- 10% for the purposes of completing the planned activities during the period April 2018 through March 2019 (FY19). The partial funding approach will provide transparency of progress as the program moves through its various stages. This request is consistent with the originally proposed roadmap and total GBE investment of \$478.282 million.

The partial sanction amount for FY19 is \$253.3 million broken down into:

- \$169.8 million Capex
- \$83.4 million Opex
- \$0 Removal

NOTE the total anticipated investment in GBE is \$478.282 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 that was invested in FY17 and \$84.5 million that was sanctioned for investment in FY18. The \$168.7 million for FY19 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

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over multiple sanctions, with the GBE Steering Group providing oversight of the program's progress.

NOTE that the Company is seeking recovery of GBE costs in the rate cases filed in April 2017 in New York and in anticipated rate case filings in November 2017 in Massachusetts and Rhode Island. Should there not be full support for the GBE Program, then the plans for FY19 and beyond will need to be re-assessed. The GBE team will work with the GBE Steering Committee to realign the plan to address any constraints and return to the SESC as necessary. It is proposed to return to the SESC in March 2018 to update the committee on progress and plans for FY19.

1.2 Project Summary

Gas Business Enablement (GBE) is a multi-year transformation that was designed to address a number of challenges facing the US Gas Business including: the need to improve 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 were amplified by the complexity created by the disparate legacy processes and systems used across the business. This was particularly acute with regards to information systems, most of which were nearing end of life, and were beginning to create unacceptable risks to core operations and future growth.

GBE involves standardizing and simplifying operational processes into new enterprise wide asset management, work management, and mobility systems (the core backbone). Then adding enhanced capabilities focused on customer experience, asset and work management, and data supplements the core backbone. Included within the portfolio are activities to define and implement a refined operating model, refreshed technical field training and a value framework to embed and sustain a culture of accountability and compliance. GBE leverages industry standard solutions, an innovative release strategy, modern delivery methods, and robust governance to 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.

GBE was originally sanctioned in May 2017 using an annual sanctioning approach starting with FY18. At this time, the full five year roadmap was

US Sanction Paper



endorsed. This is the second of five annual sanctioning papers and is for the activities in FY19.

FY18 activities have been progressing to schedule and budget. The program is on track to deliver the anticipated capabilities and initial Minimum Viable Products (MVPs) in Rhode Island by March 2018.

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
4572		Gas Business Enablement	478.282
Total			478.282

1.4 Associated Projects

N/A

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Paper Title	Sanction Type	Tolerance
May 30, 2017	SESC	\$84.5 million	\$478.282 million	Gas Business Enablement	Partial Sanction	+/- 13%

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
November 2018	Partial Sanction – GBE Phase 3

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1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory	GBE is primarily an asset replacement program.
<input checked="" type="radio"/> Policy- Driven	
<input type="radio"/> Justified NPV	
<input type="radio"/> Other	

1.8 Asset Management Risk Score

Asset Management Risk Score: 49

Primary Risk Score Driver: (Policy Driven Projects Only)

- Reliability Environment Health & Safety Not Policy Driven

1.9 Complexity Level

- High Complexity Medium Complexity Low Complexity N/A

Complexity Score: 30

1.10 Process Hazard Assessment

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

- Yes No

1.11 Business Plan

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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 type="radio"/> Over <input type="radio"/> Under <input checked="" type="radio"/> N/A	\$0.0m

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

N/A

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
CapEx	0.000	59,072	110,773	85,769	46,289	14,518	0,517	316,937
OpEx	20,142	25,458	57,969	34,925	16,877	4,876	1,098	161,345
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	84,530	168,743	120,693	63,166	19,393	1,614	478,282

Since the original sanction, the Company has completed a competitive procurement process to select the delivery vendors, which has refined the phasing of activities through fixed price contracts and has established greater certainty in the costs. The team has worked closely with plant accounting to refine the Capex/Opex splits based on the contracted work, which has driven some changes, and the remaining cost items have been reviewed and refreshed. There has been some movement of costs between Opex and Capex, but importantly, the total program costs have not increased from the original forecast of \$478.282 million, which includes the \$20.142 million pre-sanction development activities.

1.14 Key Milestones

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Milestone	Target Date: (Month/Year)
Start Up	04/2017
Partial Sanction Phase 1	05/2017
Begin Requirements and Design	05/2017
Begin Development and Implementation	07/2017
Partial Sanction Phase 2	09/2017
Portfolio Anchor 1	03/2018
Portfolio Anchor 2	10/2018
Partial Sanction Phase 3	11/2018
Portfolio Anchor 3	10/2019
Partial Sanction Phase 4	11/2019
Portfolio Anchor 4	09/2020
Project Sanction Phase 5	11/2020
Portfolio Anchor 5	04/2021
Portfolio Anchor 6	07/2021
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 on or before November 2018.

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
Operational Impact			

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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, 63 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 FY19 and beyond. GBE has a dedicated HR Business Partner and recruiter to support the team in hiring these resources, and a resource plan has been developed which includes sufficient lead time to hire resources as they are needed. Availability of internal resources to deliver the program is marked 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

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2 Decisions

The Senior Executive Sanctioning Committee (SESC) at a meeting held on September 25, 2017.

- (a) APPROVED the investment of \$253.2M (note that this includes the previous partial sanction of \$84.5 million in May 2017) and a tolerance of 10% for the purposes of Gas Business Enablement in FY19.
- (b) APPROVED the potential Run the Business (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. Note that the RTB impact has not changed since the partial sanction in May 2017.

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(c) APPROVED the potential investment of \$478.282M and a tolerance of +/- 13% contingent upon submittal and approval of Project Sanction following continued successful delivery of the previous stages. Note that the total potential investment has not changed since the partial sanction in May 2017.

(d) APPROVED that Johnny Johnston, Senior Vice President, on an exception basis, is delegated the authority to execute the Amended and Restated System Integration Services Agreement with PricewaterhouseCoopers Advisory Services LLC for the support of the GBE Program for the estimated term of the GBE Program.

(e) 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

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:	September 25, 2017

US Sanction Paper



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

GBE was originally sanctioned in May 2017 using an annual sanctioning approach starting with FY18. At that time, the full five year roadmap was endorsed. This is the second of five annual partial sanctioning papers and is for the activities in FY19.

3.2 Drivers

Gas Business Enablement (GBE) is a multi-year transformation that was designed to address a number of challenges facing the US Gas Business including: the need to improve 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 were amplified by the complexity created by the disparate legacy processes and systems used across the business. This was particularly acute with regards to information systems, most of which were nearing end of life, and were beginning to create unacceptable risks to core operations and future growth.

3.3 Project Description

GBE involves standardizing and simplifying operational processes into new enterprise wide asset management, work management, and mobility systems (the core backbone). Then adding enhanced capabilities focused on customer experience, asset and work management, and data supplements the core backbone. Included within the portfolio are activities to define and implement a refined operating model, refreshed technical field training and a value framework to embed and sustain a culture of accountability and compliance. GBE leverages industry standard solutions, an innovative release strategy, modern delivery methods, and robust governance to support the successful delivery of the desired business outcomes.

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The initiatives and high level roadmap can be seen in Appendices 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 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.
- **Leveraging agile development techniques.** Traditionally, projects like this would be developed using waterfall techniques with a 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.
- **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

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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.
- Saving customers time by being able to offer more time bound appointments.
- 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. Below is a chart summarizing those savings. Further details can be seen in Appendix 4.4.

	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	
\$M								
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

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None other than stated elsewhere in this paper.

3.6 Alternatives

Alternative 1: Bring program activities to a conclusion before the end of FY18. This alternative was rejected. FY18 is a foundational year, and while basic capabilities will have been released for Rhode Island, none of the business outcomes will be delivered, and no other jurisdiction will receive any capabilities. The majority of the spend to date would need to be written off.

Alternative 2: De-scope the solution back to the core enterprise asset and work management systems. This is estimated to reduce the FY19 spend by \$40M to \$128.7M. This alternative was rejected. This option was originally anticipated if the program was going off track, to focus on the minimum required core work and asset solutions, but not focus on customer or broader business benefits. The program has made a good start, and the anticipated benefits still appear viable and achievable.

Alternative 3: Accelerate activities from FY20, FY21, and FY22 to allow the program to complete its goals more quickly. This option has not been fully costed, and was rejected. While the program has made a strong start, FY19 sees a significant ramp in activities compared to FY18, and accelerating the program at this stage places an unnecessary additional risk on the delivery of the program and its benefits.

3.7 Safety, Environmental and Project Planning Issues

N/A

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3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability		Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
		Cost	Schedule	Cost	Schedule	Cost	Schedule				
1	Mis-alignment / lack of integration and coordination between programs	3	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	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	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

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3	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	Moderate	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 Subject Matter Expert (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.
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3.9 Permitting

N/A

3.10 Investment Recovery

N/A

3.10.1 Investment Recovery and Regulatory Implications

Full regulatory recovery for the GBE solution is challenging within the current regulatory construct due to the phasing of spend on an enterprise solution vs. the phased timing of rate case filings for each of the affected operating companies. This is exacerbated by the non-recurring Opex spend that is challenging to recover in all jurisdictions and the comparatively short 10 year depreciation life of the assets compared to traditional gas and electric assets.

Several filing strategy scenarios were modelled. The highest recovery was 90.3%, achieved by implementing four geographic-specific GBE implementations carefully aligned to rate case filings. However, this would increase the total cost to our customers by \$292M or a 54% increase in total costs due to the loss of synergies of an enterprise solution.

The GBE team continues to work with the Steering Group, Regulation, and Finance to identify solutions by jurisdiction that provide a fair and balanced outcome for customers and the Company.

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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+	
4072	Gas Business Enablement	H- 13%	CapEx	0.000	59,072	110,773	85,769	46,289	14,518	0.617	316,937
			OpEx	20,142	25,458	57,969	34,925	16,877	4,876	1,058	161,345
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	20,142	84,530	168,743	120,693	63,166	19,393	1,614	478,282
			Total Project Sanction	0.000	59,072	110,773	85,769	46,289	14,518	0.617	316,937

3.11.2 Project Budget Summary Table

\$M	Prior Yrs (Actual)	Current Planning Horizon					Total	
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5		Yr. 6+
CapEx	0.000	59,072	110,773	85,769	46,289	14,518	0.617	316,937
OpEx	20,142	25,458	57,969	34,925	16,877	4,876	1,058	161,345
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	20,142	84,530	168,743	120,693	63,166	19,393	1,614	478,282

Project Costs Per Business Plan

Variance (Business Plan-Project Estimate)

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SM	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	0.000	0.000	0.000	0.000	0.000	0.000
OpEx	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

3.11.3 Cost Assumptions

The original cost forecasts 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. These have been updated as actual costs have become available through procurement events and assumptions have been updated as better insight has become available.

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

N/A

3.11.4.2 NPV Assumptions and Calculations

N/A

3.11.5 Additional Impacts

N/A

3.12 Statements of Support

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3.12.1 Supporters

3.12.2 Reviewers

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

Function	Individual	Area
Finance	Midkiff, Felicia	Rhode Island, NES
	Collison, Mark	Massachusetts
	McNeill, Brian	New York
	Morris, Bernadette	New York
	Urban, Dennis	FERC
	Urban, Dennis	Other
Regulatory	O'Shaughnessy, John	New York Electric
	Gurry, Renee	New England Electric
	Artuso, Michael	FERC
Jurisdictional Delegate(s)	Wolf, Donald	Gas – New York
	Currie, John	Gas – New England
	Hill, Terron	Gas – FERC
Procurement	Curran, Art	All

4 Appendices

4.1 Sanction Request Breakdown by Project

\$M	4572
CapEx	169,845
OpEx	83,427
Removal	
Total	253,273

Note that this includes the previous partial sanction in May 2017.

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4.2 Initiatives List

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

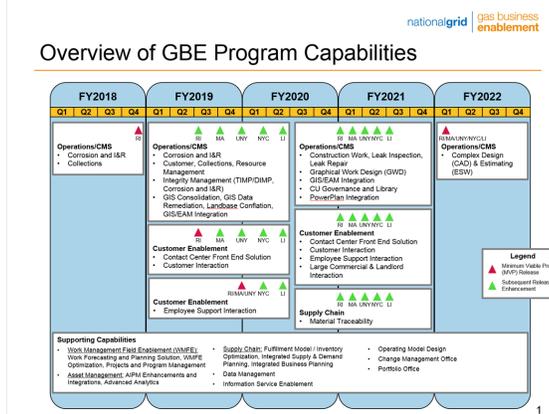


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4.3 High Level Roadmap of Capabilities to be delivered over five years

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 Enterprise Asset Management (EAM), Scheduling, Mobility and GIS platforms that will transition to the new platforms over time illustrating the reduction in technology risk.



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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:

Enhanced Capabilities	Value Drivers	Example Metrics ¹	Aspirational Ann. Benefit (Ms)
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 	Enterprises 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 Availability / idle time Pre-requisite fulfillment rate Summonses / other penalties Material stock-outs Rate of jobs requiring expedite Inventory turnover Inventory carrying cost 	\$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	
		Ending March 31, 2019	Ending March 31, 2020	Ending March 31, 2021	Ending March 31, 2022	Ending March 31, 2023	Ending March 31, 2024	Ending March 31, 2025	Ending March 31, 2026	Ending March 31, 2027			
Asset - Advanced Analytics	Reduction - Reduction in Ope via APM	Type I	\$0	\$0	\$13,750	\$1,223,750	\$1,980,000	\$1,980,000	\$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	\$573,259	\$573,259
Work Management & Field Enablement	Clerical/ Back Office Productivity Improvement	Type I	\$0	\$29,603	\$1,855,367	\$2,131,393	\$2,131,393	\$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	\$49,700	\$49,700
Work Management & Field Enablement	MCC Productivity Improvement - 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	\$7,377,085	\$7,377,085
Customer Interaction	Reduce More Call Volume through Self-Service	Type II	\$0	\$0	\$0	\$642,130	\$906,536	\$906,536	\$906,536	\$906,536	\$906,536	\$906,536	\$906,536
Customer Interaction	Volume through Self-Service	Type II	\$0	\$0	\$61,278	\$502,480	\$588,270	\$588,270	\$588,270	\$588,270	\$588,270	\$588,270	\$588,270
Data Management	Reduction in Data Cleanup/ Scrubbing Effort - Analysis	Type II	\$0	\$105,749	\$750,821	\$761,396	\$761,396	\$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	\$351,803	\$351,803
Engineering, Design, Estimating & Mobility	Complex Jobs - Estimating Accuracy Fee Avoidance	Type II	\$0	\$0	\$0	\$45,833	\$550,000	\$550,000	\$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	\$643,238	\$643,238
Integrated Supply & Demand Planning	Improved Project Delivery - Construction	Type II	\$0	\$15,278	\$2,187,222	\$2,540,000	\$2,540,000	\$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	\$629,809	\$889,142	\$889,142	\$889,142	\$889,142	\$889,142	\$889,142	\$889,142
Regulatory	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	\$13,520,800	\$13,520,800
Work Management & Field Enablement	CMS Collection Jobs - Reduction in Mileage	Type II	\$0	\$0	\$0	\$0	\$117,384	\$165,718	\$165,718	\$165,718	\$165,718	\$165,718	\$165,718
Work Management & Field Enablement	CMS Collection Jobs - Reduction in Travel Time	Type II	\$0	\$0	\$0	\$0	\$561,142	\$792,200	\$792,200	\$792,200	\$792,200	\$792,200	\$792,200
Work Management & Field Enablement	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	\$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	\$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	\$336,484	\$336,484
Work Management & Field Enablement	CMS Planned Jobs - Reduction in UTC's	Type II	\$0	\$38,760	\$51,680	\$51,680	\$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	\$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	\$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	\$26,914	\$26,914
Work Management & Field Enablement	MCC and CMS Jobs - Reduced Summaries	Type II	\$0	\$0	\$0	\$0	\$2,037,959	\$4,446,457	\$4,446,457	\$4,446,457	\$4,446,457	\$4,446,457	\$4,446,457
Work Management & Field Enablement	Reduction in Field Tech Continuance Jobs	Type II	\$0	\$99,566	\$265,511	\$265,511	\$265,511	\$265,511	\$265,511	\$265,511	\$265,511	\$265,511	\$265,511
Work Management & Field Enablement	Verification Jobs	Type II	\$0	\$121,024	\$161,365	\$161,365	\$161,365	\$161,365	\$161,365	\$161,365	\$161,365	\$161,365	\$161,365
Total Benefits Forecasted as a result of:			\$1,019,683	\$7,772,492	\$24,198,128	\$30,074,982	\$36,394,237	\$39,615,248	\$39,615,248	\$39,615,248	\$39,615,248	\$39,615,248	\$39,615,248

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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
NiagaraMohawkPowerCorp. (E&E)	\$ 24.0	\$ 27.5	\$ 30.2	\$ 30.7	\$ 33.3	\$ 33.3	\$ 250.0
KeySpanEnergyDelivery(NewYork)	\$ 26.7	\$ 26.6	\$ 30.6	\$ 22.0	\$ 6.8	\$ 0.6	\$ 154.2
KeySpanEnergyDelivery(LongIsland)	\$ 33.3	\$ 26.2	\$ 30.3	\$ 30.2	\$ 31.1	\$ 33.3	\$ 214.4
BostonGasCompany#	\$ 0.8	\$ 1.1	\$ 21.7	\$ 22.1	\$ 27.7	\$ 33.3	\$ 146.8
ColonialGasCompany#	\$ 6.0	\$ 9.1	\$ 8.3	\$ 9.5	\$ 11.1	\$ 11.1	\$ 75.8
NarragansettE&ECompany#	\$ 0.1	\$ 2.0	\$ 8.4	\$ 8.7	\$ 14.4	\$ 11.1	\$ 54.6
NiagaraMohawkPowerCorp. - Electric Distr.	\$ 0.0	\$ 0.0	\$ 3.4	\$ 0.0	\$ 0.0	\$ 0.0	\$ 3.4
MassachusettsElectricCompany	\$ 0.8	\$ 2.3	\$ 2.7	\$ 0.0	\$ 0.0	\$ 0.0	\$ 5.8
NantucketElectricCompany	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0
NarragansettElectricCompany	\$ 0.3	\$ 0.9	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 1.2
Total	\$ 84.5	\$ 106.7	\$ 130.9	\$ 132.4	\$ 156.4	\$ 158.1	\$ 881.1

Operational Expenditure

Operating Company	FY18	FY19	FY20	FY21	FY22	FY23	Total
NiagaraMohawkPowerCorp. (E&E)	\$ 8.3	\$ 9.7	\$ 9.8	\$ 9.9	\$ 8.8	\$ 8.2	\$ 55.7
KeySpanEnergyDelivery(NewYork)	\$ 10.0	\$ 10.0	\$ 12.0	\$ 9.9	\$ 2.7	\$ 0.4	\$ 45.0
KeySpanEnergyDelivery(LongIsland)	\$ 4.1	\$ 3.3	\$ 5.6	\$ 2.7	\$ 0.8	\$ 0.2	\$ 22.6
BostonGasCompany#	\$ 4.9	\$ 11.0	\$ 6.6	\$ 12.2	\$ 9.9	\$ 12.2	\$ 56.8
ColonialGasCompany#	\$ 1.4	\$ 3.2	\$ 3.9	\$ 4.9	\$ 3.3	\$ 3.3	\$ 23.0
NarragansettE&ECompany#	\$ 0.3	\$ 2.2	\$ 2.5	\$ 2.2	\$ 4.4	\$ 3.3	\$ 15.9
NiagaraMohawkPowerCorp. - Electric Distr.	\$ 0.0	\$ 0.2	\$ 0.2	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.4
MassachusettsElectricCompany	\$ 0.0	\$ 0.2	\$ 0.2	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.4
NantucketElectricCompany	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0
NarragansettElectricCompany	\$ 0.0	\$ 0.1	\$ 0.1	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.2
Total	\$ 25.5	\$ 60.0	\$ 41.9	\$ 49.9	\$ 49.9	\$ 41.1	\$ 241.2

Capital Expenditure

Operating Company	FY18	FY19	FY20	FY21	FY22	FY23	Total
NiagaraMohawkPowerCorp. (E&E)	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0
KeySpanEnergyDelivery(NewYork)	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0
KeySpanEnergyDelivery(LongIsland)	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0
BostonGasCompany#	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0
ColonialGasCompany#	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0
NarragansettE&ECompany#	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0
NiagaraMohawkPowerCorp. - Electric Distr.	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0
MassachusettsElectricCompany	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0
NantucketElectricCompany	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0
NarragansettElectricCompany	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0.0
Total	\$ 0.0						

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US Sanction Paper



Operating Company	FY18	FY19	FY20	FY21	FY22	FY23	Total
NiagaraMohawkPowerCorp.IGas	\$ 0.7	\$ 7.7	\$ 3.3	\$ 2.8	\$ 2.5	\$ 0.1	\$ 11.1
KeySpanEnergyDeliveryNewYork	\$ 39.9	\$ 36.5	\$ 27.4	\$ 26.1	\$ 21	\$ 0.2	\$ 150.1
KeySpanEnergyDeliveryLongIsland	\$ 0.2	\$ 6.9	\$ 2.7	\$ 2.5	\$ 2.3	\$ 0.1	\$ 16.7
BostonGasCompany	\$ 0.0	\$ 20.0	\$ 15.0	\$ 10	\$ 5	\$ 0.1	\$ 70.1
ColonialGasCompany	\$ 0.2	\$ 9.9	\$ 4.4	\$ 2.5	\$ 0.8	\$ 0.0	\$ 17.8
NarragansettGasCompany	\$ 0.2	\$ 2.7	\$ 5.0	\$ 4	\$ 1.1	\$ 0.0	\$ 12.2
NiagaraMohawkPowerCorp.-ElectricDist.	\$ 0.0	\$ 2.5	\$ 3.4	\$ 2	\$ 2	\$ 0	\$ 7.3
MassachusettsElectricCompany	\$ 0.8	\$ 2.3	\$ 2.7	\$ 2	\$ 2	\$ 0	\$ 9.8
NorfolkElectricCompany	\$ 0.0	\$ 0.0	\$ 0.0	\$ 0	\$ 0	\$ 0	\$ 0.0
NarragansettElectricCompany	\$ 0.3	\$ 0.3	\$ 0.0	\$ 0	\$ 0	\$ 0	\$ 0.2
Total	\$ 41.1	\$ 110.8	\$ 55.8	\$ 46.3	\$ 44.5	\$ 0.5	\$ 161.9

4.6 NPV Summary

N/A

4.7 Customer Outreach Plan

N/A

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Gas Business Enablement (GBE) Update



SESC Presentation
March 26, 2018

Johnny Johnston

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Context

Gas Business Enablement (GBE), is a multiyear (FY17 – FY23) transformational program to standardize our gas business processes; replace aging, disparate, operational legacy systems on to a cloud based enterprise asset management, work management and customer engagement platform; and refresh the gas operating model to support successful implementation of the solution and delivery of the benefits:

¹⁴ In May 2017, SESC sanctioned FY18 for \$84.5M against a total roadmap spend of \$478M including spend in FY17.

¹⁵ In September 2017, SESC sanctioned an incremental \$168.7M for FY19, consistent with the roadmap spend of \$478M.

¹⁶ Agreed that it would be prudent to return in March 2018 to update the Committee on program progress and regulatory filing progress prior to starting FY19 activities.

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Delivery Progress in FY18

Overall program is on track and on budget. Some of the highlights include:

- ❏ Complex procurement activities were completed on time to put in place fixed price contracts for the main delivery partners aligned to the roadmap and sanctioning profile.
- ❏ The program started mobilizing in July 2017, coding started in September 17 and currently there are 85 National Grid FTEs working on the program.
- ❏ The program is on track to deliver its for implementation (Portfolio Anchor 1) into Rhode Island on April 7, 2018*. This will consist of a Minimum Viable Product (MVP) for Collections, I&R and Corrosion in Rhode Island

* Note the original go-live for PA 1 was March 31, 2018 but go-live was pushed back to avoid conflict with year end activities.

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FY18 Forecast vs FY18 Sanction

With a month of actuals still to come, GBE is forecasted to come in under its forecast CapEx budget and very close to its TotEx budget and sanction as illustrated below:

Spent Category	Mar-18 Forecast	FY18 Budget	Variance
CapEx	\$ 35.6	\$ 39.1	\$ -3.5
OpEx	\$ 29.3	\$ 25.4	\$ 3.9
TotEx	\$ 64.9	\$ 64.5	\$ 0.4

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Regulatory Progress in FY18

Good progress has been made on regulatory recovery in FY18

- 1 In April 17, GBE was filed as part of the NIMO case. The PSC approved the \$458M scope for the delivery of GBE. They capped total spend at \$458M subject to additional measurable benefits, there is a downward Capex tracker. Quarterly reporting is required on progress of program and the business against the value framework metrics. If benefits are not delivered, then a proportion of costs will be deferred back to customers.
- 1 In November 17, GBE was filed as part of the MA Gas and RI cases. To date there has been significant discovery (over 170 IRs), however the overall tone in both cases remains positive
- 1 In FY19, it is planned to file GBE as part of the MA electric case and plans are still being developed for KEDNY/LI

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Summary and Recommendation

Summary

- Good progress has been made in mobilizing Gas Business Enablement
- Overall the program is on track and on budget
- A supportive outcome was achieved for GBE in the NIMO rate case
- Remaining cases continue to progress to plan

Recommendation

- Progress with plans for FY19 as sanctioned at SESC in September 2017
- Return around September 2018, to provide an update on GBE and request sanction for FY20 activities

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Appendix – Planned GBE Spend over program

Project Number	Project Title	Project Category (Est. %)	Spent (\$)	Priority	Cumulative Spend					Total
					2018	2019	2020	2021	2022	
472	Gas Business Enhancement	+ 15%	Spent	18.36	18.36	48.88	48.88	48.88	48.88	195.36
			Est.	25.14	35.41	45.68	55.95	66.22	233.40	
			Spent	25.14	35.41	45.68	55.95	66.22	233.40	
			Est.	25.14	35.41	45.68	55.95	66.22	233.40	
Total Project Section			Spent	18.36	18.36	48.88	48.88	48.88	48.88	195.36
			Est.	25.14	35.41	45.68	55.95	66.22	76.49	305.97
			Spent	25.14	35.41	45.68	55.95	66.22	76.49	305.97
			Est.	25.14	35.41	45.68	55.95	66.22	76.49	305.97

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H.O. Pieper
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Information Request AG-24-3

Request:

Referring to the Company's response to Information Request AG-15-12, please provide all materials supplied to the Steering Committee regarding the GBE Program.

Response:

Please refer to the following attachments for all presentations made to the Steering Committee regarding the GBE Program.

Attachment AG 24-3-1 CONFIDENTIAL – Steering Committee presentations made during 2016.

Attachment AG 24-3-2 CONFIDENTIAL – Steering Committee presentations made during 2017.

Attachment AG 24-3-3 CONFIDENTIAL– Steering Committee presentations made during 2018.