

Division 3-53

Request:

Referring to the testimony of Johnston & Connolly, p. 29, please provide copies of all sanctioning documents, corporate committee approvals, meeting minutes, presentations, and memos relating to the business case analysis and internal approval of the project.

Response:

The Senior Executive Sanctioning Committee (SESC) is the senior level sanctioning body for National Grid in the United States. The SESC has responsibility for reviewing all programs/projects with costs in excess of \$25 million and deciding if the projects should move forward.

The following attachments are submitted in response to this request:

- Attachment DIV 3-53-1 – US Sanction Paper, dated May 30, 2017.
- Attachment DIV 3-53-2 – Gas Business Enablement SESC Presentation, dated May 30, 2017.
- Attachment DIV 3-53-3 – US Sanction Paper, dated September 25, 2017.
- Attachment DIV 3-53-4 – Gas Business Enablement SESC Presentation, dated September 25, 2017.
- Attachment DIV 3-53-5 – Accenture, National Grid Gas Business Enablement Program, Business Case Deliverable, dated December 9, 2016.

In addition, the Company's responses to DIV 7-48 and DIV 7-49 will include additional documents provided to the New York Public Service Commission and the Massachusetts Department of Public Utilities, respectively, related to the Gas Business Enablement Program and potentially responsive to this data request.

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.



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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



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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	9.087	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

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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

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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.

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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

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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

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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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	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

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

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3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	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.

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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

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 +	
					2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
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

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3.11.2 Project Budget Summary Table

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
\$M								
CapEx	0.000	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)

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
\$M								
CapEx	0.000	0.000	(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

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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

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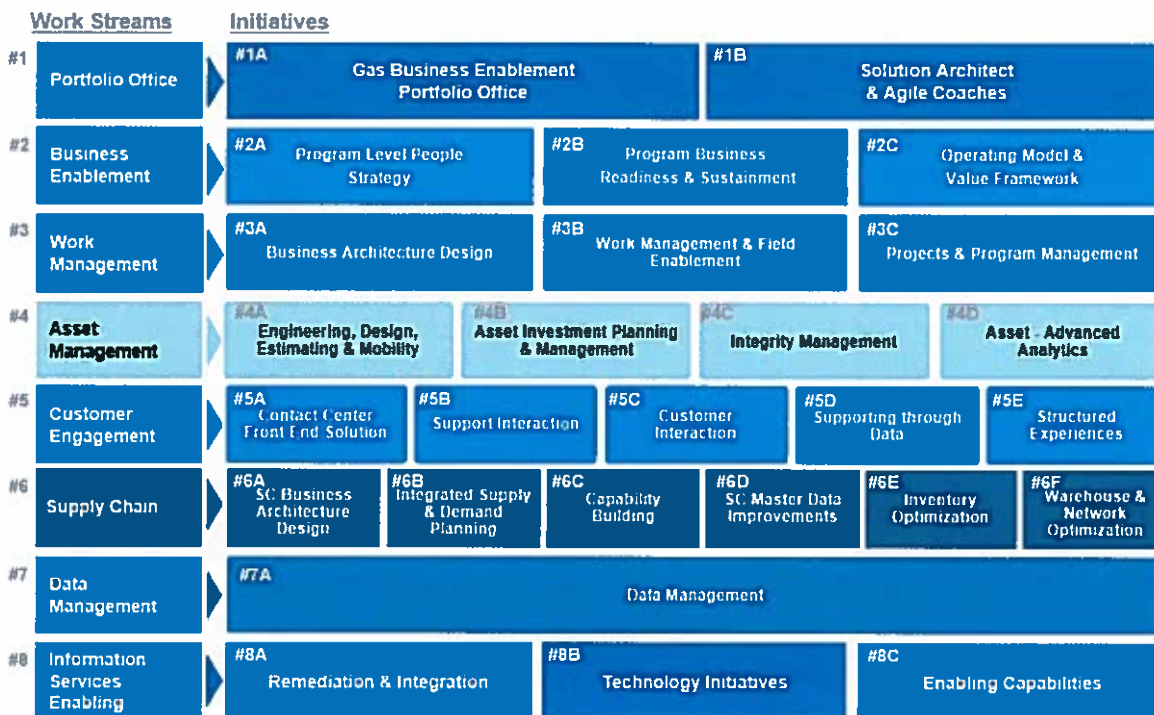
4 Appendices

4.1 Sanction Request Breakdown by Project

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

4.2 Initiatives List

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

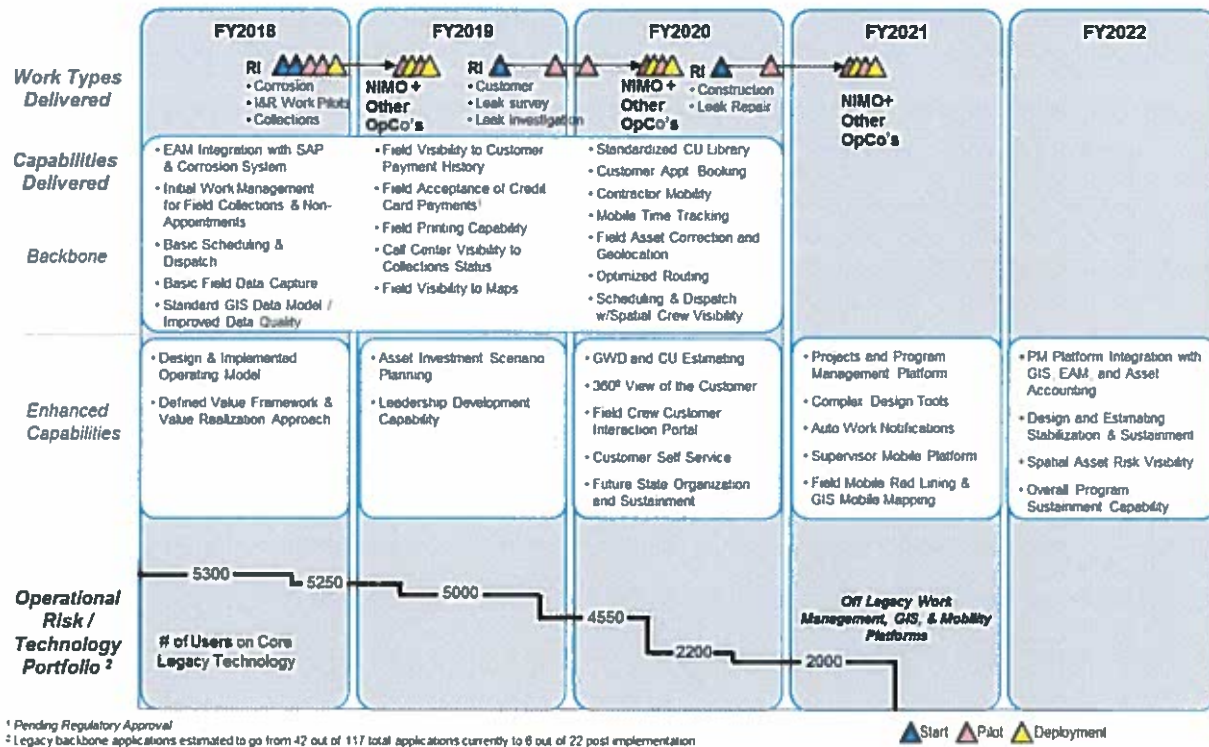


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4.3 High Level Roadmap of Capabilities to be delivered over five years

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.

Backbone and Enhanced Capabilities Delivered by FY



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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) 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 Ending March 31, 2019	12-Months Ending March 31, 2020	12-Months Ending March 31, 2021	12-Months Ending March 31, 2022	12-Months Ending March 31, 2023	12-Months Ending March 31, 2024	12-Months Ending March 31, 2025	12-Months Ending March 31, 2026	12-Months Ending March 31, 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



Gas Business Enablement (GBE)



SESC Presentation
May 30, 2017

Johnny Johnston

Project Scope

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

It is a comprehensive portfolio of programs looking at people, process and technology. The proposed GBE solution includes:

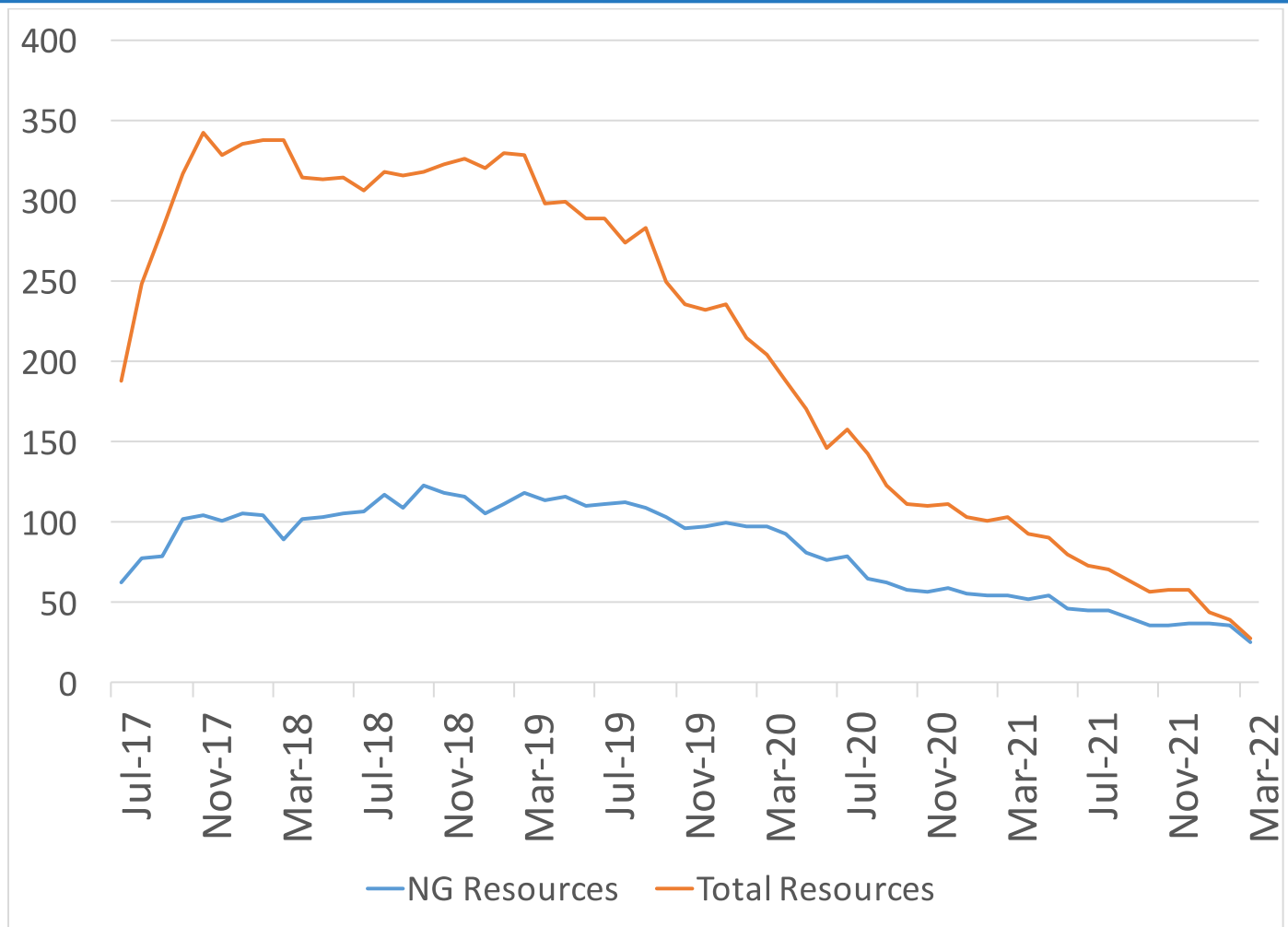
- standardizing and simplifying operational processes into new enterprise asset, work management, and mobility systems
- deploying enhanced capabilities focused on the customer engagement, asset and work management, and data processes
- refining the operating model and creating a value framework to embed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

Implementation Approach

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

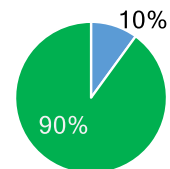
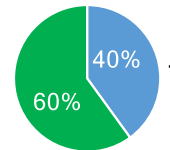
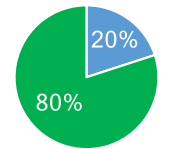
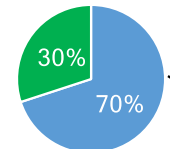
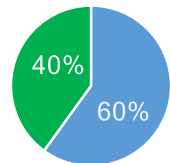


GBE Resources over the life of the program



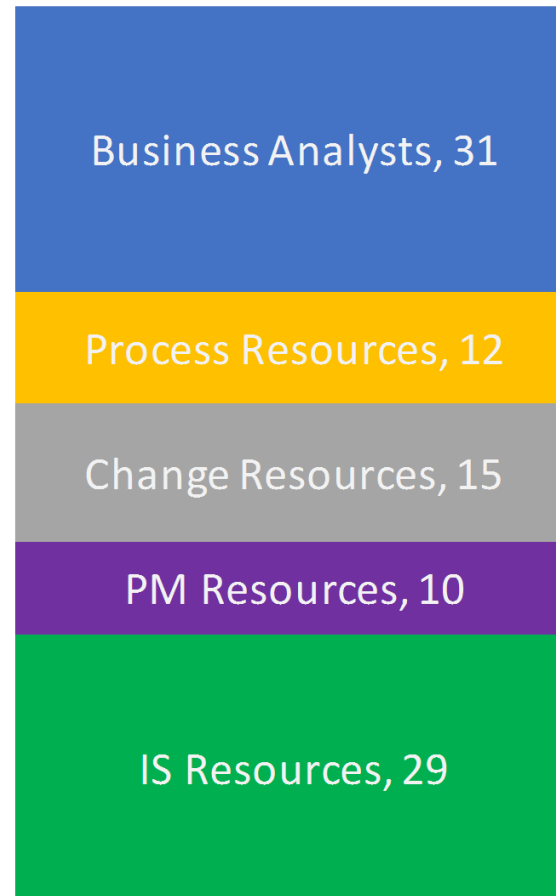
GBE resourcing lifecycle

Sourcing Breakdown:



■ Internal ■ External

~ peak NG FTEs on GBE Program:



Estimated moves post program....:

Nos:	Roles
11	IS to support overall in-sourcing
3	Project Managers for other programs
8	Change experts for future projects or L&D
10	Process practitioners support business or new process org
13	Business Leaders Supervisor-VP back in business
29	GBE support (similar to BPS for SAP)
19	Leave National Grid Retire/Move on (assumed 20%)

Key Milestones

Milestone	Target Date
Start Up	April 2017
Partial Sanction	May 2017
Begin Requirements and Design	May 2017
Begin Development and Implementation	July 2017
Partial Sanction	November 2017
Partial Sanction	November 2018
Partial Sanction	November 2019
Full Sanction	November 2020
Move to Production / Last Go Live	March 2021
Project Complete	March 2022
Project Closure	July 2022

Implementation Risks

Number	Detailed Description of Risk / Opportunity	Probability	I		Score			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.

Financials

- This paper notes sanction of Gas Business Enablement (INVP4572) in the amount of \$84.5 million for the FY 2018 portion of the program. (\$56.5 Capex, \$28.0 Opex, \$0.0 Removal)
- In February 2017, National Grid Plc
 - Approved the FY 2018 funding associated with this request
 - Endorsed the proposed \$458.142 million anticipated roadmap, with an incremental \$61.000 contingency
 - Endorsed the annual sanctioning approach, which will include periodic reviews of program progress, deliverables, and funding requirements over multiple sanctions, with Delegation of Authority (DoA) to the GBE Steering Group.
- Note the 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.

Financials (cont.)

- Program Benefits
 - Primary benefit is a reduction in operational risk by replacing aging information systems which are at or nearing end of life.
 - 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 FY2024)

Regulatory Recovery

- Filed in NiMO including forward looking for full recovery of Capex, and Opex from FY19 forwards.
Constructively received to date, but too early to tell for final outcome
- Filing in MA Gas and RI – seeking forwards recovery but higher risk than NY. JJ and MR meeting DPU on June 30
- We are working closely with regulation, finance and treasury to refine the regulatory strategy & financing approach for a program of this size and scale to identify opportunities to improve under-recovery and regulatory lag



US Sanction Paper

Title:	Gas Business Enablement	Sanction Paper #:	USSC-17-222 v2
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:

- \$169.9 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 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

US Sanction Paper

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 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.



US Sanction Paper

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

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.



US Sanction Paper

1.8 Asset Management Risk Score

Asset Management Risk Score: 49

Primary Risk Score Driver: (Policy Driven Projects Only)

☒ Reliability
 ☐ Environment
 ☐ Health & Safety
 ☐ Not Policy Driven

1.9 Complexity Level

☒ High Complexity
 ☐ Medium Complexity
 ☐ Low Complexity
 ☐ N/A

Complexity Score: 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 type="radio"/> Over <input type="radio"/> Under <input checked="" type="radio"/> NA	\$0.0m

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

N/A

US Sanction Paper

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
CapEx	-	59.10	110.77	83.86	46.29	14.52	0.52	315.06
OpEx	20.14	25.43	57.97	34.92	18.78	4.88	1.10	163.22
Removal	-	-	-	-	-	-	-	-
CIAC/Reimbursement	-	-	-	-	-	-	-	-
Total	20.14	84.53	168.74	118.79	65.07	19.39	1.61	478.28

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

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



US Sanction Paper

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			
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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US Sanction Paper

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

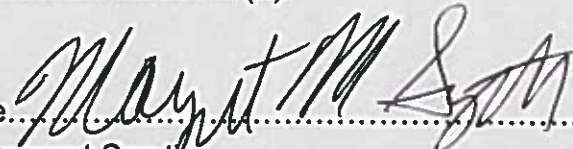
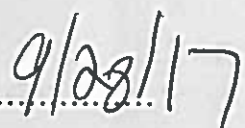
N/A

US Sanction Paper

2 Decisions

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

- (a) APPROVED the investment of \$253.3M (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.
- (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

US Sanction Paper

3 Sanction Paper Detail

Title:	Gas Business Enablement	Sanction Paper #:	USSC-17-222 v2
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

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

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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.

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

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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.
- 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.

		Current Planning Horizon						Total
	Prior Yrs	Yr 1 18/19	Yr 2 19/20	Yr 3 20/21	Yr 4 21/22	Yr 5 22/23	Yr 6+ 23/24	
\$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

None other than stated elsewhere in this paper.

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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				
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	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
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	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 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.

3.9 Permitting

N/A

3.10 Investment Recovery

N/A

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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.

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						
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total
					2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
4572	Gas Business Enablement	+/- 13%	CapEx	-	59.10	110.77	83.86	46.29	14.52	0.52	315.06
			OpEx	20.14	25.43	57.97	34.92	18.78	4.88	1.10	163.22
			Removal	-	-	-	-	-	-	-	-
			Total	20.14	84.53	168.74	118.79	65.07	19.39	1.61	478.28
Total Project Sanction			CapEx	-	59.10	110.77	83.86	46.29	14.52	0.52	315.06
			OpEx	20.14	25.43	57.97	34.92	18.78	4.88	1.10	163.22
			Removal	-	-	-	-	-	-	-	-
			Total	20.14	84.53	168.74	118.79	65.07	19.39	1.61	478.28



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3.11.2 Project Budget Summary Table

		Current Planning Horizon						
		Prior Yrs (Actual)	Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23
\$M								Total
CapEx	-	59.10	110.77	83.86	46.29	14.52	0.52	315.06
OpEx	20.14	25.43	57.97	34.92	18.78	4.88	1.10	163.22
Removal	-	-	-	-	-	-	-	-
Total Cost in Bus. Plan	20.14	84.53	168.74	118.79	65.07	19.39	1.61	478.28

Project Costs Per Business Plan

Variance (Business Plan-Project Estimate)

		Current Planning Horizon						
		Prior Yrs (Actual)	Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23
\$M								Total
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

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3.11.5 Additional Impacts

N/A

3.12 Statements of Support

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	169.878
OpEx	83.395

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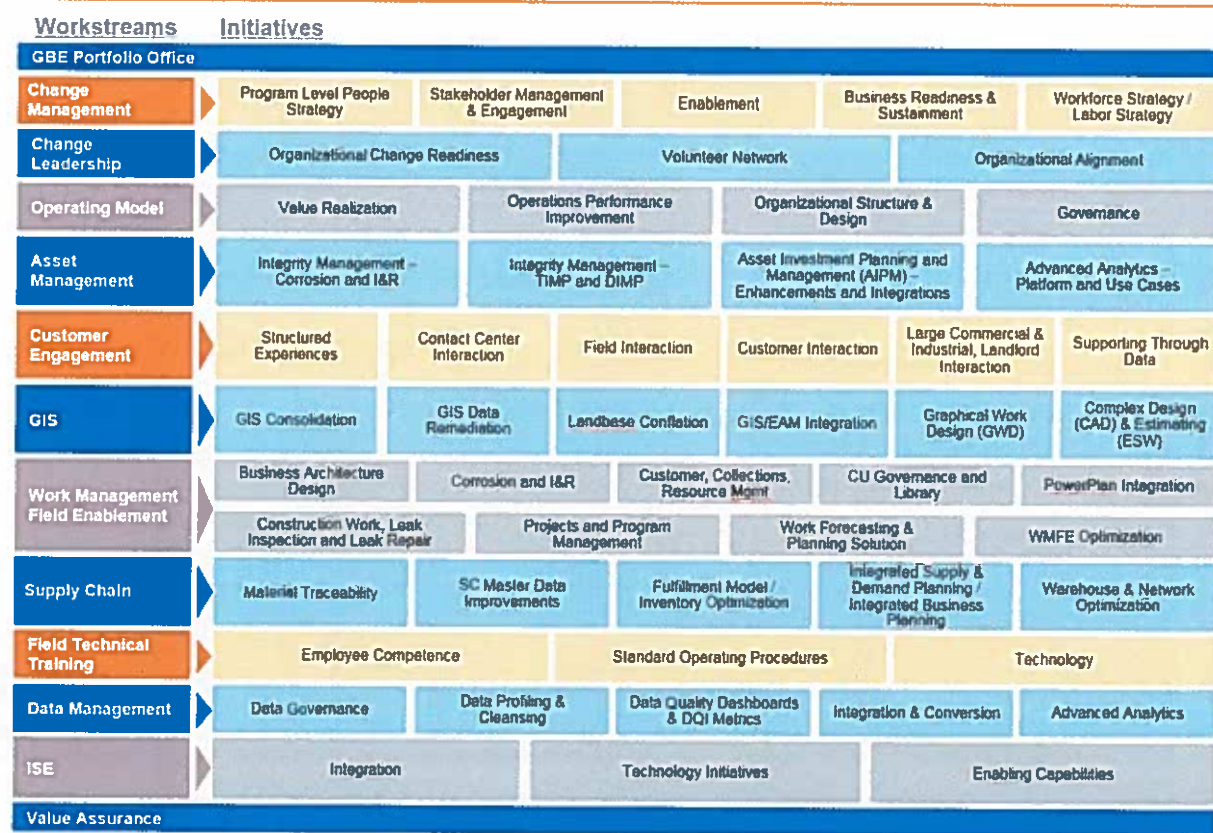
Removal	
Total	253.273

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

4.2 Initiatives List

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

Key Initiatives



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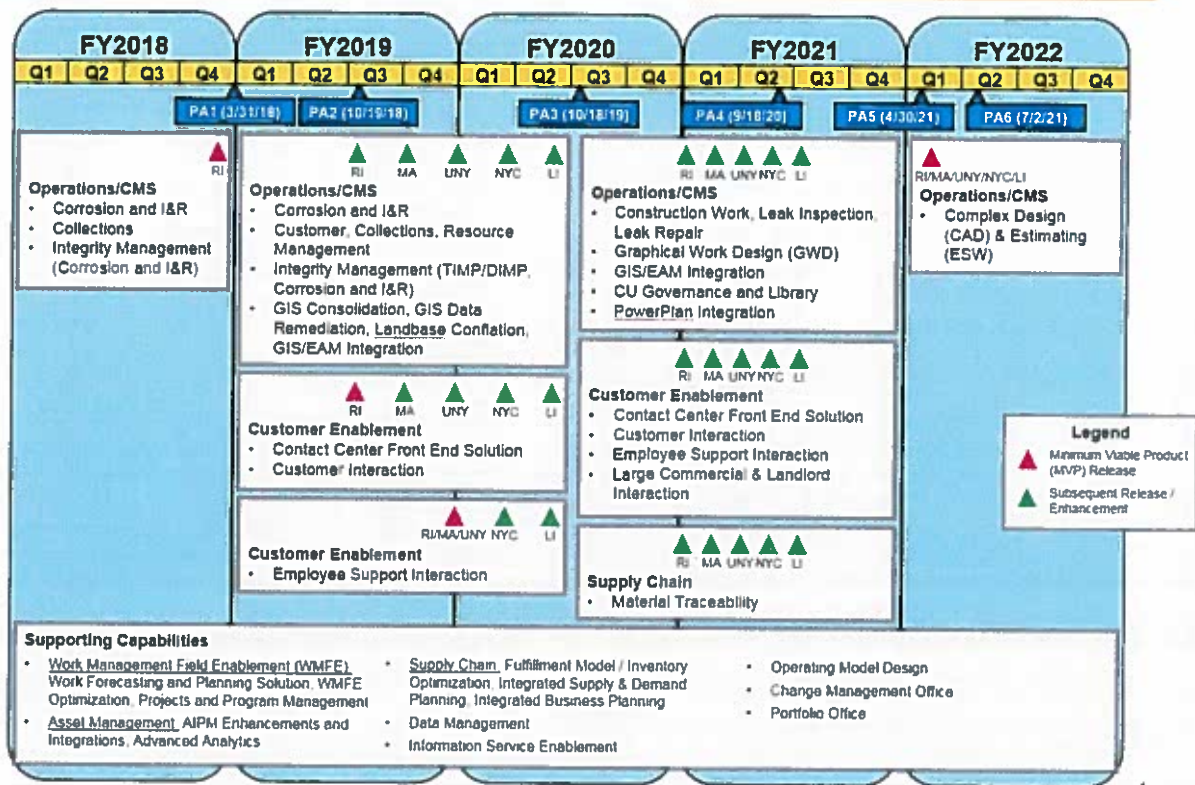


4.3 High Level Roadmap of Capabilities to be delivered over five years

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.



Overview of GBE Program Capabilities



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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 	Enterprise 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 Ending March 31, 2019	12-Months Ending March 31, 2020	12-Months Ending March 31, 2021	12-Months Ending March 31, 2022	12-Months Ending March 31, 2023	12-Months Ending March 31, 2024	12-Months Ending March 31, 2025	12-Months Ending March 31, 2026	12-Months Ending March 31, 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
Customer Interaction	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
Data Management	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



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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	\$ 14.0	\$ 27.5	\$ 18.9	\$ 11.0	\$ 3.3	\$ 0.3	\$ 75.0
KeySpan Energy Delivery New York	\$ 28.7	\$ 56.6	\$ 38.9	\$ 22.7	\$ 6.8	\$ 0.6	\$ 154.3
KeySpan Energy Delivery Long Island	\$ 13.3	\$ 26.2	\$ 18.0	\$ 10.5	\$ 3.1	\$ 0.3	\$ 71.4
Boston Gas Company	\$ 15.8	\$ 31.1	\$ 21.4	\$ 12.5	\$ 3.7	\$ 0.3	\$ 84.8
Colonial Gas Company	\$ 4.6	\$ 9.1	\$ 6.2	\$ 3.6	\$ 1.1	\$ 0.1	\$ 24.8
Narragansett Gas Company	\$ 6.1	\$ 12.0	\$ 8.2	\$ 4.8	\$ 1.4	\$ 0.1	\$ 32.6
Niagara Mohawk Power Corp.- Electric Distr.	\$ 1.0	\$ 3.0	\$ 3.3	\$ -	\$ -	\$ -	\$ 7.3
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	\$ -	\$ -	\$ -	\$ 2.2
Total	\$ 84.5	\$ 168.7	\$ 118.8	\$ 65.1	\$ 19.4	\$ 1.6	\$ 458.1

Operational Expenditure

Operating Company	FY18	FY19	FY20	FY21	FY22	FY23	Total
Niagara Mohawk Power Corp. - Gas	\$ 4.3	\$ 9.7	\$ 5.8	\$ 3.2	\$ 0.8	\$ 0.2	\$ 24.0
KeySpan Energy Delivery New York	\$ 8.8	\$ 20.0	\$ 12.0	\$ 6.5	\$ 1.7	\$ 0.4	\$ 49.5
KeySpan Energy Delivery Long Island	\$ 4.1	\$ 9.3	\$ 5.5	\$ 3.0	\$ 0.8	\$ 0.2	\$ 22.9
Boston Gas Company	\$ 4.9	\$ 11.0	\$ 6.6	\$ 3.6	\$ 0.9	\$ 0.2	\$ 27.2
Colonial Gas Company	\$ 1.4	\$ 3.2	\$ 1.9	\$ 1.1	\$ 0.3	\$ 0.1	\$ 7.9
Narragansett Gas Company	\$ 1.9	\$ 4.2	\$ 2.5	\$ 1.4	\$ 0.4	\$ 0.1	\$ 10.5
Niagara Mohawk Power Corp.- Electric Distr.	\$ 0.0	\$ 0.2	\$ 0.2	\$ -	\$ -	\$ -	\$ 0.5
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	\$ -	\$ -	\$ -	\$ 0.1
Total	\$ 25.4	\$ 58.0	\$ 34.9	\$ 18.8	\$ 4.9	\$ 1.1	\$ 143.1

Capital Expenditure

Operating Company	FY18	FY19	FY20	FY21	FY22	FY23	Total
Niagara Mohawk Power Corp. - Gas	\$ 9.7	\$ 17.7	\$ 13.0	\$ 7.8	\$ 2.5	\$ 0.1	\$ 50.8
KeySpan Energy Delivery New York	\$ 19.9	\$ 36.5	\$ 26.8	\$ 16.1	\$ 5.1	\$ 0.2	\$ 104.5
KeySpan Energy Delivery Long Island	\$ 9.2	\$ 16.9	\$ 12.4	\$ 7.5	\$ 2.3	\$ 0.1	\$ 48.4
Boston Gas Company	\$ 10.9	\$ 20.0	\$ 14.7	\$ 8.9	\$ 2.8	\$ 0.1	\$ 57.4
Colonial Gas Company	\$ 3.2	\$ 5.9	\$ 4.3	\$ 2.6	\$ 0.8	\$ 0.0	\$ 16.8
Narragansett Gas Company	\$ 4.2	\$ 7.7	\$ 5.7	\$ 3.4	\$ 1.1	\$ 0.0	\$ 22.1
Niagara Mohawk Power Corp.- Electric Distr.	\$ 1.0	\$ 2.9	\$ 3.3	\$ -	\$ -	\$ -	\$ 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	\$ 59.1	\$ 110.8	\$ 83.9	\$ 46.3	\$ 14.5	\$ 0.5	\$ 315.1

4.6 NPV Summary



US Sanction Paper

N/A

4.7 *Customer Outreach Plan*

N/A



Gas Business Enablement (GBE)



SESC Presentation
September 25, 2017



Johnny Johnston
Christopher Connolly

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.

- In May 2017, SESC sanctioned FY18 for \$84.5M against a total roadmap spend of \$478M including spend in FY17.
- 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.
- This paper is looking for sanction for FY19 costs. These are in line with the roadmap presented in May 2017.
- It is anticipated there will be future sanctions for the remaining years in the roadmap.

Gas Business Enablement (GBE) Program Scope

nationalgrid

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:

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

Implementation Approach

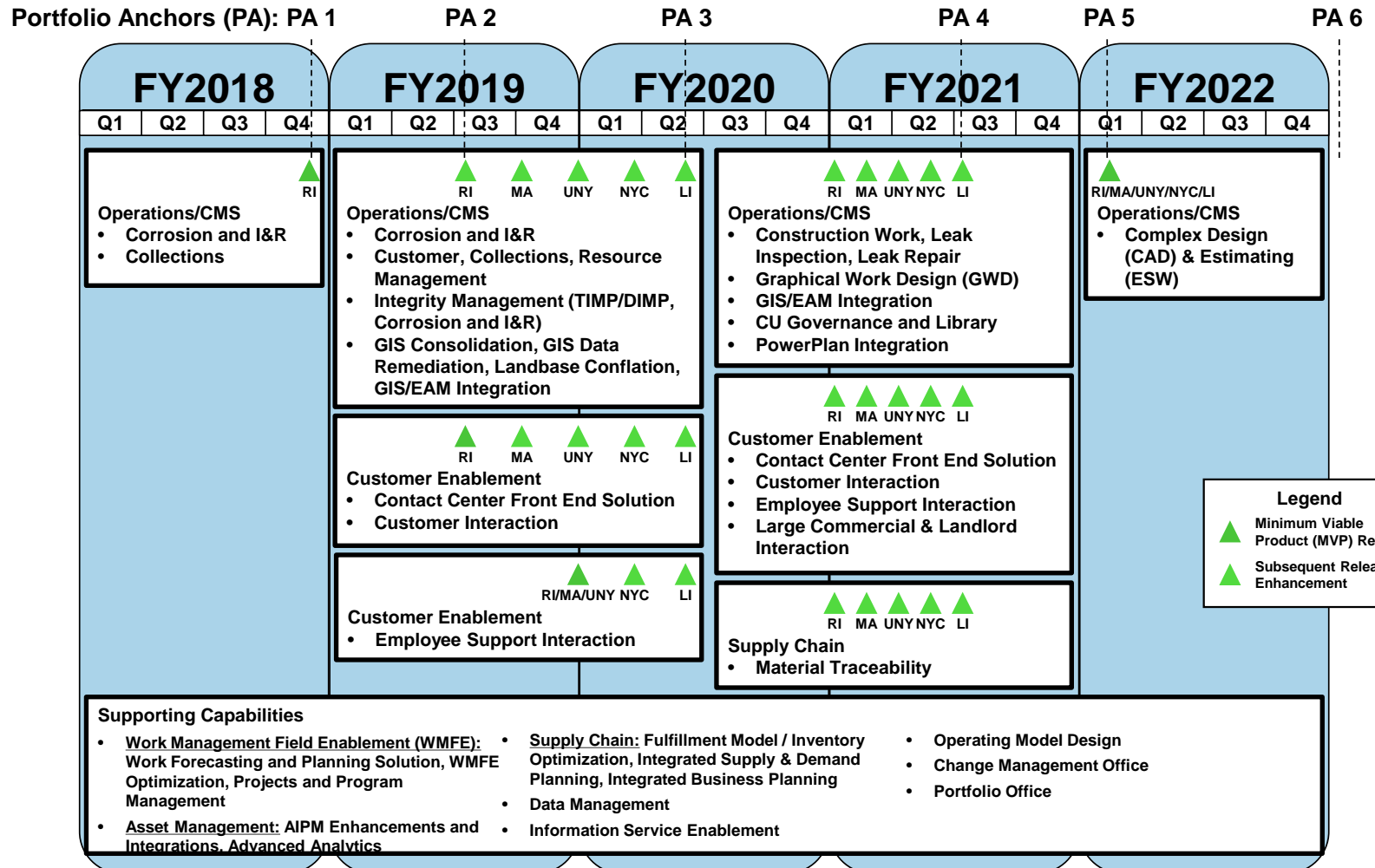
- Leverage standard industry technology packages.
- Development of the core backbone solution first with incremental enhanced capabilities to follow.
- Phased approach based on geography and work type. For example, Rhode Island – I&R. This will enable quicker initial deployments and avoid a “big bang”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

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.

Latest roadmap showing the key capabilities and Portfolio Anchors:

nationalgrid



Financials - Costs

- This paper requests sanction of Gas Business Enablement (GBE - INVP4572) in the amount of 253.2 million, which includes the FY18 phase of the program (\$56.5 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 \$458.142 million anticipated roadmap, with an incremental \$61.000 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, deliverables, and funding requirements, and annual formal partial 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 to this amount since the May 2017 sanction.

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.

Requests:

- APPROVE 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. (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.



National Grid Gas Business Enablement Program

Business Case Deliverable

December 9, 2016



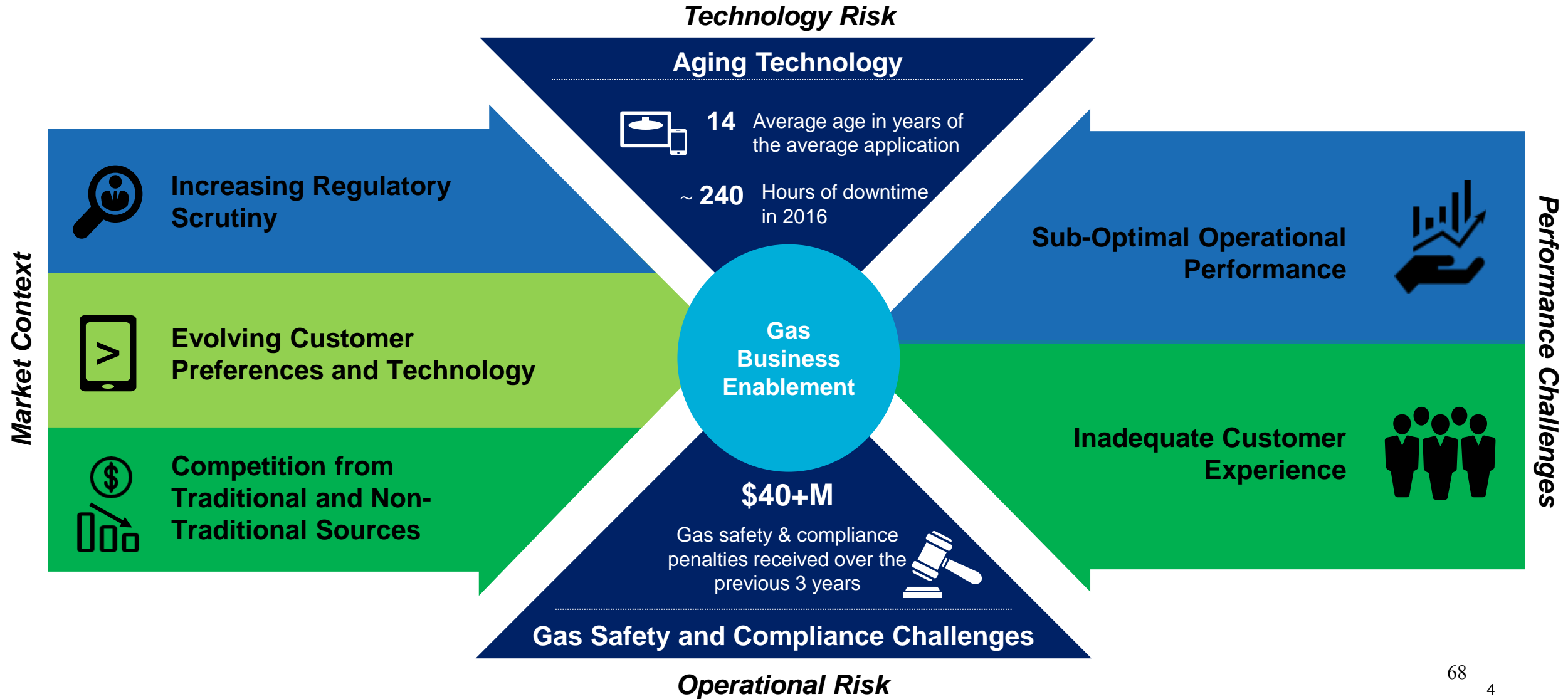
Contents

- Executive Summary
- Program Context
- Options Considered & Recommendation
- Recommended Option Scope, Benefits, and Costs
- Appendix

Executive Summary



National Grid is proposing a gas business enablement program to address aging technology and gas safety and compliance challenges, improve performance, enhance the customer experience, and be able to adapt to a changing market framework.



Of the five options that were evaluated, the jurisdiction deployment value oriented option best addresses National Grid’s challenges and reduces delivery risk by deploying capabilities by jurisdiction.

THE NARRAGANSETT ELECTRIC COMPANY

vs. NATIONAL GRID

RIPUC Docket No. 4770

Attachment DIV 3-53-5

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Option	Characteristics	Duration	Investment
1 Tech Stabilization	<ul style="list-style-type: none"> Continue to provide limited support for the current systems Upgrade supporting infrastructure where possible 	<ul style="list-style-type: none"> Likely 3+ years ¹ 	\$15M to \$20M ³
2 Like for Like Replacements	<ul style="list-style-type: none"> Upgrade or replace current systems, where possible Limited system consolidation; stand alone systems not integrated No capability, process, or people / leadership improvements Does not include improvements in data quality or technical training 	<ul style="list-style-type: none"> Likely 4+ years ² 	\$221M+ ⁴
3 Backbone	<ul style="list-style-type: none"> Focused on replacing core AM/WM systems Capability & process improvements limited to work and asset mgmt. Scope limited to what is required to mitigate key risks 	<ul style="list-style-type: none"> 3 ½ years 	\$273M
4 Value Oriented – Jurisdiction Deployment	<ul style="list-style-type: none"> Backbone scope + enhanced capabilities; initial focus on risk reduction Enhanced capabilities include strategic change, talent, & operating model, customer interaction, advanced asset & work management, supply chain, & technical training Addresses data quality and technical training gaps Transitions support and maintenance to a modern SaaS model Deployment by jurisdiction to allow for refinements prior to broader rollout 	<ul style="list-style-type: none"> 5 years 	Total: \$458M Enhanced Capabilities: \$185M
5 Value Oriented – Accelerated Deployment	<ul style="list-style-type: none"> Same as above except program accelerates delivery of capabilities Takes more aggressive deployment approach 	<ul style="list-style-type: none"> 4 ½ years 	Total: \$466M Enhanced Capabilities: \$193M

1 Potential IS budgetary / O&M constraints will influence timeframe

2 Assumes longer duration than backbone due to lack of system consolidation; more applications need to be replaced, upgraded, or remediated than in the backbone scenario

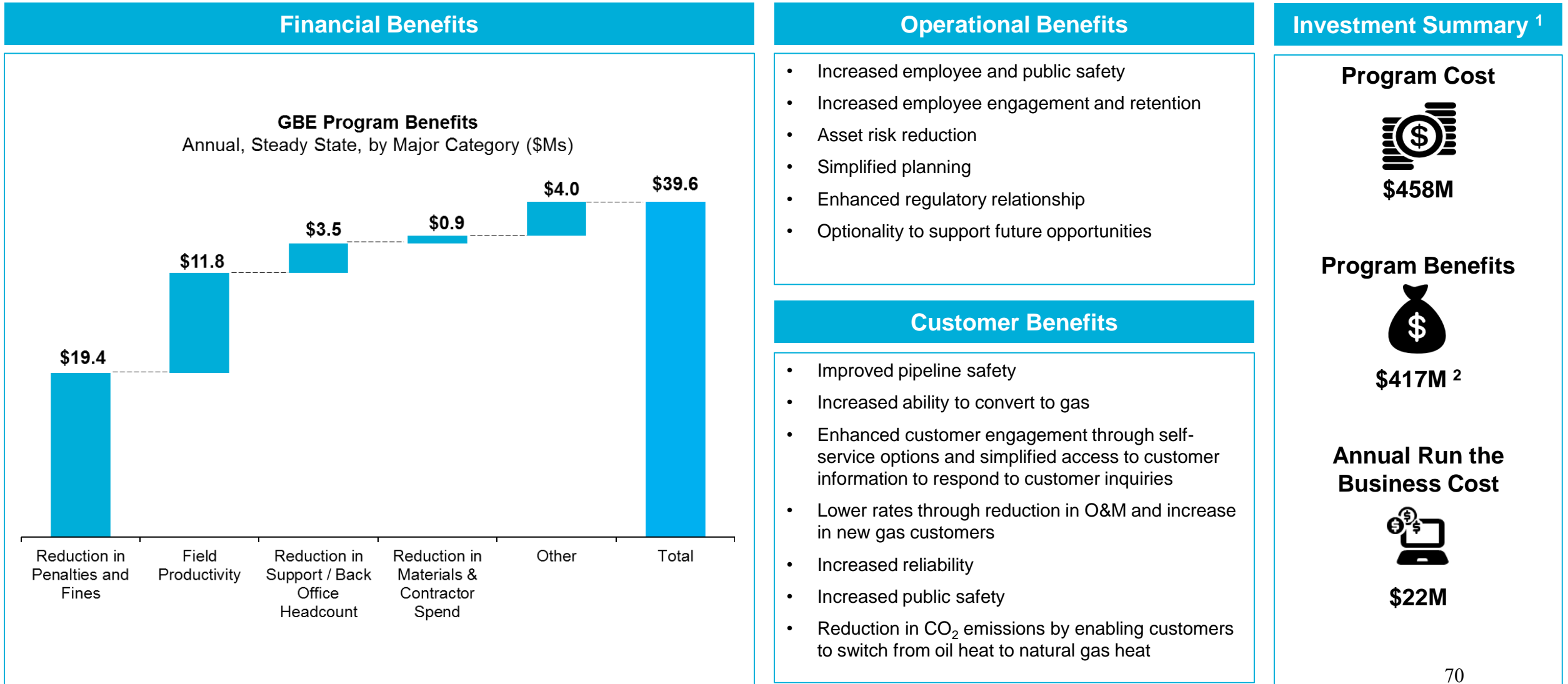
3 Tech stabilization investment assumes \$200K per application which includes infrastructure and application updates

4 Like for like investment assumes major business and operational critical applications can be upgraded, remediated or replaced and are estimated as such; for custom and older technology with no replacement in the market, investment is assumed to be \$200K for stabilization / remediation and \$350K for upgrade per application

69

5

The jurisdiction deployment value oriented option delivers significant benefits over the useful life of the assets and financial benefits and considerably improves the customer experience.



¹ Costs and benefits are in nominal terms
² Capabilities assumed to be fully deployed in FY21; benefits accumulated from FY19 to FY31 – benefits start prior to full deployment of capabilities

Program Context



THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770
Attachment DIV 3-53-5
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The US Gas Business carries an unsustainable level of operational risk driven by aging technology and gas safety and compliance challenges.

Aging Technology

- Average age of the application portfolio is 14 years with some applications at 26 years
- 90% of the 'front office' systems will have reached end of life within 2 years
- Critical applications have missed availability targets 35% of the time causing ~240 hours of down¹
- 99 disparate systems make it difficult to plan, manage, and report on compliance work

Gas Safety and Compliance Challenges

- In 2016, Internal Audit and two third party assessments² by industry experts identified significant gaps in gas field technical training governance, curriculum, and delivery, including lack of modern instructional design and technology
- In 2015, National Grid agreed to a Compliance Plan with the Mass. DPU based on systemic non-compliance associated with not completing mandated work in fifteen (15) program areas, paid a \$450K fine (total exposure was \$30M), and agreed to certain hiring, training, and qualification processes for field employees and Supervisors.
- Gas standards and procedures, although technically sound, are difficult for field workers to follow and not always aligned with training materials, leading to procedural non-compliance.
- \$40+M in gas safety and compliance penalties have been received or are in negotiation over the last 3 years
- The total annual gas safety and compliance penalty exposure is more than \$76M in NY and is largely unlimited in MA and RI with \$2M maximum cap per violation

Operational risk impacts our ability to support safe, compliant operations and meet ongoing regulatory obligations.

¹ A small # of applications are monitored for performance as many do not have SLAs for maintenance; timeframe Dec 15 through Dec 16

² Pipeline Performance Improvement Company(P-Pic) performed a pipeline safety/compliance review utilizing API RP 1173. In addition, the Mosaic Company performed an assessment of our Field Technical Training program and developed recommended actions/roadmap to close significant gaps identified. Recommendations to improve our Pipeline Safety Management System and Field Technical Training are being incorporated into the GBE effort.

In addition, a step change is needed to improve operational performance and enhance the customer experience.

Operational Performance

- Disparate systems and heavy reliance on paper negatively impact our O&M and capital unit cost performance ¹
- Inefficiencies driven by inadequate technology, non-standard processes, reliance on paper, and a “make due” culture impact our ability to achieve allowed ROE and TSR targets ²
- Operating model, system, and process improvements are needed to secure the delivery of our current \$2B capital spend plan
- Increase in capital spend has materially reduced resource capacity limiting our ability to support additional growth opportunities (e.g., customer gas conversions)
- Non-standard processes and disparate tools limit our ability to understand performance results and course-correct as necessary.



Customer Experience and Value

- Disparate systems and information limit our ability to provide customers with status and other pertinent information in a timely manner
- Many customer inquiries take multiple interactions to resolve / address
- Lack of resource capacity limits our ability to meet the demand for new gas connections and conversion requests
- Lack of a modern, digital platform for effective and efficient interaction make it increasingly difficult for our customers to do business with us
- Customer preferences for communication (e.g., text message, apps) can’t be met with the current suite of capabilities and platforms
- Inefficient operations has negatively affected our ability to meet all customer commitments including appointments

Finally, more flexible capabilities and platforms are needed to address the dramatically changing market framework.



Increasing Regulatory Scrutiny

- Gas safety incidents (e.g., San Bruno, East Harlem) have resulted in significant cost to gas utilities, stricter regulations, and newly recommended practices (e.g., API1173); National Grid must be able to quickly adopt new practices



Evolving Customer Preferences and Technology

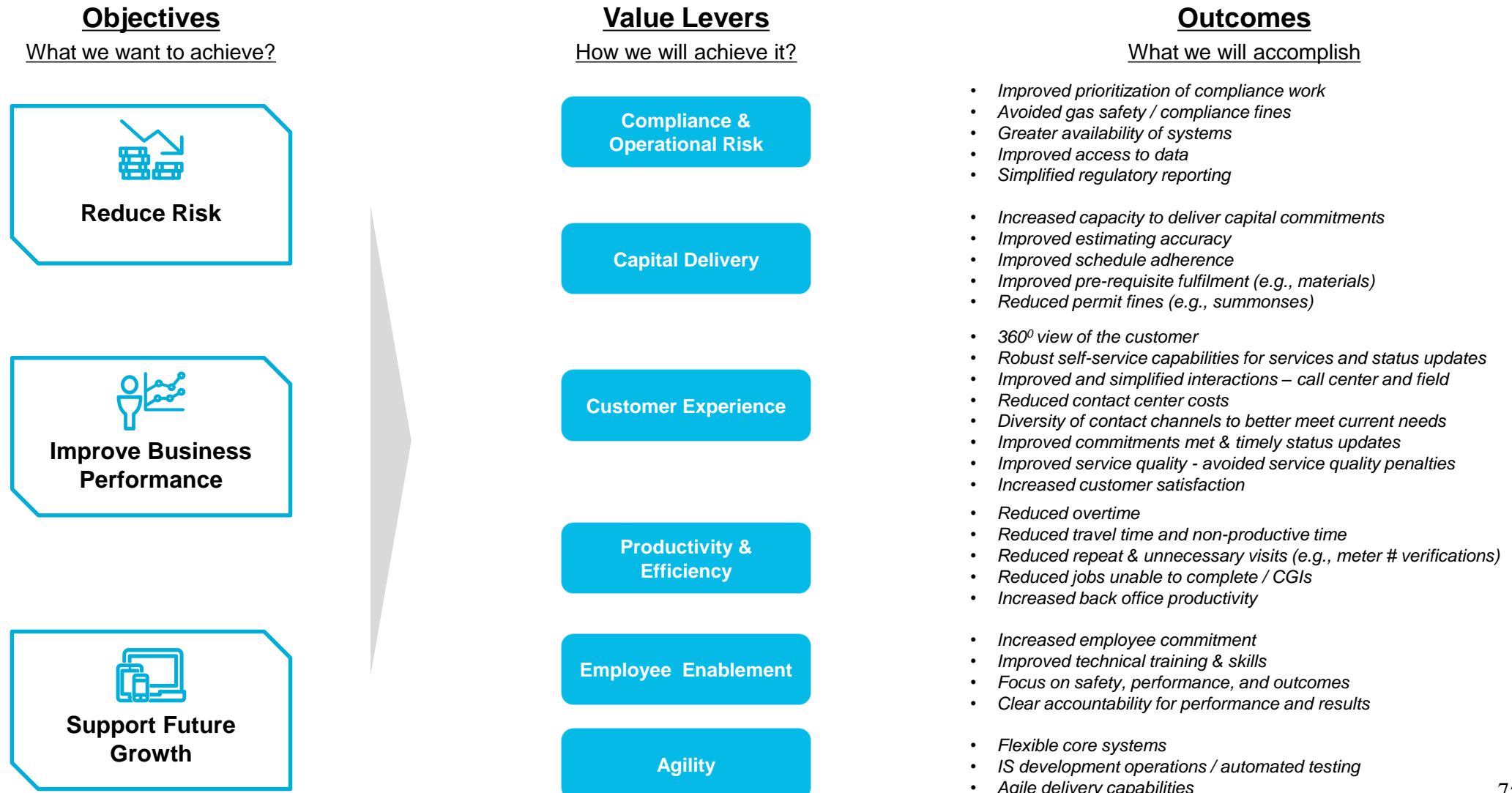
- Customer preferences and technology have and will continue to change; National Grid must anticipate and incorporate these changes into its operations



Competition from Traditional and Non-Traditional Sources

- Competition from traditional and non-traditional sources continue to evolve and become economically viable (e.g., geothermal heat, intelligent home); National Grid must be able to compete to protect and expand the business

As a result of the challenges faced, a Gas Business Enablement program was developed to reduce risk, improve business performance, and support future growth.



Options Considered & Recommendation



Five Gas Business Enablement program options were assessed each differing in scope and characteristics.

<u>Option</u>	<u>Characteristics</u>	<u>Duration</u>
1 Tech Stabilization	<ul style="list-style-type: none"> Continue to provide limited support for the current systems Upgrade supporting infrastructure where possible 	<ul style="list-style-type: none"> Likely 3+ years Potential IS budgetary / O&M constraints will influence timeframe
2 Like for Like Replacements	<ul style="list-style-type: none"> Upgrade or replace current systems, where possible Limited system consolidation; stand alone systems not integrated No capability, process, or people / leadership improvements Does not include improvements in data quality or technical training 	<ul style="list-style-type: none"> Likely 4+ years Assumes longer duration due to potential IS capacity constraints & dependencies
3 Backbone	<ul style="list-style-type: none"> Focused on replacing core AM/WM systems Capability & process improvements limited to work and asset mgmt. Scope limited to what is required to mitigate key risks 	<ul style="list-style-type: none"> 3 ½ years
4 Value Oriented – Jurisdiction Deployment	<ul style="list-style-type: none"> Backbone scope + enhanced capabilities; initial focus on risk reduction Capability, process, and people / leadership improvements Addresses data quality and technical training gaps Transitions support and maintenance to a modern SaaS model Deployment by jurisdiction to allow for refinements prior to broader rollout 	<ul style="list-style-type: none"> 5 years
5 Value Oriented – Accelerated Deployment	<ul style="list-style-type: none"> Same as above except program accelerates delivery of capabilities Takes more aggressive deployment approach 	<ul style="list-style-type: none"> 4 ½ years

Each option was evaluated against National Grid's objectives to determine which option best addresses the challenges faced and is the most prudent investment.

Objectives



Reduce Risk



Improve Business Performance



Support Future Growth

Evaluation Criteria

The solution must...

- Improve Gas Safety and Compliance Performance
 - Secure Delivery of Capital Spend Plan
 - Improve Application Availability / Reduce Downtime
-
- Improve Efficiency and Productivity
 - Improve the Customer Experience
 - Simplify Data Management / Improve Data Quality
 - Enable Quick Response to Regulatory Requests / Changes
 - Enable Consistent Measurement of Performance / Continuous Improvement
-
- Establish a Common Platform
 - Standardize Capabilities, Processes, and Practices
 - Establish a Platform to Enable an Electric Business Enablement & Future Enhancements

Three options partially or fully meet all three objectives and were further evaluated.

Option	Reduces Risk	Improves Business Performance	Supports Future Growth
1 Tech Stabilization	<ul style="list-style-type: none"> ⬇ Limited impact to application availability ⬇ No impact on gas safety and compliance risk ⬇ No impact on capital delivery 	<ul style="list-style-type: none"> ⬇ No impact on efficiency and productivity, the customer experience, data management / data quality, regulatory response, and performance measurement 	<ul style="list-style-type: none"> ⬇ Disparate platforms ⬇ Non-standardized capabilities, processes, and practices ⬇ No platform for electric business enablement or future enhancements
2 Like for Like Replacements	<ul style="list-style-type: none"> ↔ Moderate impact to application availability ⬇ No impact on gas safety and compliance risk ⬇ No impact on capital delivery 	<ul style="list-style-type: none"> ↔ Focuses on technology replacements / upgrades only ⬇ No impact on efficiency and productivity, the customer experience, data management / data quality, regulatory response, and performance measurement 	<ul style="list-style-type: none"> ⬇ Disparate platforms ⬇ Non-standardized capabilities, processes, and practices ⬇ No platform for electric business enablement or future enhancements
3 Backbone	<ul style="list-style-type: none"> ⬆ Improves application availability ↔ Partially addresses operational challenges; gas safety and compliance ↔ Improved work management systems supports capital delivery 	<ul style="list-style-type: none"> ↔ Moderate impact on efficiency and productivity ⬇ No impact to the customer experience ⬆ Simplifies data management and improves data quality ⬆ Improves ability to respond to regulatory requests ⬆ Enables consistent performance measurement 	<ul style="list-style-type: none"> ⬆ Consolidates core AM / WM platforms ⬆ Standardizes core AM/ WM capabilities, processes, and practices ⬆ Establishes WM / AM platform to support electric business enablement and future enhancements
4 Value Oriented – Jurisdiction Deployment	<ul style="list-style-type: none"> ⬆ Improves application availability ⬆ Comprehensively addresses operational challenges; gas safety and compliance ⬆ Improved work management systems & capabilities support capital delivery 	<ul style="list-style-type: none"> ⬆ Significant impact on efficiency and productivity ⬆ Enhances the customer experience ⬆ Simplifies data management and improves data quality ⬆ Improves ability to respond to regulatory requests ⬆ Enables consistent performance measurement 	<ul style="list-style-type: none"> ⬆ Consolidates major gas business platforms ⬆ Standardizes capabilities, processes, and practices ⬆ Establishes platforms to support electric business enablement and future enhancements
5 Value Oriented – Accelerated Deployment	<ul style="list-style-type: none"> ⬆ Improves application availability ⬆ Comprehensively addresses operational challenges; gas safety and compliance ⬆ Improved work management systems & capabilities support capital delivery 	<ul style="list-style-type: none"> ⬆ Significant impact on efficiency and productivity ⬆ Enhances the customer experience ⬆ Simplifies data management and improves data quality ⬆ Improves ability to respond to regulatory requests ⬆ Enables consistent performance measurement 	<ul style="list-style-type: none"> ⬆ Consolidates major gas business platforms ⬆ Standardizes capabilities, processes, and practices ⬆ Establishes platforms to support electric business enablement and future enhancements

Legend

⬆ Fully Meets

↔ Partially Meets




⬇ Doesn't Meets

Of the three options evaluated, the jurisdiction and accelerated value oriented options deliver financial benefits by implementing enhanced capabilities which offset the investment.


<u>Option</u>	<u>Investment</u>	<u>Financial Benefits</u>	<u>Payback</u>
3 Backbone	\$273M	None	N/A ¹
4 Value Oriented – Jurisdiction Deployment	\$458M ○ Enhanced Capabilities: \$185M	\$39.6M	4Y 2M ²
5 Value Oriented – Accelerated Deployment	\$466M ○ Enhanced Capabilities: \$193M	\$39.6M	4Y 4M ²


1 No payback analysis completed as capabilities that drive value (e.g., enhanced capabilities) are not being implemented in these three options
2 Payback based on the implementation of enhanced capabilities that drive value; the start of payback assumed to be year 5 which is the full deployment of the enhanced capabilities


In addition, the backbone and jurisdiction deployment value oriented options allow for delivery approaches that reduce overall delivery risk and minimize impact to the business.

<i>Option</i>	<i>Delivery Approach</i>					<i>Reduces Delivery Risk / Minimizes Business Disruption</i>
	<i>Method</i>	<i>Use of Pilots (Y/N)</i>	<i>Scope of Deployment ¹</i>	<i>Run New System In Parallel w/Old (Y/N)</i>	<i>Resource Ramp ²</i>	
3 Backbone	Agile	Yes	Work Type / Application	Yes	Moderate	
4 Value Oriented – Jurisdiction Deployment	Agile	Yes	Work Type / Application	Yes	Moderate	
5 Value Oriented – Accelerated Deployment	Agile	Yes	Work Type / Application	Yes	Aggressive	

Legend

Yes

Partially

No

¹ More granular scope of deployment allows for small scale minimum viable product and hence less risk; work type by application is the least scope that could feasibly be deployed
² The backbone option requires less resources overall compared to the value oriented options; the jurisdiction deployment option elongates some of the early deployments to allow for testing of the capability in a single jurisdiction before broader rollout

Option	Decision Rationale
3 Backbone ¹	<div><div>↓</div>Partially addresses technical and operational risk; exposure to gas safety and compliance penalties remains</div> <div><div>↓</div>Provides no financial benefits / some non-financial benefits; no payback on investment</div> <div><div>↑</div>Consolidates disparate business and operational critical platforms</div> <div><div>↑</div>Requires less resources than value oriented options; slower ramp of resources minimizes delivery risk</div> <div><div>↓</div>Partially supports the broader NG strategic ambition</div>

Legend

↑

Positive

↓

Negative

¹ Backbone option recommended as a reduced scope, fall back option to the rate case aligned, value oriented option

Recommended Option Scope, Benefits, and Costs



The jurisdiction deployment option scope includes backbone and enhanced capabilities and systems.

Backbone Scope

Enterprise Asset Management

- Work Management
- Scheduling, & Field Mobility
- Integrity Management

Geospatial Information System

- Platform Consolidation
- Data Remediation
- Field Mobility

Asset Management

- PowerPlan Remediation

Data Management

- Data Quality & Cleansing

IS Enabling

- Agile Methodology
- Development Operations
- Testing Automation

Enhanced Capabilities Scope

Strategic Change, Talent, & Operating Model

- Operating Model & Value Framework
- Business Readiness & Sustainment
- Program People Strategy

Customer Experience & Interaction

- Customer & Employee Interaction
- CxT Portal & Channel Management
- CRM Contact Center Front End
- Voice of the Customer, Channel Analytics

Advanced Asset Management

- Asset Investment Planning & Management
- Advanced Asset Analytics
- Graphical Work Design, Complex Design, & Estimating

Advanced EAM Platform

- Capital Projects & Program Management
- Work Management Optimization
- Work Forecasting & Planning

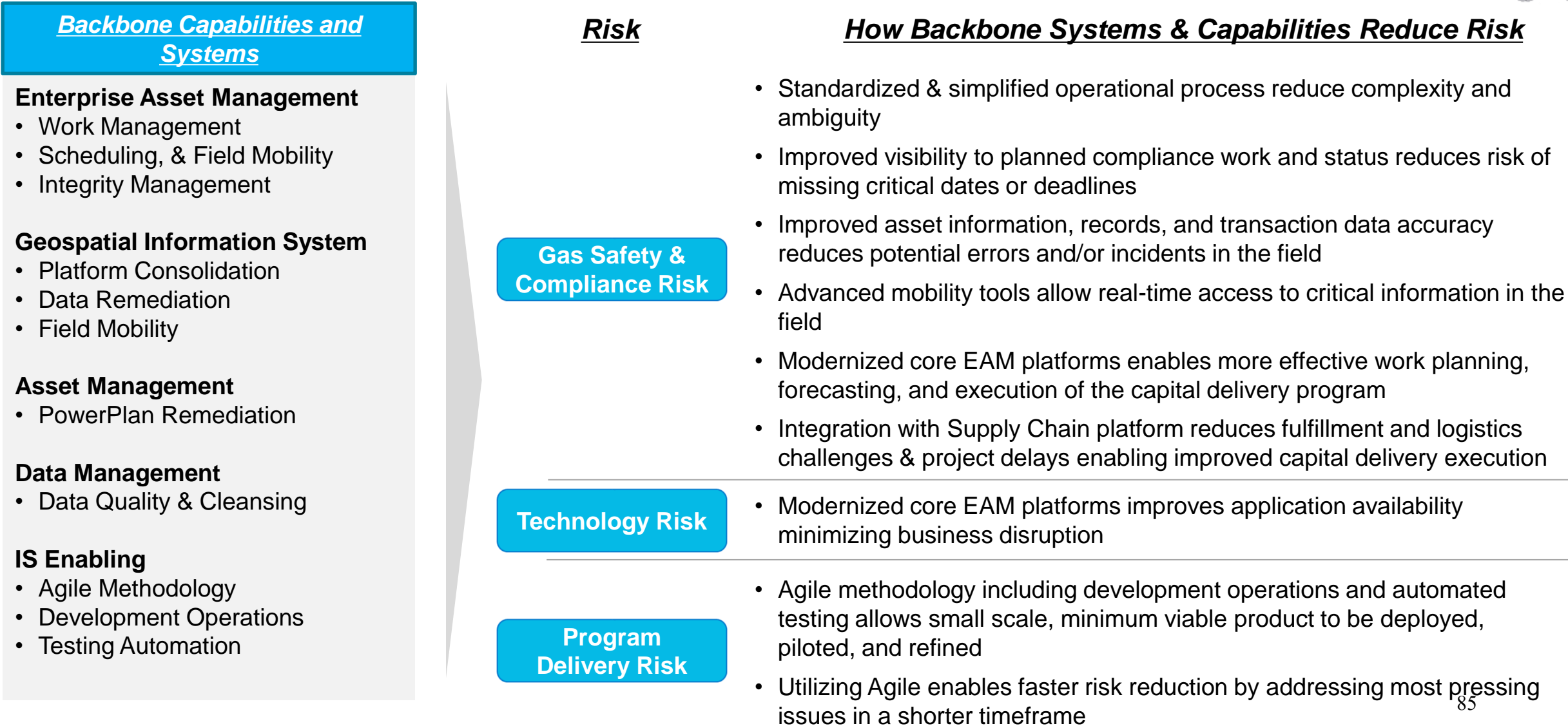
Supply Chain

- Integrated Supply/ Demand Planning
- Inventory Optimization
- Warehouse and Network Optimization

Field Technical Training

- Technical Training Refresh
- Work Methods and Procedures

The jurisdiction option materially reduces risk through implementation of the backbone systems and capabilities.

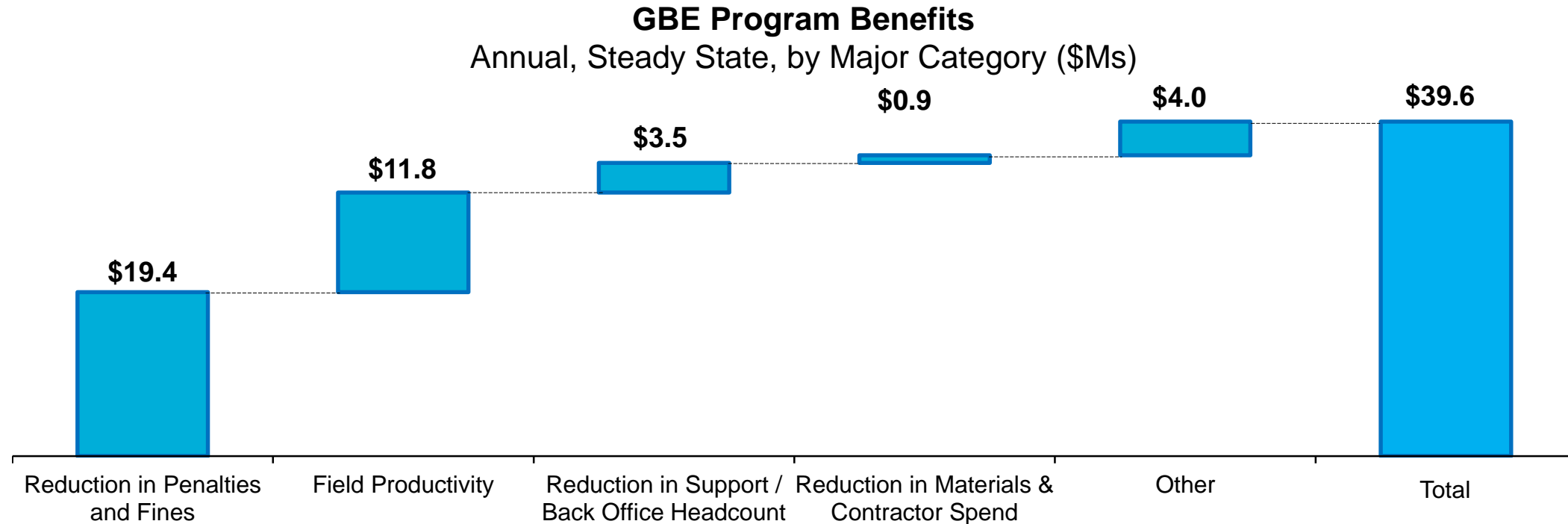


In addition to reducing risk, the program also improves business performance and delivers material financial benefits through the implementation of six key enhanced capabilities.

Enhanced Capabilities	Value Drivers	Annual Benefit (\$M)	
Strategic Change, Talent, & Operating Model	<ul style="list-style-type: none">• Process efficiency• Improved performance management• Performance oriented culture	N/A ¹	
Customer Experience & Interactions	<ul style="list-style-type: none">• Increased use of self-service• New service growth• Increased customer satisfaction	\$4.5	
Advanced Asset Management	<ul style="list-style-type: none">• Reduced material spend• Reduced O&M spend reduction• Capex effectiveness	\$4.1	
Advanced EAM Platform	<ul style="list-style-type: none">• Appointments met / kept; reduced penalties• Improved field productivity & utilization• Back office efficiency• Improved operational data / less wasted time analyzing	\$14.9	
Supply Chain	<ul style="list-style-type: none">• Reduced capex project delays• Reduced material spend• Reduced inventory carrying costs	\$2.5	
Field Technical Training	<ul style="list-style-type: none">• Reduced gas safety & compliance violations	\$13.5	
			Total Annual Benefits (\$M) \$39.6

¹ Capabilities increase likelihood of program success and probability of delivering program benefits.
² The threshold benefits are included in the business case and will be part of our rate case submissions. There is a high degree of confidence these will be delivered

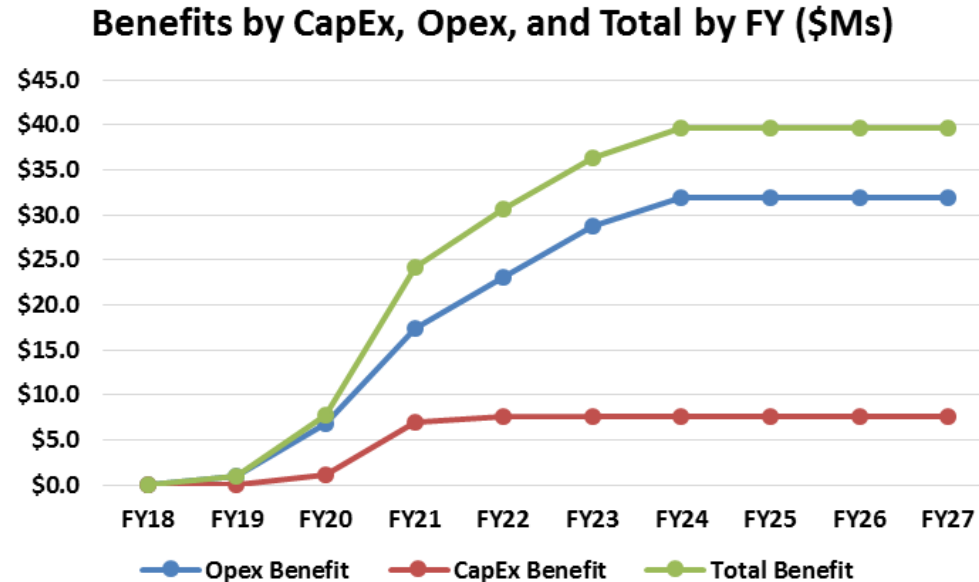
These financial benefits can be categorized into four main categories.



Key Points

- Approximately 50% of the benefits come from reduced penalties and fines; almost all fines are associated with three categories - gas safety, compliance, and service quality
- Field productivity benefits span both M&C and CMS and come from reducing travel time, CGIs, and non-productive time (e.g., available time in CMS), as well as reducing or eliminating repeat visits (e.g., meter verifications)
- Back office and support benefits come from reducing clerical and mapping / records support through improved field mobility capabilities (e.g., electronic time sheets, electronic red-line updates, etc.)

Benefits start to be realized in FY19 and achieve an annual steady state run rate of \$39.6M by FY24.



Key Points

- Benefits assumed to be realized after the deployment of the enhanced capabilities
- The first enhanced capabilities to be deployed are Advanced Asset Management Engineering and Technical Training capabilities which start to drive value in FY19
- Start of benefits assumes a lag period after the deployment of the enhanced capabilities to allow for a stabilization period; the typical lag period is between three (3) and nine (9) months depending on the type of benefits
- Benefits ramp from the start of realization to a full annual run rate over a number of months; the typical ramp period is between three (3) and eighteen (18) months depending on the type of benefits; NOTE: benefits that require culture / performance changes typically take longer to ramp to than benefits that require simple technology or process changes

In addition to financial benefits, significant non-financial benefits are achieved through the implementation of enhanced capabilities.

Operational Benefits

Operations will see a number of benefits:

- **Employee Engagement and Retention:** Robust systems and tools, standardized processes, and simplified work methods make it easier for employees to do their jobs leading to improved engagement, morale, and retention
- **Asset Risk Reduction:** Robust asset investment planning capabilities, tools, and analytics allow for more effective asset replacement and maintenance prioritization thus reducing asset risk for each dollar spent
- **Simplified Planning:** Visibility to all work in one core platform coupled with seamless, electronic integration of work demand with other key platforms (e.g., HR, supply chain) reduces planning complexity
- **Regulatory Relationship:** Simplified regulatory reporting and improved safety and compliance performance will enhance our regulatory relationships
- **Safety:** Advanced and consistent technical training improves employees' technical skills and simplified work methods reduce ambiguity in the field leading to increased safety performance
- **Optionality:** Common platforms, processes, practices and an efficient and effective operating model provides an opportunity to capture inorganic growth opportunities (e.g., M&A)

Customer Benefits

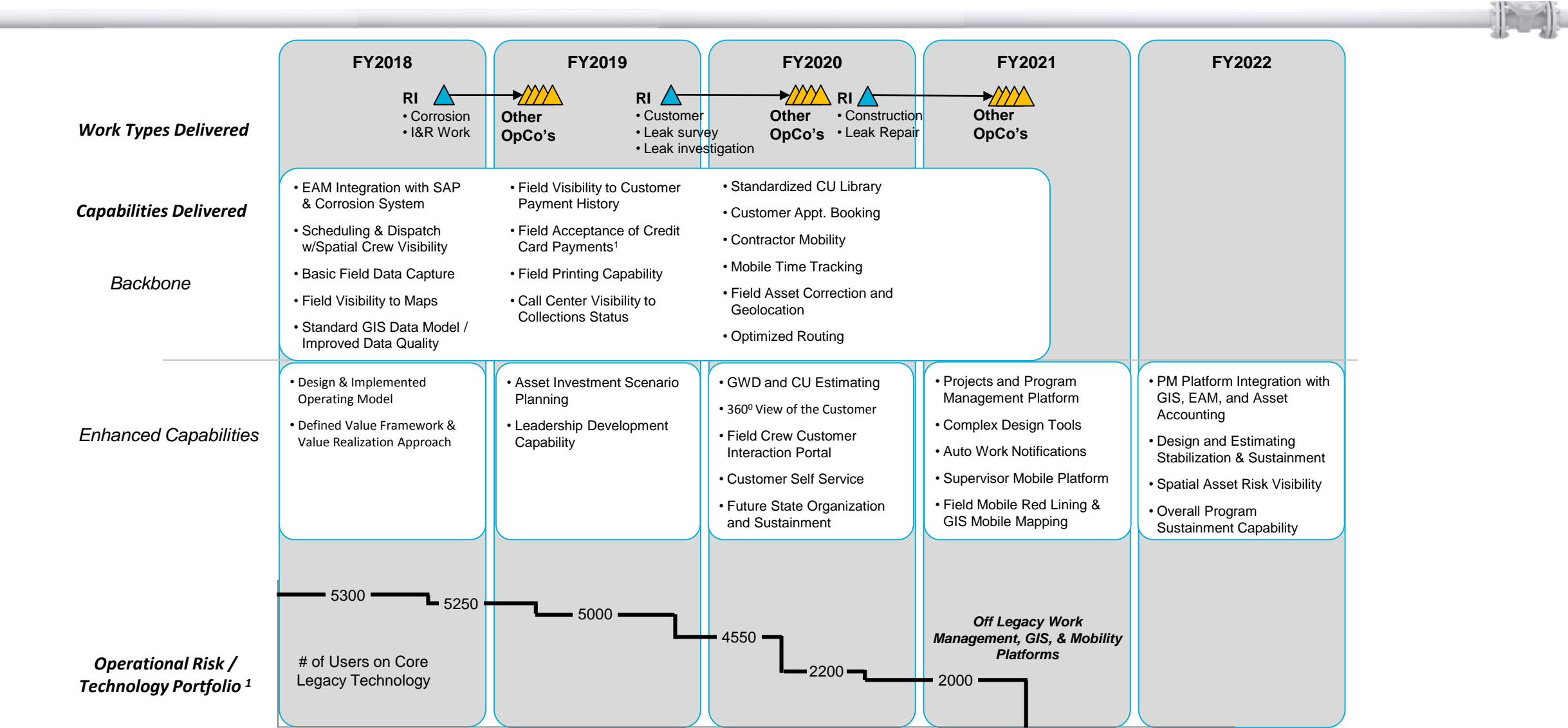
Customers will see a number of benefits:

- **Ability to Convert to Gas:** Increased ability to meet the demand for new gas connections and conversion requests reducing customer energy costs by approximately \$1,500 per year ¹
- **Customer Engagement Benefits:** Robust self-service platform will allow our customers to interact with us via the internet and avoid having to call the contact center and spend an average 5 minutes interacting per call; consolidated customer information to allow us to respond quickly and accurately to customer inquiries
- **Rate Benefits:** Reduction in O&M and increase in new gas customers results in downward pressure on rates
- **Reliability:** Delivery of our main replacement program (\$2Bln in FY18) enables us to reduce the number of leaks and potential outages our customers may face
- **Safety:** Reduction in leaks reduces the probability of a significant event occurrence improving public safety
- **Environmental:** Significant reduction in CO₂ emissions (44 pounds per BTU) by enabling customers to switch from oil heat to natural gas heat ²

¹ Mass DOER 2016/2017 Heating Season Costs

² Oil – 161.3 pounds per BTU, Natural Gas – 117 pounds per BTU; Source: https://www.eia.gov/environment/emissions/co2_vol_mass.cfm

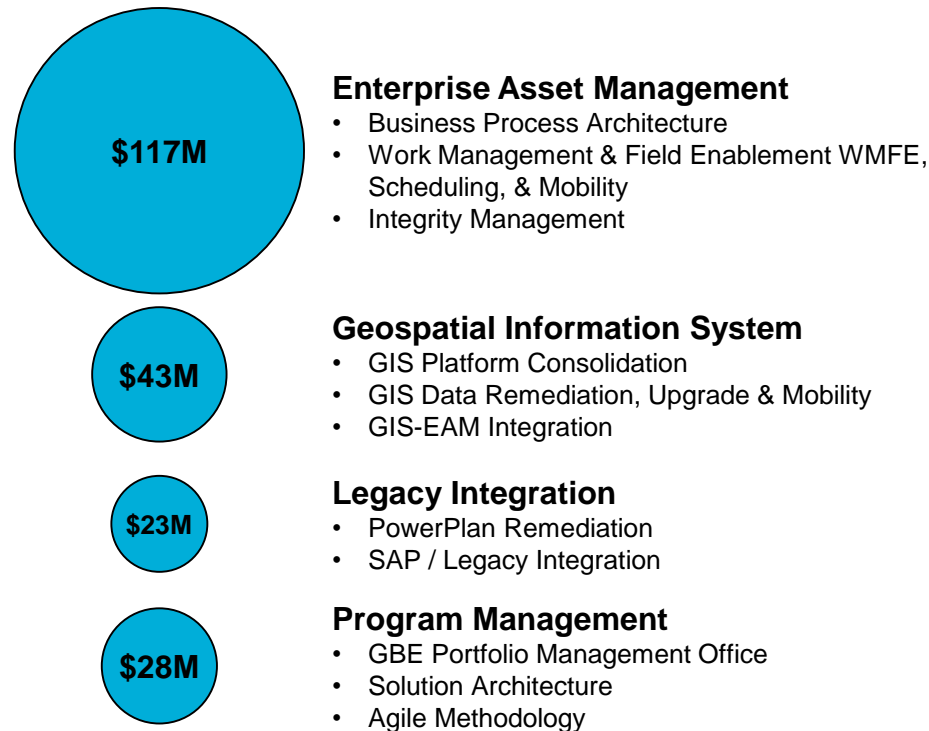
Backbone capabilities are delivered over three and a half years, prioritized to reduce operational risk and reduce the # of uses on legacy technology, with enhanced capabilities delivered in five years.



¹ Legacy backbone applications estimated to go from 42 out of 117 total applications currently to 6 out of 22 post implementation

The \$458M¹ investment includes \$211M for backbone capabilities, \$163M for enhanced capabilities, and \$84M for supporting investments.

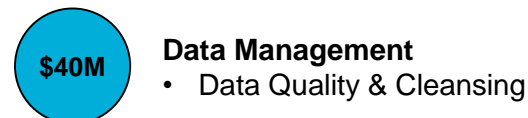
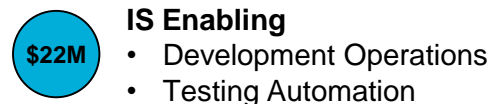
Backbone - \$211M
(\$273 Including IS and Data investments)



Enhanced Capabilities- \$163M
(\$185M including Tech Training Investments)

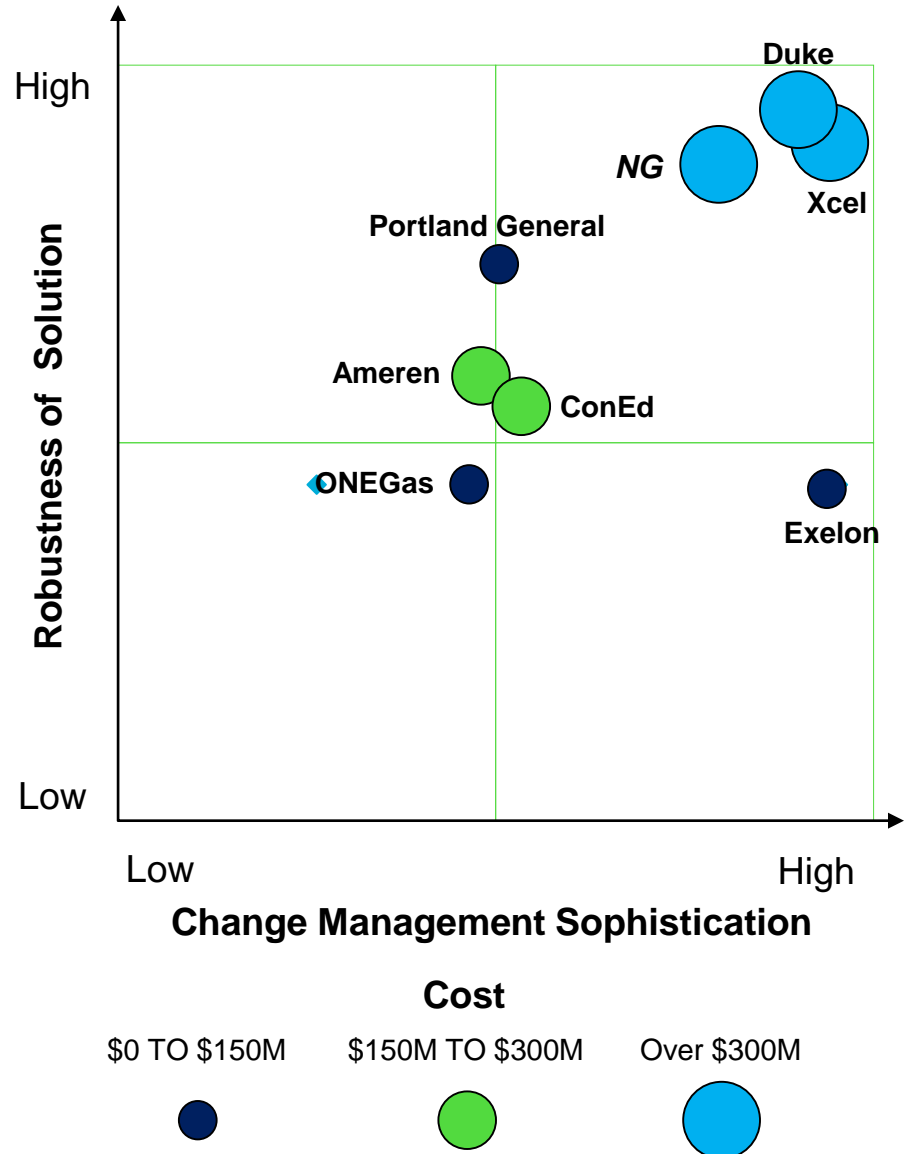


Supporting Investments- \$84M



¹ Investment does not include contingency of \$61M

The investment relative to the robustness of the proposed solution and change management sophistication is in line with other large programs.



Key Points

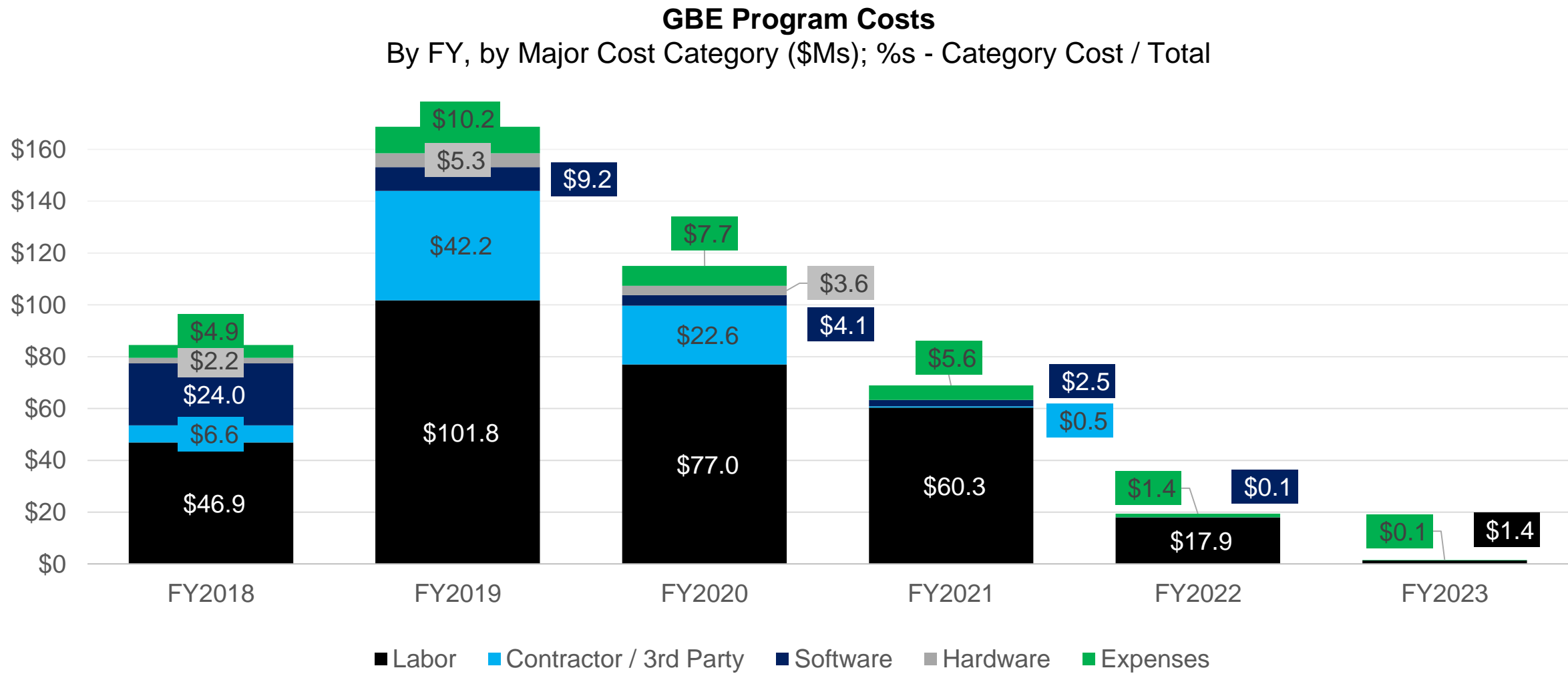
- Core Work and Asset Management with Mobility is a common denominator of the programs
- Duke Energy continues to integrate the acquisitions and has implemented all lines of business including Supply Chain, Generation, Gas and Electric onto a single instance/platform
- Xcel Energy has implemented the first major release for electric in Energy Supply; T&D Operations to follow in Summer 2017
- Portland General Electric is a consolidated platform built on standard processes
- Exelon is focused on merger integration and is more of a technical upgrade with less emphasis on standardization of processes
- ONE Gas standardized processes and platforms and change management was a minimalistic approach

The \$458M investment excludes estimated contingency of \$61M over the life of the program. ¹

Category & Initiative	FY18	FY19	FY20	FY21	FY22	FY23	Total
Backbone	(\$45,365)	(\$80,946)	(\$58,311)	(\$23,868)	(\$2,698)	\$0	(\$211,187)
Core EAM Platform	(\$23,006)	(\$46,599)	(\$32,882)	(\$13,576)	(\$1,135)	\$0	(\$117,199)
GIS	(\$6,569)	(\$18,689)	(\$14,105)	(\$3,528)	\$0	\$0	(\$42,890)
Legacy Integration	(\$10,055)	(\$6,991)	(\$3,579)	(\$2,161)	(\$548)	\$0	(\$23,334)
Program Management	(\$5,736)	(\$8,666)	(\$7,745)	(\$4,603)	(\$1,015)	\$0	(\$27,765)
Enhanced Capabilities	(\$16,094)	(\$63,968)	(\$37,989)	(\$33,177)	(\$10,924)	(\$669)	(\$162,821)
Advanced Asset Management	(\$2,544)	(\$4,187)	(\$6,936)	(\$12,660)	(\$943)	\$0	(\$27,270)
Advanced EAM Platform	(\$150)	(\$361)	(\$766)	(\$8,796)	(\$6,066)	\$0	(\$16,139)
Customer Experience & Interactions	(\$1,387)	(\$30,038)	(\$18,027)	(\$4,839)	(\$566)	\$0	(\$54,857)
Strategic Change, Talent, & Operating Model	(\$7,689)	(\$13,349)	(\$4,970)	(\$3,295)	(\$2,589)	(\$669)	(\$32,561)
Supply Chain	\$0	(\$9,104)	(\$1,748)	\$0	\$0	\$0	(\$10,852)
Legacy Integration	(\$1,300)	(\$2,613)	(\$1,504)	(\$765)	(\$137)	\$0	(\$6,319)
Program Management	(\$3,024)	(\$4,317)	(\$4,038)	(\$2,821)	(\$622)	\$0	(\$14,822)
Supporting Investments	(\$23,017)	(\$23,827)	(\$18,731)	(\$11,885)	(\$5,798)	(\$875)	(\$84,133)
Data Management	(\$14,481)	(\$8,122)	(\$7,152)	(\$6,870)	(\$3,658)	\$0	(\$40,283)
Regulatory/ Compliance	(\$3,900)	(\$10,500)	(\$7,100)	(\$500)	\$0	\$0	(\$22,000)
IS Enabling	(\$4,636)	(\$5,205)	(\$4,480)	(\$4,515)	(\$2,140)	(\$875)	(\$21,850)
Total Before Contingency	(\$84,476)	(\$168,741)	(\$115,032)	(\$68,930)	(\$19,419)	(\$1,544)	(\$458,141)
Contingency	(\$9,383)	(\$20,356)	(\$15,407)	(\$12,068)	(\$3,588)	(\$279)	(\$61,082)
Total	(\$93,859)	(\$189,097)	(\$130,438)	(\$80,998)	(\$23,007)	(\$1,823)	(\$519,223)

¹ Contingency equals 20% applied to program labor cost only

Labor and 3rd party contractor costs make up 82% of the total program cost.



NOTE: Labor cost is inclusive of the cost internal National Grid labor and external consulting / system integrator labor needed to deliver the program; an exercise in ongoing to determine how much of the internal National Grid labor has been included in the rate base and how much is incremental.

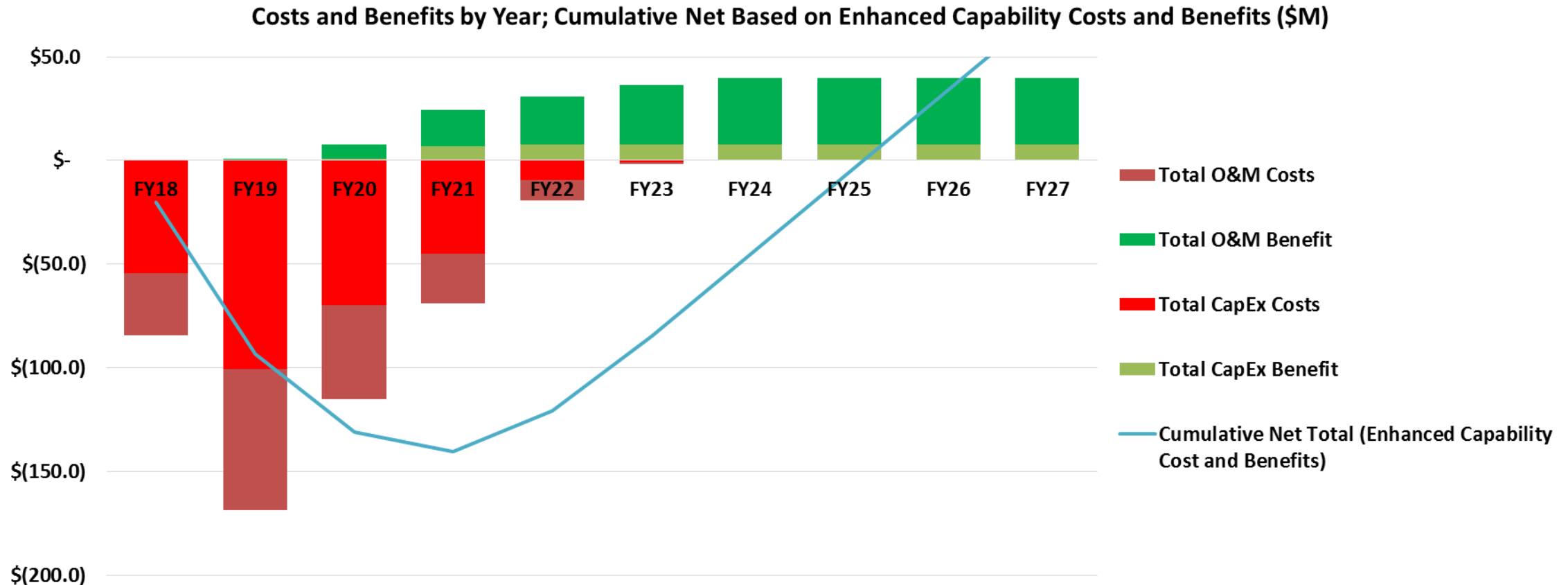
Ongoing run the business costs to support, maintain, and update the new platforms is \$22.3M.

Support Cost Category	FY18	FY19	FY20	FY21	FY22	FY23
Software License Maintenance/Subscriptions	\$ 1,085,149	\$ 3,396,499	\$ 7,933,079	\$ 10,851,487	\$ 10,851,487	\$ 10,851,487
Hardware License Maintenance / Mobile Subscriptions	\$ 516,033	\$ 1,615,176	\$ 3,772,506	\$ 5,160,330	\$ 5,160,330	\$ 5,160,330
Internal & External Labor	\$ -	\$ 2,817,960	\$ 5,635,920	\$ 5,635,920	\$ 5,635,920	\$ 5,635,920
Gas Business Enablement Support Cost	\$ 1,601,182	\$ 7,829,635	\$ 17,341,505	\$ 21,647,737	\$ 21,647,737	\$ 21,647,737
Reduction in Ongoing Legacy Application Support (Net of Any Increase)	\$ -	\$ 192,717	\$ 658,866	\$ 1,621,222	\$ 2,272,003	\$ 2,272,003
Incremental Gas Business Enablement Support Cost	\$ 1,895,961	\$ 8,559,572	\$ 18,837,649	\$ 22,974,305	\$ 22,323,525	\$ 22,323,525

Key Points

- Support costs ramp from FY18 to a steady state run rate of \$24.6M in FY21
- As a result of replacing a significant portion of the legacy application portfolio, existing ongoing legacy support would decrease by \$2.3M annually per year by FY22 offsetting the increase in new support costs
- Software License Maintenance / Subscriptions consists of Software as a Service (SaaS) support for the EAM, scheduling, mobility, IS development operations, visualization, and big data platforms
- Traditional license maintenance support model is utilized for the GIS, PowerPlan, and Copperleaf platforms as well as all other software packages implemented as part of the program
- Hardware License Maintenance / Mobile Subscriptions consist of traditional hardware license maintenance for those platforms not supported via a SaaS model (e.g., servers, mobile devices, etc.)
- Internal and external represent the National Grid IS and application maintenance provides required to support those platforms not supported via a SaaS model

Aligning the investment in enhanced capabilities against the benefits yields a break even in early FY26.



Key Points

- Full deployment of the advanced capabilities is assumed to occur in FY21; some capabilities will be deployed in FY22 but the major capabilities will have been deployed by end of FY21
- Break even point occurs within the first two months of FY26, representing a 4Y 2M payback period; key assumption - year 1 is FY22

The investment yields a 10 year NPV of ~\$100M assuming the life of the solutions implemented is 15 years driving recurring investment to sustain benefits.

Free Cash Flow

(\$000)		Type	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32
Opex Benefits																	
	Capacity Savings		-	-	1,242	6,990	7,814	8,486	8,722	8,722	8,722	8,722	8,722	8,722	8,722	8,722	8,722
	Compliance		-	876	5,070	9,577	13,254	16,739	19,406	19,406	19,406	19,406	19,406	19,406	19,406	19,406	19,406
	Spend Reduction		-	79	425	754	2,010	3,527	3,841	3,841	3,841	3,841	3,841	3,841	3,841	3,841	3,841
Total Opex Benefits			-	955	6,737	17,321	23,077	28,752	31,969	31,969	31,969	31,969	31,969	31,969	31,969	31,969	31,969
Opex Expenses																	
	Labor	Investment	(9,571)	(22,379)	(10,181)	(7,052)	(3,676)	(534)	-	-	-	-	-	-	-	-	-
	Contractor / 3rd Party	Investment	(3,150)	(10,152)	(6,823)	(500)	-	-	-	-	-	-	-	-	-	-	-
	Program Expenses	Investment	(1,101)	(2,389)	(833)	(465)	(262)	(21)	-	-	-	-	-	-	-	-	-
	SW / HW Support	Maintenance	-	(577)	(2,866)	(6,229)	(7,393)	(7,131)	(7,131)	(7,131)	(7,131)	(7,131)	(7,131)	(7,131)	(7,131)	(7,131)	(7,131)
Total Opex Expenses			(13,823)	(35,497)	(20,704)	(14,245)	(11,332)	(7,685)	(7,131)	(7,131)	(7,131)	(7,131)	(7,131)	(7,131)	(7,131)	(7,131)	(7,131)
EBITDA			(13,823)	(34,542)	(13,966)	3,076	11,746	21,067	24,838	24,838	24,838	24,838	24,838	24,838	24,838	24,838	24,838
Depreciation (Book, Net)			(179)	(1,324)	(2,084)	(2,629)	(2,611)	(2,393)	(2,171)	(1,949)	(1,728)	(1,506)	(1,284)	(1,063)	(841)	(619)	(397)
EBIT			(14,002)	(35,866)	(16,051)	447	9,135	18,674	22,667	22,889	23,111	23,332	23,554	23,776	23,998	24,219	24,441
Income Taxes			5,601	14,346	6,420	(179)	(3,654)	(7,470)	(9,067)	(9,156)	(9,244)	(9,333)	(9,422)	(9,510)	(9,599)	(9,688)	(9,776)
Net Income			(8,401)	(21,520)	(9,630)	268	5,481	11,205	13,600	13,733	13,866	13,999	14,132	14,265	14,399	14,532	14,665
Depreciation (Book, Net)			179	1,324	2,084	2,629	2,611	2,393	2,171	1,949	1,728	1,506	1,284	1,063	841	619	397
Net Capex			(6,171)	(39,484)	(26,217)	(18,783)	612	7,527	7,646	7,646	7,646	7,646	7,646	7,646	7,646	7,646	7,646
Deferred Income Taxes			281	2,335	5,001	5,963	5,616	4,033	2,915	2,293	1,335	94	(899)	(1,529)	(1,704)	(1,753)	(1,801)
Free Cash Flow			\$ (14,112)	\$ (57,345)	\$ (28,762)	\$ (9,923)	\$ 14,320	\$ 25,157	\$ 26,333	\$ 25,622	\$ 24,575	\$ 23,246	\$ 22,164	\$ 21,445	\$ 21,182	\$ 21,044	\$ 20,907

NPV

3-year	\$16,004
5-year	\$41,427
10-year	\$99,389

Terminal Value Calculation

Average 15 Year Cash Flows*	\$ 9,057
Cost/Benefit Growth Rate**	2.00%
Rate of Return	9.98%
Terminal Value	\$ 113,495

* Terminal value average cash flows assumes the solution will need to be replaced every 15 years to maintain the benefit stream; terminal value annual cash flow is the average annual free cash flow over the 15 year period from FY18 to FY32

** Growth rate is equivalent to the rate of inflation

Appendix



Key business case assumptions and inputs.

Rates

External

Application Maintenance Provider Onshore	\$3,800
Application Maintenance Provider Offshore	\$1,600
Business/Management Consultant Onshore	\$2,315
Business/Management Consultant Offshore	\$1,240
System Integrator Onshore	\$1,680
System Integrator Offshore	\$390
NOTE: External rates have an annual 3% escalation	

Internal

Client Executive Onshore	\$1,430
Client Business – Non-Executive Onshore	\$908
Client IS – Non-Executive Onshore	\$880
NOTE: Internal rates have an annual 2% escalation	

Expenses

- 17% on External / Onshore Labor
- 10% on National Grid Labor

NOTE: Client rates inclusive of 10% expenses; external rates exclude expenses

Contingency

20% contingency added to labor

General Operating Company Allocator

New York	30.10%
New York	21.55%
New York	12.44%
Massachusetts	23.29%
Massachusetts	5.21%
Rhode Island	7.41%

NOTE: General allocator used for costs and some benefits

Days / Horus

Days Per Month	20
Hours Per Day	8
Hours Per Month	160

Benefits

Lag Period

Lag period defined as the time between deployment of a capability (e.g., system, process, etc.) and the time benefits start to be achieved. Benefit lag period can be 3, 6, or 9 months depending on the type of benefits.

Ramp

Ramp defined as the time benefits start to be achieved to the time benefits are at full steady state run rate. Ramps can be 0 months (e.g., benefits realized immediately) to 36 months and like lag period, depends on the type of benefits.

Options, investment, financial benefits, and payback

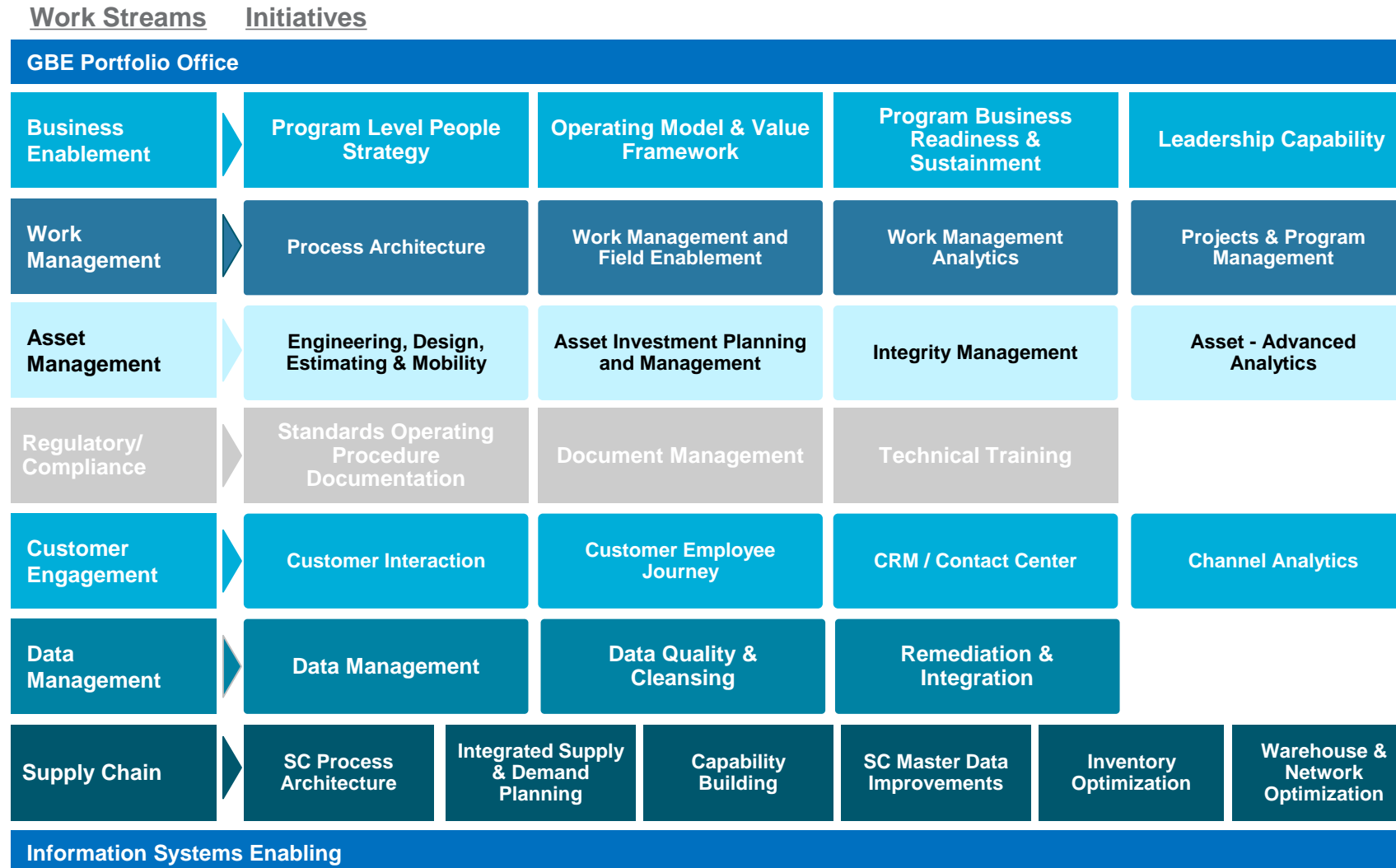
<u>Option</u>	<u>Investment</u>	<u>Financial Benefits</u>	<u>Payback</u>
1 Tech Stabilization	\$15M to \$20M	None	N/A ¹
2 Like for Like Replacement	\$174M	None	N/A ¹
3 Backbone Only	\$273M	None	N/A ¹
4 Value Oriented – Jurisdiction Deployment	\$458M ○ Enhanced Capabilities: \$185M	\$39.6M	4Y 4M ²
5 Value Oriented – Accelerated Deployment	\$466M ○ Enhanced Capabilities: \$193M	\$39.6M	4Y 2M ²

¹ No payback analysis completed as capabilities that drive value (e.g., enhanced capabilities) are not being implemented in these three options

² Payback based on the implementation of enhanced capabilities that drive value; the start of payback assumed to be Year 5 which is the full deployment of the enhanced capabilities; payback calculation = enhanced capability cost / enhanced capability benefits



Work streams and initiatives



Cost by initiative category and backbone, enhanced capabilities, and supporting investments

Initiative Category	Backbone \$Ms	Enhanced Capabilities \$Ms	Supporting Investments \$Ms	Total Cost \$Ms ^{1, 2}	% of Total Investment
Advanced Asset Management		\$27		\$27	6%
Advanced EAM Platform		\$16		\$16	4%
Core EAM Platform	\$117			\$117	26%
Customer Experience & Interactions		\$55		\$55	12%
Data Management			\$40	\$40	9%
Field Technical Training	\$43			\$43	9%
GIS			\$22	\$22	5%
IS Enabling	\$23	\$6		\$30	6%
Legacy Integration	\$28	\$15		\$43	9%
Program Management			\$22	\$22	5%
Strategic Change, Talent, & Operating Model		\$33		\$33	7%
Supply Chain		\$11		\$11	2%
Total before Contingency	\$211	\$163	\$84	\$458	100%
% of Total	46%	36%	18%		
Contingency				\$61	
Total				\$519	

¹ Costs include expenses (17% external, onshore labor cost; 10% internal labor costs); cost includes HW/SW)

² Average Daily Rates: NG - \$845; External - \$1,001 (External Onshore - \$1,711; External Offshore - \$326)

³ Contingency equals 20% applied to labor cost only; not applied to support (RTB) costs

Cost by operating company, capex / opex (\$000s)

CapEx Cost Incurred	FY18	FY19	FY20	FY21	FY22	FY23	Total ^{1,2}
Brooklyn Union Gas (KEDNY)	(\$16,341)	(\$30,265)	(\$21,051)	(\$13,567)	(\$2,896)	(\$222)	\$ (84,342)
Keyspan Gas East (KEDLI)	(\$11,699)	(\$21,668)	(\$15,071)	(\$9,713)	(\$2,073)	(\$159)	\$ (60,384)
NiagraMohawk Gas	(\$6,753)	(\$12,508)	(\$8,700)	(\$5,607)	(\$1,197)	(\$92)	\$ (34,857)
Boston Gas	(\$12,644)	(\$23,418)	(\$16,288)	(\$10,498)	(\$2,240)	(\$172)	\$ (65,260)
Colonial Gas	(\$2,828)	(\$5,239)	(\$3,644)	(\$2,348)	(\$501)	(\$38)	\$ (14,599)
Narragansett Gas	(\$4,023)	(\$7,451)	(\$5,182)	(\$3,340)	(\$713)	(\$55)	\$ (20,763)
Total:	\$ (54,288)	\$ (100,549)	\$ (69,937)	\$ (45,073)	\$ (9,620)	\$ (738)	\$ (280,205)

Opex Cost Incurred	FY18	FY19	FY20	FY21	FY22	FY23	Total ^{1,2}
Brooklyn Union Gas (KEDNY)	(\$9,086)	(\$20,526)	(\$13,573)	(\$7,181)	(\$2,950)	(\$243)	\$ (53,559)
Keyspan Gas East (KEDLI)	(\$6,505)	(\$14,695)	(\$9,718)	(\$5,141)	(\$2,112)	(\$174)	\$ (38,345)
NiagraMohawk Gas	(\$3,755)	(\$8,483)	(\$5,610)	(\$2,968)	(\$1,219)	(\$100)	\$ (22,135)
Boston Gas	(\$7,031)	(\$15,882)	(\$10,502)	(\$5,556)	(\$2,282)	(\$188)	\$ (41,441)
Colonial Gas	(\$1,573)	(\$3,553)	(\$2,349)	(\$1,243)	(\$511)	(\$42)	\$ (9,270)
Narragansett Gas	(\$2,237)	(\$5,053)	(\$3,341)	(\$1,768)	(\$726)	(\$60)	\$ (13,185)
Total:	\$ (30,188)	\$ (68,192)	\$ (45,094)	\$ (23,857)	\$ (9,800)	\$ (806)	\$ (177,936)

Total Cost Incurred	FY18	FY19	FY20	FY21	FY22	FY23	Total ^{1,2}
Brooklyn Union Gas (KEDNY)	(\$25,427)	(\$50,791)	(\$34,624)	(\$20,748)	(\$5,845)	(\$465)	\$ (137,901)
Keyspan Gas East (KEDLI)	(\$18,204)	(\$36,364)	(\$24,789)	(\$14,854)	(\$4,185)	(\$333)	\$ (98,729)
NiagraMohawk Gas	(\$10,509)	(\$20,991)	(\$14,310)	(\$8,575)	(\$2,416)	(\$192)	\$ (56,993)
Boston Gas	(\$19,674)	(\$39,300)	(\$26,791)	(\$16,054)	(\$4,523)	(\$360)	\$ (106,701)
Colonial Gas	(\$4,401)	(\$8,791)	(\$5,993)	(\$3,591)	(\$1,012)	(\$80)	\$ (23,869)
Narragansett Gas	(\$6,260)	(\$12,504)	(\$8,524)	(\$5,108)	(\$1,439)	(\$114)	\$ (33,948)
Total:	\$ (84,476)	\$ (168,741)	\$ (115,032)	\$ (68,930)	\$ (19,419)	\$ (1,544)	\$ (458,141)

¹ Costs include expenses (17% external, onshore labor cost; 10% internal labor costs); cost includes HW/SW)

² Average Daily Rates: NG - \$845; External - \$1,001 (External Onshore - \$1,711; External Offshore - \$326)

Capex / opex benefit splits

Job Category	CapEx	O&M	Notes
Analysts	15%	85%	Assume some work performed as part of capital program
CMS Clerk (Electric and Gas)	10%	90%	FY18 CMS workplan; assume same split as field worker
CMS Field Worker - Other CMS (Electric and Gas)	10%	90%	FY18 CMS workplan
CMS Field Worker - Collections (Electric and Gas)	0%	100%	FY18 CMS workplan
CMS Field Worker - Meter Verifications (Electric and Gas)	0%	100%	FY18 CMS workplan
CMS Field Supervisor (Electric and Gas)	5%	95%	Assume less capex than field worker as some administrative work charged as O&M
Dispatcher	10%	90%	FY18 CMS workplan split
Dispatch Supervisor	5%	95%	Assumed less capex than dispatcher as some administrative work charges as O&M
Engineer – AM	30%	70%	NG Finance
Engineer / Designer – Systems Engineering	70%	30%	NG Finance
Mapper	70%	30%	NG Finance
Field Ops Field Worker (M&C)	45%	55%	Based on FY17 OT report with base and OT hours and \$ (Feb through April)
Field Ops Field Worker (I&R)	13%	87%	Based on FY17 OT report with base and OT hours and \$ (Feb through April)
Field Ops Field Worker (Corrosion)	13%	87%	Based on FY17 OT report with base and OT hours and \$ (Feb through April)
Field Ops Field Worker (Damage Prevention)	19%	81%	Based on FY17 OT report with base and OT hours and \$ (Feb through April)
Field Ops Supervisor (PM&CC)	71%	29%	Based on FY17 OT report with base and OT hours and \$ (Feb through April)
Field Ops Supervisor (All)	32%	68%	Based on FY17 OT report with base and OT hours and \$ (Feb through April) – average of all work
Field Ops Support (Coordinator)	32%	68%	Assume same as supervisor – average of all work
Field Ops Support (Clerk)	32%	68%	Assume same as supervisor – average of all work
QA/QC Inspector	0%	100%	Based on type of work
Project Manager	71%	29%	Based on type of work – PM&CC
Call Center Rep	0%	100%	Based on type of work
Material Handler / Stock Clerk	0%	100%	Based on type of work
Materials	87%	13%	Based on category
Inventory Carrying Cost	0%	100%	Based on category
Inventory Write Offs	0%	100%	Based on category
Fleet Operating Cost	0%	100%	Based on category; includes mileage, minor maintenance and parts
Alliance Contractor Spend (Capital Projects)	90%	10%	Based on category

Capex / opex cost splits by initiative (1 of 2)

Initiatives	Releases	CapEx	Opex
Gas Business Enablement Portfolio Management Office AIPM	Portfolio Management Leadership	0%	100%
	Asset Analytics Integration	100%	0%
	EAM-FIN Integration	100%	0%
	Enhancements	95%	5%
	GIS (GWD/CU) - PPM Integration	100%	0%
AM Program Leadership	AM Program Leadership	0%	100%
Asset - Advanced Analytics	Use Case No.1 - Asset Risk	95%	5%
Business Architecture Design	Business Architecture Design	80%	20%
Customer Experience Program Leadership	Customer Experience Program Leadership	0%	100%
Customer Interaction	Customer Interaction	95%	5%
	CxT Portal & Channel Management	95%	5%
	Large Commercial & Landlord Interaction	95%	5%
	Building An Advanced Analytics Capability	0%	100%
	Building Score Cards & Metrics Capability	0%	100%
Data Management	Data Enrichment Through Record Digitization	0%	100%
	Data Management Implementation (Quality & Cleansing)	0%	100%
	Enable the Data Archive Process	90%	10%
	Pre GBE Deployment & Data Profiling	0%	100%
	Data Governance Assessment & Implementation	0%	100%
Enabling Capabilities	Data Management & Governance Program Leadership	0%	100%
	Comprehensive Integration Services (Enhancements)	100%	0%
	Development Operations & BPA Enablement	80%	20%
	IS Operating Model (Delivery / Support, Run)	0%	100%
	Security Enhancements (CASB, MDM)	100%	0%
Engineering, Design, Estimating & Mobility	Testing Center of Excellence	80%	20%
	Complex Design (CAD) & Estimating (ESW)	90%	10%
	GIS Upgrade/ Migration & GIS Mobility	95%	5%
	GIS Data Remediation	0%	100%
	Design & Estimating Process Stabilization	0%	100%
Integrity Management	Design (GWD), Estimating (CU), & Mobility	90%	10%
	GIS-EAM Integration	100%	0%
	Additional IM Modules	90%	10%
	Integrity Management Integrations	100%	0%
	Pressure Reg Station (Prelim Work)	0%	100%
Integrated Supply & Demand Planning	Risk Management (Tx Mains & Dx Mains)	90%	10%
	Construction Planning	0%	100%
	Maintenance & Inspection Planning	0%	100%
	Program and Project Management Planning	0%	100%
	Integrated Supply Feasibility Assessment	0%	100%
Integrated Supply Feasibility Evaluation and Strategy	Inventory Optimization	0%	100%
Inventory Optimization	Inventory Strategy	0%	100%
Operating Model & Value Framework	Business Architecture - Organization Design & Transition	0%	100%
	Operations Performance, Governance & Value Realization	0%	100%
	Skills/ Capability Assessment & Curriculum Redesign	0%	100%
	Future State Culture Definition	0%	100%
	Leadership Capability Development	0%	100%

Capex / opex cost splits by initiative (2 of 2)

Initiatives	Releases	CapEx	Opex
Program Business Readiness & Sustainment	Program Business Readiness	0%	100%
	Program Business Sustainment	0%	100%
	Knowledge Transition & Collaboration Strategy	0%	100%
Program Level People Strategy	Program Learning Management	25%	75%
	Program Transformational Change Office	15%	85%
	Workforce Strategy Planning & Implementation Support	0%	100%
	Labor Contract Strategy & Implementation Support	0%	100%
Projects & Program Management Remediation & Integration	Core Projects & Program Management	90%	10%
	Powerplan Remediation	90%	10%
	SAP and Application Integration Development- Release 1	100%	0%
	SAP and Application Integration Development- Release 2	100%	0%
	SAP and Application Integration Development- Release 3	100%	0%
Regulatory/ Compliance	Technical Training	14%	86%
SC - Business Architecture Design	SC - Business Architecture Design	0%	100%
Structured Experiences	Customer & Employee Journey Mobilization	0%	100%
Supply Chain Master Data Improvements	Data Cleansing Execution	0%	100%
	Defined Data Cleansing Approach	0%	100%
	Supply Chain Program Leadership	0%	100%
Supply Chain Program Leadership Supporting through Data	Campaign Management	0%	100%
	Channel Analytics	0%	100%
	Solution Architects & Agile Coaches	90%	10%
Solution Architects & Agile Coaches Support Interaction	CRM / Contact Center	95%	5%
	Employee Support Interaction	95%	5%
	Application (Environment) Infrastructure	100%	0%
Technology Initiatives	Mobility CoE & End-User Computing	100%	0%
	Network Enhancements	100%	0%
	Operations/System Monitoring	95%	5%
WMFE Program Leadership	WMFE Program Leadership	0%	100%
Work Management & Field Enablement	Company Driven Work: Collections and non-Appointment Offs	90%	10%
	Construction Work & Leak Repair	90%	10%
	Corrosion and I&R Work	90%	10%
	CU Governance & Library - process	90%	10%
	Customer, Leak Investigation & Inspections	90%	10%
	PowerPlan Integration & Enhancements	90%	10%
	WMFE Optimization	90%	10%
	Work Forecasting & Planning - solution	90%	10%
	Networking Transportation & Optimization Analysis	0%	100%
	Networking Transportation & Optimization Implementation	0%	100%
	Warehousing Optimization	0%	100%
Warehousing and Network Optimization			

Benefit types

Type	Description	Examples
Type 1	<ul style="list-style-type: none"> Have a direct and certain impact on bottom line and there is a clear cause and effect relationship between the project and benefit. Direct P&L impact Is a permanent reduction in costs / assets or increased revenue Stated in dollars (\$) 	<ul style="list-style-type: none"> Reduction in labor Scrap or Material reductions Inventory reduction Incremental sales
Type 2	<ul style="list-style-type: none"> Not a direct and immediate bottom line impact Consists of expenses re-assigned, resources freed up or future cost avoidance Often stated in terms such as “5 person-days freed up”, etc. 	<ul style="list-style-type: none"> Existing resources (capital or human) are re-assigned Future resource (capital or human) requirements are reduced because of process improvements Space requirements are reduced but we are unable to vacate the building
Type 3	<ul style="list-style-type: none"> Difficult to establish a clear cause and effect relationship to the bottom line Typically operational / non-financial savings Typically stated in units specific to the benefit (e.g. SAIFI) 	<ul style="list-style-type: none"> Safety Customer satisfaction and loyalty Employee engagement Mandatory statutory requirements

Annual benefits by category, capex / opex, and type

Area	Threshold Benefit
Customer Experience & Interactions	Total \$4.5
	CapEx: \$0.0
	Opex: \$4.5
	Type 1: \$0.6
	Type 2: \$3.9
Asset Management	Total \$4.1
	CapEx: \$1.0
	Opex: \$3.1
	Type 1: \$2.0
	Type 2: \$2.1
EAM / Work Management Platform	Total \$14.9
	CapEx: \$6.4
	Opex: \$8.5
	Type 1: \$1.8
	Type 2: \$13.1
Supply Chain	Total \$2.5
	CapEx: \$2.2
	Opex: \$0.3
	Type 1: \$0.0
	Type 2: \$2.5
Field Technical Training	Total \$13.5
	CapEx: \$0.0
	Opex: \$13.5
	Type 1: \$0.0
	Type 2: \$13.5
Totals	Total \$39.6
	CapEx: \$9.7
	Opex: \$29.9
	Type 1: \$4.4
	Type 2: \$35.2

Cost by Initiative, capex / opex (000's)

Category & Initiative	Total Cost	Total CapEx Cost	CapEx as % of Total	Total O&M Cost	O&M as % of Total
Backbone	(\$211,187)	(\$151,315)	54%	(\$59,872)	34%
Core EAM Platform	(\$117,199)	(\$102,750)	37%	(\$14,448)	8%
Business Architecture Design	(\$3,755)	(\$3,004)	1%	(\$751)	0%
WMFE Program Leadership	(\$5,201)	\$0	0%	(\$5,201)	3%
Work Management & Field Enablement	(\$98,148)	(\$90,340)	32%	(\$7,808)	4%
Data Management	(\$2,422)	(\$2,179)	1%	(\$242)	0%
Enabling Capabilities	(\$79)	(\$79)	0%	\$0	0%
Integrity Management	(\$4,333)	(\$3,916)	1%	(\$417)	0%
Technology Initiatives	(\$3,262)	(\$3,232)	1%	(\$29)	0%
GIS	(\$42,890)	(\$19,131)	7%	(\$23,760)	13%
AM Program Leadership	(\$2,804)	\$0	0%	(\$2,804)	2%
Engineering, Design, Estimating & Mobility	(\$40,086)	(\$19,131)	7%	(\$20,956)	12%
Legacy Integration	(\$23,334)	(\$22,825)	8%	(\$509)	0%
Remediation & Integration	(\$23,334)	(\$22,825)	8%	(\$509)	0%
Program Management	(\$27,765)	(\$6,609)	2%	(\$21,156)	12%
Gas Business Enablement Portfolio Management Office	(\$20,378)	\$0	0%	(\$20,378)	11%
Solution Architects & Agile Coaches	(\$7,387)	(\$6,609)	2%	(\$778)	0%
Performance	(\$162,821)	(\$96,673)	35%	(\$66,148)	37%
Advanced Asset Management	(\$27,270)	(\$23,091)	8%	(\$4,179)	2%
AM Program Leadership	(\$1,948)	\$0	0%	(\$1,948)	1%
AIPM	(\$7,109)	(\$7,048)	3%	(\$61)	0%
Asset - Advanced Analytics	(\$3,898)	(\$3,703)	1%	(\$195)	0%
Engineering, Design, Estimating & Mobility	(\$14,314)	(\$12,340)	4%	(\$1,974)	1%
Advanced EAM Platform	(\$16,139)	(\$13,634)	5%	(\$2,505)	1%
WMFE Program Leadership	(\$991)	\$0	0%	(\$991)	1%
Projects & Program Management	(\$4,756)	(\$4,281)	2%	(\$476)	0%
Work Management & Field Enablement	(\$10,392)	(\$9,353)	3%	(\$1,039)	1%
Customer Experience & Interactions	(\$54,857)	(\$47,913)	17%	(\$6,945)	4%
Customer Experience Program Leadership	(\$2,919)	\$0	0%	(\$2,919)	2%
Customer Interaction	(\$21,754)	(\$20,666)	7%	(\$1,088)	1%
Structured Experiences	(\$1,387)	\$0	0%	(\$1,387)	1%
Support Interaction	(\$28,681)	(\$27,247)	10%	(\$1,434)	1%
Supporting through Data	(\$117)	\$0	0%	(\$117)	0%
Strategic Change, Talent, & Operating Model	(\$32,561)	(\$3,578)	1%	(\$28,983)	16%
Operating Model & Value Framework	(\$10,239)	\$0	0%	(\$10,239)	6%
Program Business Readiness & Sustainment	(\$7,283)	\$0	0%	(\$7,283)	4%
Program Level People Strategy	(\$15,040)	(\$3,578)	1%	(\$11,461)	6%
Supply Chain	(\$10,852)	\$0	0%	(\$10,852)	6%
Legacy Integration	(\$6,319)	(\$6,319)	2%	\$0	0%
Remediation & Integration	(\$6,319)	(\$6,319)	2%	\$0	0%
Program Management	(\$14,822)	(\$2,138)	1%	(\$12,684)	7%
Gas Business Enablement Portfolio Management Office	(\$12,490)	\$0	0%	(\$12,490)	7%
Solution Architects & Agile Coaches	(\$2,333)	(\$2,138)	1%	(\$194)	0%
Supporting Investments	(\$84,133)	(\$32,217)	11%	(\$51,916)	29%
Data Management	(\$40,283)	(\$11,100)	4%	(\$29,183)	16%
Regulatory/ Compliance	(\$22,000)	(\$3,000)	1%	(\$19,000)	11%
IS Enabling	(\$21,850)	(\$18,117)	6%	(\$3,734)	2%
Enabling Capabilities	(\$18,186)	(\$14,452)	5%	(\$3,734)	2%
Technology Initiatives	(\$3,665)	(\$3,665)	1%	\$0	0%
Total	(\$458,141)	(\$280,205)	61%	(\$177,936)	39%

Cost by initiative, year over year (000's)

Category & Initiative	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	Total
Backbone	(\$45,365)	(\$80,946)	(\$58,311)	(\$23,868)	(\$2,698)	\$0	(\$211,187)
Core EAM Platform	(\$23,006)	(\$46,599)	(\$32,882)	(\$13,576)	(\$1,135)	\$0	(\$117,199)
Business Architecture Design	(\$3,755)	\$0	\$0	\$0	\$0	\$0	(\$3,755)
WMFE Program Leadership	(\$786)	(\$1,894)	(\$1,999)	(\$521)	\$0	\$0	(\$5,201)
Work Management & Field Enablement	(\$13,235)	(\$40,756)	(\$29,967)	(\$13,055)	(\$1,135)	\$0	(\$98,148)
Data Management	\$0	(\$2,347)	(\$75)	\$0	\$0	\$0	(\$2,422)
Enabling Capabilities	(\$79)	\$0	\$0	\$0	\$0	\$0	(\$79)
Integrity Management	(\$2,476)	(\$1,015)	(\$841)	\$0	\$0	\$0	(\$4,333)
Technology Initiatives	(\$2,674)	(\$587)	\$0	\$0	\$0	\$0	(\$3,262)
GIS	(\$6,569)	(\$18,689)	(\$14,105)	(\$3,528)	\$0	\$0	(\$42,890)
AM Program Leadership	(\$654)	(\$941)	(\$964)	(\$245)	\$0	\$0	(\$2,804)
Engineering, Design, Estimating & Mobility	(\$5,915)	(\$17,748)	(\$13,141)	(\$3,282)	\$0	\$0	(\$40,086)
Legacy Integration	(\$10,055)	(\$6,991)	(\$3,579)	(\$2,161)	(\$548)	\$0	(\$23,334)
Remediation & Integration	(\$10,055)	(\$6,991)	(\$3,579)	(\$2,161)	(\$548)	\$0	(\$23,334)
Program Management	(\$5,736)	(\$8,666)	(\$7,745)	(\$4,603)	(\$1,015)	\$0	(\$27,765)
Gas Business Enablement Portfolio Management Office	(\$4,082)	(\$5,318)	(\$5,360)	(\$4,603)	(\$1,015)	\$0	(\$20,378)
Solution Architects & Agile Coaches	(\$1,654)	(\$3,348)	(\$2,385)	\$0	\$0	\$0	(\$7,387)
Performance	(\$16,094)	(\$63,968)	(\$37,989)	(\$33,177)	(\$10,924)	(\$669)	(\$162,821)
Advanced Asset Management	(\$2,544)	(\$4,187)	(\$6,936)	(\$12,660)	(\$943)	\$0	(\$27,270)
AM Program Leadership	(\$454)	(\$654)	(\$670)	(\$170)	\$0	\$0	(\$1,948)
AIPM	(\$2,089)	(\$1,612)	(\$799)	(\$2,609)	\$0	\$0	(\$7,109)
Asset - Advanced Analytics	\$0	\$0	\$0	(\$3,780)	(\$118)	\$0	(\$3,898)
Engineering, Design, Estimating & Mobility	\$0	(\$1,921)	(\$5,467)	(\$6,100)	(\$825)	\$0	(\$14,314)
Advanced EAM Platform	(\$150)	(\$361)	(\$766)	(\$8,796)	(\$6,066)	\$0	(\$16,139)
WMFE Program Leadership	(\$150)	(\$361)	(\$381)	(\$59)	\$0	\$0	(\$991)
Projects & Program Management	\$0	\$0	\$0	(\$3,482)	(\$1,274)	\$0	(\$4,756)
Work Management & Field Enablement	\$0	\$0	(\$385)	(\$5,215)	(\$4,792)	\$0	(\$10,392)
Customer Experience & Interactions	(\$1,387)	(\$30,038)	(\$18,027)	(\$4,839)	(\$566)	\$0	(\$54,857)
Customer Experience Program Leadership	\$0	(\$1,041)	(\$1,065)	(\$813)	\$0	\$0	(\$2,919)
Customer Interaction	\$0	(\$8,922)	(\$8,664)	(\$3,601)	(\$566)	\$0	(\$21,754)
Structured Experiences	(\$1,387)	\$0	\$0	\$0	\$0	\$0	(\$1,387)
Support Interaction	\$0	(\$20,075)	(\$8,298)	(\$308)	\$0	\$0	(\$28,681)
Supporting through Data	\$0	\$0	\$0	(\$117)	\$0	\$0	(\$117)
Strategic Change, Talent, & Operating Model	(\$7,689)	(\$13,349)	(\$4,970)	(\$3,295)	(\$2,589)	(\$669)	(\$32,561)
Operating Model & Value Framework	(\$3,660)	(\$5,683)	(\$722)	(\$173)	\$0	\$0	(\$10,239)
Program Business Readiness & Sustainment	(\$526)	(\$2,125)	(\$1,127)	(\$1,352)	(\$1,685)	(\$469)	(\$7,283)
Program Level People Strategy	(\$3,503)	(\$5,541)	(\$3,122)	(\$1,770)	(\$904)	(\$200)	(\$15,040)
Supply Chain	\$0	(\$9,104)	(\$1,748)	\$0	\$0	\$0	(\$10,852)
Legacy Integration	(\$1,300)	(\$2,613)	(\$1,504)	(\$765)	(\$137)	\$0	(\$6,319)
Remediation & Integration	(\$1,300)	(\$2,613)	(\$1,504)	(\$765)	(\$137)	\$0	(\$6,319)
Program Management	(\$3,024)	(\$4,317)	(\$4,038)	(\$2,821)	(\$622)	\$0	(\$14,822)
Gas Business Enablement Portfolio Management Office	(\$2,502)	(\$3,260)	(\$3,285)	(\$2,821)	(\$622)	\$0	(\$12,490)
Solution Architects & Agile Coaches	(\$522)	(\$1,057)	(\$753)	\$0	\$0	\$0	(\$2,333)
Supporting Investments	(\$23,017)	(\$23,827)	(\$18,731)	(\$11,885)	(\$5,798)	(\$875)	(\$84,133)
Data Management	(\$14,481)	(\$8,122)	(\$7,152)	(\$6,870)	(\$3,658)	\$0	(\$40,283)
Regulatory/ Compliance	(\$3,900)	(\$10,500)	(\$7,100)	(\$500)	\$0	\$0	(\$22,000)
IS Enabling	(\$4,636)	(\$5,205)	(\$4,480)	(\$4,515)	(\$2,140)	(\$875)	(\$21,850)
Enabling Capabilities	(\$4,031)	(\$4,284)	(\$3,448)	(\$3,563)	(\$1,985)	(\$875)	(\$18,186)
Technology Initiatives	(\$605)	(\$921)	(\$1,032)	(\$953)	(\$155)	\$0	(\$3,665)
Total	(\$84,476)	(\$168,741)	(\$115,032)	(\$68,930)	(\$19,419)	(\$1,544)	(\$458,141)

Cost detail by category, capex / opex (000's)

Cost Category	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	Total
O&M	(\$30,188)	(\$68,192)	(\$45,094)	(\$23,857)	(\$9,800)	(\$806)	(\$177,936)
Labor	(\$21,549)	(\$43,893)	(\$29,445)	(\$22,031)	(\$9,313)	(\$755)	(\$126,988)
External	(\$12,801)	(\$25,814)	(\$13,137)	(\$8,849)	(\$3,398)	(\$312)	(\$64,310)
OnShore	(\$12,284)	(\$23,217)	(\$11,918)	(\$7,797)	(\$2,860)	(\$301)	(\$58,376)
Application Maintenance Provider	(\$15)	(\$95)	(\$12)	(\$12)	\$0	\$0	(\$135)
Business / Management Consultant	(\$8,557)	(\$17,494)	(\$7,695)	(\$4,009)	(\$1,442)	(\$161)	(\$39,358)
System Integrator	(\$3,712)	(\$5,628)	(\$4,210)	(\$3,776)	(\$1,418)	(\$140)	(\$18,883)
OffShore	(\$517)	(\$2,597)	(\$1,219)	(\$1,052)	(\$538)	(\$11)	(\$5,935)
Application Maintenance Provider	\$0	(\$20)	\$0	\$0	\$0	\$0	(\$20)
Business / Management Consultant	(\$74)	(\$766)	\$0	\$0	\$0	\$0	(\$841)
System Integrator	(\$442)	(\$1,811)	(\$1,219)	(\$1,052)	(\$538)	(\$11)	(\$5,074)
Internal	(\$8,749)	(\$18,079)	(\$16,308)	(\$13,182)	(\$5,916)	(\$443)	(\$62,677)
Executive	(\$2,911)	(\$6,264)	(\$5,992)	(\$2,617)	(\$263)	\$0	(\$18,046)
Business	(\$3,999)	(\$7,898)	(\$6,350)	(\$5,751)	(\$4,275)	(\$443)	(\$28,717)
IS	(\$1,839)	(\$3,917)	(\$3,965)	(\$4,814)	(\$1,378)	\$0	(\$15,914)
Contractor / 3rd Party Expenses	(\$6,550)	(\$20,352)	(\$13,623)	(\$500)	\$0	\$0	(\$41,025)
Expenses	(\$2,088)	(\$3,947)	(\$2,026)	(\$1,325)	(\$486)	(\$51)	(\$9,924)
CapEx	(\$54,288)	(\$100,549)	(\$69,937)	(\$45,073)	(\$9,620)	(\$738)	(\$280,205)
Software	(\$23,963)	(\$9,163)	(\$4,080)	(\$2,498)	(\$50)	\$0	(\$39,753)
Hardware	(\$2,162)	(\$5,340)	(\$3,603)	\$0	\$0	\$0	(\$11,105)
Labor	(\$25,367)	(\$57,888)	(\$47,589)	(\$38,309)	(\$8,626)	(\$642)	(\$178,422)
External	(\$21,293)	(\$48,097)	(\$39,567)	(\$31,116)	(\$6,745)	(\$604)	(\$147,422)
OnShore	(\$16,444)	(\$36,936)	(\$33,351)	(\$25,097)	(\$5,553)	(\$561)	(\$117,942)
Application Maintenance Provider	(\$61)	(\$852)	(\$112)	(\$112)	\$0	\$0	(\$1,137)
Business / Management Consultant	(\$4,360)	(\$3,990)	(\$2,491)	(\$2,311)	(\$70)	\$0	(\$13,224)
System Integrator	(\$12,023)	(\$32,094)	(\$30,748)	(\$22,673)	(\$5,482)	(\$561)	(\$103,581)
OffShore	(\$4,849)	(\$11,161)	(\$6,215)	(\$6,019)	(\$1,193)	(\$43)	(\$29,480)
Application Maintenance Provider	(\$1,252)	(\$2,655)	(\$204)	\$0	\$0	\$0	(\$4,110)
Business / Management Consultant	(\$372)	\$0	\$0	\$0	\$0	\$0	(\$372)
System Integrator	(\$3,225)	(\$8,506)	(\$6,012)	(\$6,019)	(\$1,193)	(\$43)	(\$24,998)
Internal	(\$4,075)	(\$9,791)	(\$8,023)	(\$7,193)	(\$1,880)	(\$38)	(\$31,000)
Executive	(\$774)	(\$1,371)	(\$2,079)	(\$1,092)	(\$273)	\$0	(\$5,590)
Business	(\$2,068)	(\$3,786)	(\$3,453)	(\$3,222)	(\$942)	(\$38)	(\$13,509)
IS	(\$1,232)	(\$4,635)	(\$2,491)	(\$2,878)	(\$665)	\$0	(\$11,901)
Contractor / 3rd Party Expenses	\$0	(\$21,880)	(\$8,995)	\$0	\$0	\$0	(\$30,875)
Expenses	(\$2,795)	(\$6,279)	(\$5,670)	(\$4,267)	(\$944)	(\$95)	(\$20,050)
Total	(\$84,476)	(\$168,741)	(\$115,032)	(\$68,930)	(\$19,419)	(\$1,544)	(\$458,141)

Benefits by initiative, capex / opex (000's)

Initiative	Total O&M Benefit	Total CapEx Benefit	Total Benefit
AIPM	\$ -	\$ -	\$ -
Asset - Advanced Analytics	\$ 1,980,000	\$ -	\$ 1,980,000
Customer Interaction	\$ 2,383,948	\$ -	\$ 2,383,948
Data Management	\$ 647,186	\$ 114,209	\$ 761,396
Engineering, Design, Estimating & Mobility	\$ 1,163,805	\$ 954,495	\$ 2,118,300
Integrated Supply & Demand Planning	\$ 330,200	\$ 2,209,800	\$ 2,540,000
Integrated Supply Feasibility Evaluation and Strategy	\$ -	\$ -	\$ -
Inventory Optimization	\$ -	\$ -	\$ -
Regulatory/ Compliance	\$ 13,520,800	\$ -	\$ 13,520,800
Work Management & Field Enablement	\$ 11,943,042	\$ 4,367,762	\$ 16,310,804
Grand Total	\$ 31,968,981	\$ 7,646,267	\$ 39,615,248

* Note: Work Management & Field Enablement contains Data Management benefits

Benefits by initiative, year over year (000's)

Initiative	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026
AIPM	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Asset - Advanced Analytics	\$0	\$0	\$0	\$13,750	\$1,223,750	\$1,980,000	\$1,980,000	\$1,980,000	\$1,980,000
Customer Interaction	\$0	\$0	\$0	\$61,278	\$502,480	\$1,860,208	\$2,383,948	\$2,383,948	\$2,383,948
Data Management	\$0	\$0	\$105,749	\$750,821	\$761,396	\$761,396	\$761,396	\$761,396	\$761,396
Engineering, Design, Estimating & Mobility	\$0	\$143,315	\$582,193	\$1,132,045	\$1,565,272	\$2,118,300	\$2,118,300	\$2,118,300	\$2,118,300
Integrated Supply & Demand Planning	\$0	\$0	\$35,278	\$2,187,222	\$2,540,000	\$2,540,000	\$2,540,000	\$2,540,000	\$2,540,000
Integrated Supply Feasibility Evaluation and Strategy	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Inventory Optimization	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Regulatory/ Compliance	\$0	\$876,348	\$5,070,300	\$9,577,233	\$13,207,819	\$13,520,800	\$13,520,800	\$13,520,800	\$13,520,800
Work Management & Field Enablement	\$0	\$0	\$1,978,971	\$10,475,779	\$10,874,265	\$13,613,533	\$16,310,804	\$16,310,804	\$16,310,804
Grand Total	\$0	\$1,019,663	\$7,772,492	\$24,198,128	\$30,674,982	\$36,394,237	\$39,615,248	\$39,615,248	\$39,615,248

Benefits by operating company, capex / opex (000's)

Operating Company	Total O&M Benefit	Total CapEx Benefit	Total Benefit
Boston Gas	\$ 4,144,024	\$ 2,029,060	\$ 6,173,083
Brooklyn Union Gas (KEDNY)	\$ 12,161,205	\$ 1,942,221	\$ 14,103,426
Colonial Gas	\$ 806,069	\$ 407,517	\$ 1,213,586
Keyspan Gas East (KEDLI)	\$ 2,402,076	\$ 1,320,565	\$ 3,722,641
Narragansett Gas	\$ 1,317,229	\$ 720,239	\$ 2,037,468
NiagaraMohawk Gas	\$ 11,138,377	\$ 1,226,665	\$ 12,365,042
Total	\$ 31,968,981	\$ 7,646,267	\$ 39,615,248

NPV Analysis Assumptions

Inputs	
Depreciation	Composite Rate / Useful Life
Hardware - Book	2.9%
Hardware - MACRS	5
Software – Book	2.9%
Software – MACRS	7
Plant & Machinery - Book	2.9%
Plant & Machinery - MACRS	20
Depreciation	Values
After-tax WACC	9.89%
Marginal Corporate Tax Rate	40.00%
Growth Rate	Values
Terminal Value Growth Rate	2%

Sources: Book Depreciation % - Sam McClemon; MACRS Useful Life – Howard Kamenski; WAAC MA: William Richer; WAAC RI: Melissa Little; WAAC NY: Melissa Barnes; Marginal Corporate Tax Rate – Christine Yordt; WAAC calculated as the average across the operating companies using the general allocator; terminal value growth rate calculated at 2% assuming costs and benefits will increase with inflation

Division 3-54

Request:

Referring to the testimony of Johnston & Connolly, p. 31, please provide a copy of any presentations or memos used on or around November 2015 to bring the “conceptual basis” of the Gas Business Enablement Program to the “Group Executive Committee for review, approval, and initial funding.”

Response:

Please see Attachment DIV 3-54 for the presentation used to facilitate discussion regarding the conceptual basis for the Gas Business Enablement Program at the October 2015 Group Executive Committee meeting. The Company inadvertently referred to the month that meeting took place as November, rather than October, on Page 31 (Bates Page 108 of Book 7) of the pre-filed direct testimony of Company Witnesses Anthony H. Johnston and Christopher J. Connolly. The meeting with the Group Executive Committee resulted in the initial funding for Gas Business Enablement and was followed by a detailed assessment of the program. There was a significant evolution in the overall approach and scope of Gas Business Enablement as the detailed program assessment was undertaken.

Attachment DIV 3-54 – REDACTED INFORMATION

Attachment DIV 3-54 is comprised of a confidential Gas Business Enablement Program presentation to the Group Executive Committee and consists of 14 pages. The Company has requested protective treatment of this document in its entirety.

Division 3-55

Request:

Referring to the testimony of Johnston & Connolly, p. 31, please indicate whether any portion of the \$25 million authorized "to perform and assessment of program alternatives and commence program planning" was charged to Narragansett Electric. If so, please state the amount and the fiscal year in which the costs were incurred. If not charged to Narragansett Electric, please explain why not.

Response:

Of the \$25,000,000 that was authorized to perform an assessment of program alternatives and commence program planning, \$20,142,307 was incurred during Fiscal Year 2017. Of that amount, \$1,485,947 was charged to Narragansett Gas in Fiscal Year 2017 (Test Year costs incurred were \$20,530,869 million of that amount, \$1,511,923 million was charged to Narragansett Gas). There were no charges to Narragansett Electric in Fiscal Year 2017.

Division 3-56

Request:

Referring to the testimony of Little, pp. 66-67, and MAL-36, please provide an itemized description of all the components of cost that result in charges of \$619,618 to the electric business and \$4,133,125 to the gas business in the Rate Year. If these amounts are allocations of costs that are allocated across jurisdictions, please provide the amounts allocated across all jurisdictions.

Response:

Per Schedule MAL-36, Page 6¹, the following is a itemized list of the gas components of cost that equal \$4,133,125:

Return -	\$1,033,312
Amortization-	\$1,360,899
Incremental OPEX-	\$1,016,617
Run the Business-	\$ 779,580
Savings Offset-	<u>\$ (57,283)</u>
Total-	<u>\$4,133,125</u>

Per Schedule MAL-36, Page 11², the following is a itemized list of the electric components of cost that equal \$619,618:

Return -	\$ 269,071
Amortization-	<u>\$ 350,747</u>
Total-	<u>\$ 619,818</u>

¹ See Bates Page 51 of Book 10.

² See Bates Page 56 of Book 10.

Division 3-57

Request:

Referring to MAL-36, p. 6, please state the rate of return used in line 1 and the basis for using that rate of return, including without limitation any embedded return on equity.

Response:

The Company inadvertently used an incorrect National Grid USA Service Company, Inc. (Service Company) pre-tax return of 10.63 percent in its calculations of the revenue requirement on projected in-service capitalized Gas Business Enablement investment for the twelve-month period ending August 31, 2019 (Rate Year), the twelve-month period ending August 31, 2020 (Data Year 1), and the twelve-month period ending August 31, 2021 (Data Year 2). The Company will correct the Service Company rate of return to be 10.29 percent in a future update of the revenue requirement.

The correction of this error will decrease the revenue requirement for Narragansett Gas and Narragansett Electric as shown below. The calculation of the 10.29 percent pre-tax return was provided in Attachment DIV 3-20.

Revenue Requirement Impact – Gas

Rate Year - (\$31,613)
Data Year 1 - (\$32,697)
Data Year 2 - (\$34,444)

Revenue Requirement Impact - Electric

Rate Year - (\$8,232)
Data Year 1 - (\$7,192)
Data Year 2 - (\$5,546)

Allocation %: All Gas Retail, # of Customers

Jurisdiction:	Operating Company:	Percentage:
New York	Brooklyn Union Gas (KEDN)	34.87%
New York	Keyspan Gas East (KEDLI)	16.27%
New York	NiagraMohawk Gas	16.89%
Massachusetts	Boston Gas	19.02%
Massachusetts	Colonial Gas	5.58%
Rhode Island	Narragansett Gas	7.37%
Total:		100.00%

<u>Service Company</u>	Capitalization Ratio	Cost Rate	Weighted Cost	40.20% Tax	Pre-tax WACC
<u>Long-Term Debt</u> ^[1]	50.00%	3.70%	1.85%		1.85%
Common Equity	50.00%	10.50%	5.25%	3.53%	8.78%
Total	100.00%		7.10%	3.53%	10.63%

[1] National Grid USA Service Company Inc. has 25-year intercompany debt maturing in 2035 with a balance of \$80,000,000 and an interest rate of 5.803% and 10-year intercompany debt maturing in 2022 with a balance of \$395,044,311 and an interest rate of 3.28%. The service company has no planned financing activity during the Rate Year or Data Years.

Division 3-58

Request:

Referring to the testimony of Little, p. 107, please explain why it is reasonable for the Commission to approve of the creation of a regulatory asset for the deferral of program costs that will grant full recovery for all of the forecasted one-time operating Gas Business Enablement Program expenses where most of the costs have not yet been incurred, none of the assets have been placed in service, and the Commission does not know whether the proposed program actually will bring all of the benefits until the program is fully implemented.

Response:

There are two different concepts embedded in this question. These concepts are: (1) whether costs associated with the Gas Business Enablement are reasonable and prudently incurred and eligible for recovery from customers; and (2) the timing of recovery of those costs.

The question implies that the ideal resolution of these two questions might be for the Company to design, plan, and implement the Gas Business Enablement Program in Rhode Island and then for the Company to subsequently request recovery of the program costs through a base-rate proceeding, which would be timed perfectly so as to allow for a retrospective review of actual costs. Recovery of those costs would then occur on an amortized basis through base rates, as has been the practice for other large-scale systems that have been implemented for the benefit of customers in the past.

However, this approach does not work in relation to the Gas Business Enablement Program for two reasons. These reasons are that: (1) the Gas Business Enablement Program is a uniquely large-scale project that will require planning and implementation over a multi-year period; and (2) timely recovery of the costs of the program would necessitate the filing of sequential rate requests to adjust rates for recovery, where there may not otherwise be a need for those filings. Meaning that, given the magnitude of investment; the need for a multi-year implementation plan and the customer benefit generated by the investment, it is necessary for the Public Utilities Commission's (PUC) to consider a reasonable recovery plan.

The Company's request to create a regulatory asset for the annual expense associated with implementation of the Gas Business Enablement is reasonable because: (1) it will allow for amortization of the costs in base distribution rates after the project is completed consistent with traditional ratemaking practice; and (2) it will assure that a reasonable representation of costs is included in rates so that the Company is afforded recovery of a major system upgrade, but customers pay no more than they should for that upgrade.

It is important to note that National Grid is not asking the PUC to allow recovery without the opportunity for investigation of the costs incurred to determine those costs are reasonable and prudently incurred for the benefit of customers. The Company also is not asking the PUC to pre-approve an annual cost amount based on forecast costs without reconciliation to the final, actual project costs. Under the Company's proposal, the Company ultimately would recover the actual cost, subject to review and approval of the PUC. Here, the Company is asking only that the PUC allow the Company to defer its actual, annual expense amount for future amortization and recovery through rates to support project implementation and to smooth out the cost impact for customers. This is a reasonable request given the benefits that are anticipated to arise from the expeditious implementation of the work-management, asset-management and customer enablement systems encompassed within the program.

It should also be noted that this request is necessitated largely due to the applicable accounting protocols, National Grid is projecting to invest \$478.3 million on an enterprise basis to develop and implement the Gas Business Enablement Program. The accounting requirements for the development of systems that are used for internal purposes (internal-use software) like the Gas Business Enablement systems are based on the Financial Accounting Standards Board (FASB), Accounting Standards Codification Topic 350, "Intangibles—Goodwill and Other," sub-topic 40, "Internal Use Software" (ASC 350-40).

The Company follows the guidance of ASC 350-40 to determine which Gas Business Enablement costs should be capitalized on the balance sheet and amortized over the useful life of the investment, and those costs that are not allowed to be capitalized. However, all program costs, whether capital or expense, are necessary to achieve the desired benefits that the Gas Business Enablement suite of systems will provide to customers. Incremental Gas Business Enablement costs that are required to be charged to expense as incurred are no less necessary to the successful achievement of the desired customer benefits of the Gas Business Enablement Program than capitalized costs.

Of the total estimated \$478.3 million Gas Business Enablement investment, approximately \$163.2 million must be expensed as incurred under accounting standards. Because of the magnitude of these incremental costs and the necessity of these costs to the success of the Gas Business Enablement Program, the Company must be allowed timely recovery of these costs in the Rate Year and beyond. The activities associated with these costs include: project management, training, data conversion, and software as a service (SAAS). The incurrence of these costs is anticipated to occur on the following timeline:

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Period	Total Non-Recurring Expense	Rhode Island Allocation
Rate Year	\$48.4M	\$3.3M
Data Year 1	\$28.2M	\$1.8M
Data Year 2	\$13.0M	\$0.8M
Total	\$89.6M	\$5.9M

The Company's projected share of the \$163.2 million total investment in non-capitalized Gas Business Enablement costs is expected to be approximately \$12 million. The Company is proposing to amortize the recovery of the non-capitalized Gas Business Enablement costs on a straight-line basis over the 10-year in-service period of each Gas Business Enablement system. This proposal is aimed at smoothing the impact on customer rates as compared to recovery of the actual costs incurred in the Rate Year and Data Years. Furthermore, a levelized amount in rates makes sense because the actual non-capitalized costs in any given year are not representative for the following year and would not be the appropriate basis for cost recovery.

In addition, an important consideration in relation to these expenses is that the PUC's ratemaking practice has been to establish new base distribution rates on a single test-year period, with adjustments made to incorporate Rate Year costs for forecasted changes. If rates are properly set to recover a representative level of costs, then the Company is able to operate without the need for a subsequent rate case for multiple years.

However, in this case, there is no "representative" level of these non-capitalized costs because the costs are non-recurring and associated with project implementation such that the actual cost will vary (significantly) each year, as indicated in the table above. If the PUC were to lock in the estimated \$3.3 million Rate Year level of non-capitalized Gas Business Enablement costs in rates as shown in the table above (consistent with ratemaking practice), the amount included in rates would be well in excess of the current projected level of non-capitalized Gas Business Enablement costs in Data Year 1 and Data Year 2. Moreover, the Rate Year level also would be in an over-recovery position in every year thereafter until rates are reset. This would be a detriment to customers if the Company did not make a new base distribution-rate filing because the amount in rates would continue to flow to the Company.

As stated above, the Company's projected share of non-capitalized Gas Business Enablement costs over the life of the project is expected to be approximately \$12 million. If the PUC were to grant the Company's \$3.3 million Rate Year level of non-capitalized Gas Business Enablement costs, the Company would start to over recover these costs after 3.6 years have passed if rates were not reset prior to that time. Thus, the Company's proposal to amortize these non-

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capitalized Gas Business Enablement costs over the 10-year life of each Gas Business Enablement system ensures that customers pay no more, and no less than their share of the cost of the Gas Business Enablement Program.

Lastly, the Company's request to recover forecasted non-capitalized Gas Business Enablement costs, as well as the revenue requirement on forecasted capitalized Gas Business Enablement costs is consistent with traditional ratemaking in Rhode Island. Forecasted non-ISR eligible capital investment, as well as forecasted ISR eligible capital investment in base distribution rate cases that occurred over the many years that the PUC has regulated the Company prior to the existence of the ISR, always have been included in the calculation of the base rate revenue requirement. Furthermore, the Company is not asking for recovery of the revenue requirement on all Gas Business Enablement investment at this time, but is instead requesting to recover the revenue requirement on those Gas Business Enablement systems that are expected to be in service for customers during the Rate Year, and only for the period of the Rate Year that such systems will be in service. Similarly, the Data Year Gas Business Enablement revenue requirements are based on only those Gas Business Enablement systems expected to be in service during those years and for the portions of those years that such systems will be in service.

Division 3-59

Request:

Referring to the testimony of Little, p. 108 (lines 12-14), please provide an explanation for the assumption that the useful life of the capital investments would be ten years.

Response:

In determining the estimated useful life of the capital investment, National Grid, following the guidance in ASC 350-40 Accounting for Internal Use Software, considered the effects of obsolescence, technology, competition, and the economic benefits of the applications being developed. Based on these considerations, most significantly the pace of technological change today, National Grid expects to receive economic benefit from this investment for a period of approximately 10 years.

Division 3-60

Request:

Referring to Schedule MAL-36, p. 6 of 16, please provide a similar schedule that shows the total costs by the same components for the aggregate multi-jurisdictional project, breaking down estimated costs for each of the companies by the same components of cost.

Response:

Please refer to Attachment DIV 3-61 for the total costs allocated by jurisdiction. The costs are allocated based on allocation codes as described in the Company's response to Division 3-61 and as provided in the attachment to that response.

Division 3-61

Request:

Referring to the testimony of Johnson and Connolly, p. 8, please provide an itemized breakdown of the multi-year cost of \$478.3 million by cost type. Please also show the forecasted expenses to be incurred by each of the companies across all the jurisdictions by year through completion of the project. (Include all project costs, including without limitation O&M, Service Company Rental expenses, and any capital projects charged solely to the applicable distribution company).

Response:

Please see Attachment DIV 3-61 for the information requested. Attachment DIV 3-61 provides a breakdown of the \$478.3 million by its capitalized and non-capitalized components. The capitalized components are further broken down by workstream and "Portfolio Anchor" designation. The timing of the implementation of each workstream/portfolio anchor designation by jurisdiction is shown on Page 5 of the attachment. The costs that are not eligible to be capitalized in accordance with generally accepted accounting principles are detailed on Lines 26 through 45 on Page 1 of the attachment. In addition, the breakdown of the \$478.3 million Gas Business Enablement investment and the components described above by jurisdiction is provided on Pages 2 through 4 of the attachment. The distribution of these costs by jurisdiction will be spread by the use of allocation codes. The percentages shown on the attachment are the current percentages in effect for Fiscal Year 2018. These allocation percentages are updated each fiscal year.

Ongoing costs to operate and maintain the various Gas Business Enablement systems referred to as run the business costs will be distributed to each jurisdiction using the allocation code C-210, which allocates costs between all US retail gas companies based on number of customers.

The Narragansett Electric Company
Gas Business Enablement
Total forecasted GBE Program spend by jurisdiction

Line	Portfolio Anchor	Workstream	Allocation Code	Total US GBE Investment (recorded on the books of the Service Company)		
				Total US CapEx Spend	Total US Non- CapEx Spend	Total US Spend
Cap Ex Investment						
1	PA1-3	Asset Management	C-210	\$ 27,740,204	\$ -	\$ 27,740,204
2	PA1-3	Asset Management / GIS	C-210	\$ 57,094,854	\$ -	\$ 57,094,854
3	PA1-3	Work Management (Maximo)	C-210	\$ 77,789,270	\$ -	\$ 77,789,270
4	PA4	Asset Management	C-210	\$ 11,194,992	\$ -	\$ 11,194,992
5	PA4	Asset Management / GIS	C-210	\$ 11,593,919	\$ -	\$ 11,593,919
6	PA4	Work Management (Maximo)	C-210	\$ 23,162,044	\$ -	\$ 23,162,044
7	PA5	Asset Management	C-210	\$ 7,543,962	\$ -	\$ 7,543,962
8	PA5	Asset Management / GIS	C-210	\$ 5,708,998	\$ -	\$ 5,708,998
9	PA5	Work Management (Maximo)	C-210	\$ 8,821,682	\$ -	\$ 8,821,682
10	PA6	Asset Management	C-210	\$ 3,430,354	\$ -	\$ 3,430,354
11	PA6	Asset Management / GIS	C-210	\$ 2,426,260	\$ -	\$ 2,426,260
12	PA6	Work Management (Maximo)	C-210	\$ 2,669,104	\$ -	\$ 2,669,104
13	PA1-3	Customer Engagement	C-175	\$ 21,662,720	\$ -	\$ 21,662,720
14	PA4	Customer Engagement	C-175	\$ 5,375,307	\$ -	\$ 5,375,307
15	PA1-3	WM-SDM	C-175	\$ 21,241,751	\$ -	\$ 21,241,751
16	PA4	WM-SDM	C-210	\$ 7,223,210	\$ -	\$ 7,223,210
17	PA5	WM-SDM	C-210	\$ 704,896	\$ -	\$ 704,896
18	PA6	WM-SDM	C-210	\$ 566,330	\$ -	\$ 566,330
19	PA1-3	Supply Chain	C-210	\$ 8,802,068	\$ -	\$ 8,802,068
20	PA4	Supply Chain	C-210	\$ 2,299,468	\$ -	\$ 2,299,468
21	PA1-3	Hardware (CapEx)	C-175	\$ 4,979,300	\$ -	\$ 4,979,300
22	PA4	Hardware (CapEx)	C-210	\$ 1,348,500	\$ -	\$ 1,348,500
23	PA5	Hardware (CapEx)	C-210	\$ 1,050,000	\$ -	\$ 1,050,000
24	PA6	Hardware (CapEx)	C-210	\$ -	\$ -	\$ -
25	PA1-3	PP Enhancements (CapEx)	G-012	\$ 990,833	\$ -	\$ 990,833
Non-Cap Ex Investment						
26		Business Enablement & Change Management	C-210	\$ -	\$ 12,833,790	\$ 12,833,790
27		Data Management	C-210	\$ -	\$ 1,367,967	\$ 1,367,967
28		IS Enabling	C-210	\$ -	\$ 8,306,845	\$ 8,306,845
29		Operating Model	C-210	\$ -	\$ 1,426,405	\$ 1,426,405
30		Portfolio Office	C-210	\$ -	\$ 35,089,803	\$ 35,089,803
31		Strategic BECM	C-210	\$ -	\$ 11,617,248	\$ 11,617,248
32		Software	C-210	\$ -	\$ 13,868,273	\$ 13,868,273
33		Hardware	C-210	\$ -	\$ 3,767,200	\$ 3,767,200
34		PP Enhancements	C-210	\$ -	\$ 1,840,119	\$ 1,840,119
35		Tech Training - Labor	C-210	\$ -	\$ 19,750,000	\$ 19,750,000
36		Data Migration	C-210	\$ -	\$ 713,574	\$ 713,574
37		Value Assurance	C-210	\$ -	\$ 2,600,000	\$ 2,600,000
38		Phase 1	C-210	\$ -	\$ 6,130,746	\$ 6,130,746
39		Asset Management	C-210	\$ -	\$ 1,823,624	\$ 1,823,624
40		Asset Management / GIS	C-210	\$ -	\$ 2,190,698	\$ 2,190,698
41		Work Management (Maximo)	C-210	\$ -	\$ 6,455,987	\$ 6,455,987
42		Customer Engagement	C-210	\$ -	\$ 2,072,189	\$ 2,072,189
43		WM-SDM	C-210	\$ -	\$ 7,980,079	\$ 7,980,079
44		Supply Chain	C-210	\$ -	\$ 2,887,559	\$ 2,887,559
45		FY17 Non-CapEx Investment	G-210	\$ -	\$ 20,142,307	\$ 20,142,307
46		Totals		\$ 315,420,028	\$ 162,864,413	\$ 478,284,440

Fiscal Year 2018 Bill Pool Allocators

All US Electric and Gas Distribution Companies--Number of Customers	C-175	All Retail Companies	100.00%
All US Gas Distribution Companies--Number of Customers	C-210	All Gas Retail Companies	100.00%
All US Electric and Gas Distribution Companies--General 3-Point Allocator (1)	G-012	All Companies	100.00%

- (1) 3-Point Allocator is based on weighting of each company's (1) Net Plant,
(2) Net Margin & (3) Net Operations & Maintenance Expense

The Narragansett Electric Company
Gas Business Enablement
Total forecasted GBE Program spend by jurisdiction

Line	Portfolio Anchor	Workstream	Allocation Code	RI-Electric Share		
				CapEx	Non-CapEx	Total RI Electric
Cap Ex Investment						
1	PA1-3	Asset Management	C-210	\$ -	\$ -	\$ -
2	PA1-3	Asset Management / GIS	C-210	\$ -	\$ -	\$ -
3	PA1-3	Work Management (Maximo)	C-210	\$ -	\$ -	\$ -
4	PA4	Asset Management	C-210	\$ -	\$ -	\$ -
5	PA4	Asset Management / GIS	C-210	\$ -	\$ -	\$ -
6	PA4	Work Management (Maximo)	C-210	\$ -	\$ -	\$ -
7	PA5	Asset Management	C-210	\$ -	\$ -	\$ -
8	PA5	Asset Management / GIS	C-210	\$ -	\$ -	\$ -
9	PA5	Work Management (Maximo)	C-210	\$ -	\$ -	\$ -
10	PA6	Asset Management	C-210	\$ -	\$ -	\$ -
11	PA6	Asset Management / GIS	C-210	\$ -	\$ -	\$ -
12	PA6	Work Management (Maximo)	C-210	\$ -	\$ -	\$ -
13	PA1-3	Customer Engagement	C-175	\$ 1,503,393	\$ -	\$ 1,503,393
14	PA4	Customer Engagement	C-175	\$ 373,046	\$ -	\$ 373,046
15	PA1-3	WM-SDM	C-175	\$ 1,474,178	\$ -	\$ 1,474,178
16	PA4	WM-SDM	C-210	\$ -	\$ -	\$ -
17	PA5	WM-SDM	C-210	\$ -	\$ -	\$ -
18	PA6	WM-SDM	C-210	\$ -	\$ -	\$ -
19	PA1-3	Supply Chain	C-210	\$ -	\$ -	\$ -
20	PA4	Supply Chain	C-210	\$ -	\$ -	\$ -
21	PA1-3	Hardware (CapEx)	C-175	\$ 345,563	\$ -	\$ 345,563
22	PA4	Hardware (CapEx)	C-210	\$ -	\$ -	\$ -
23	PA5	Hardware (CapEx)	C-210	\$ -	\$ -	\$ -
24	PA6	Hardware (CapEx)	C-210	\$ -	\$ -	\$ -
25	PA1-3	PP Enhancements (CapEx)	G-012	\$ 78,078	\$ -	\$ 78,078
Non-Cap Ex Investment						
26		Business Enablement & Change Management	C-210	\$ -	\$ -	\$ -
27		Data Management	C-210	\$ -	\$ -	\$ -
28		IS Enabling	C-210	\$ -	\$ -	\$ -
29		Operating Model	C-210	\$ -	\$ -	\$ -
30		Portfolio Office	C-210	\$ -	\$ -	\$ -
31		Strategic BECM	C-210	\$ -	\$ -	\$ -
32		Software	C-210	\$ -	\$ -	\$ -
33		Hardware	C-210	\$ -	\$ -	\$ -
34		PP Enhancements	C-210	\$ -	\$ -	\$ -
35		Tech Training - Labor	C-210	\$ -	\$ -	\$ -
36		Data Migration	C-210	\$ -	\$ -	\$ -
37		Value Assurance	C-210	\$ -	\$ -	\$ -
38		Phase 1	C-210	\$ -	\$ -	\$ -
39		Asset Management	C-210	\$ -	\$ -	\$ -
40		Asset Management / GIS	C-210	\$ -	\$ -	\$ -
41		Work Management (Maximo)	C-210	\$ -	\$ -	\$ -
42		Customer Engagement	C-210	\$ -	\$ -	\$ -
43		WM-SDM	C-210	\$ -	\$ -	\$ -
44		Supply Chain	C-210	\$ -	\$ -	\$ -
45		FY17 Non-CapEx Investment	G-210	\$ -	\$ -	\$ -
46		Totals		\$ 3,774,258	\$ -	\$ 3,774,258

Fiscal Year 2018 Bill Pool Allocators

All US Electric and Gas Distribution Companies--Number of Customers	C-175	RI Electric
All US Gas Distribution Companies--Number of Customers	C-210	6.94%
All US Electric and Gas Distribution Companies--General 3-Point Allocator (1)	G-012	0.00%
		7.88%

- (1) 3-Point Allocator is based on weighting of each company's (1) Net Plant,
(2) Net Margin & (3) Net Operations & Maintenance Expense

The Narragansett Electric Company
Gas Business Enablement
Total forecasted GBE Program spend by jurisdiction

Line	Portfolio Anchor	Workstream	Allocation Code	RI-Gas Share		
				CapEx	Non-CapEx	Total RI Gas
Cap Ex Investment						
1	PA1-3	Asset Management	C-210	\$ 2,044,453	\$ -	\$ 2,044,453
2	PA1-3	Asset Management / GIS	C-210	\$ 4,207,891	\$ -	\$ 4,207,891
3	PA1-3	Work Management (Maximo)	C-210	\$ 5,733,069	\$ -	\$ 5,733,069
4	PA4	Asset Management	C-210	\$ 825,071	\$ -	\$ 825,071
5	PA4	Asset Management / GIS	C-210	\$ 854,472	\$ -	\$ 854,472
6	PA4	Work Management (Maximo)	C-210	\$ 1,707,043	\$ -	\$ 1,707,043
7	PA5	Asset Management	C-210	\$ 555,990	\$ -	\$ 555,990
8	PA5	Asset Management / GIS	C-210	\$ 420,753	\$ -	\$ 420,753
9	PA5	Work Management (Maximo)	C-210	\$ 650,158	\$ -	\$ 650,158
10	PA6	Asset Management	C-210	\$ 252,817	\$ -	\$ 252,817
11	PA6	Asset Management / GIS	C-210	\$ 178,815	\$ -	\$ 178,815
12	PA6	Work Management (Maximo)	C-210	\$ 196,713	\$ -	\$ 196,713
13	PA1-3	Customer Engagement	C-175	\$ 816,685	\$ -	\$ 816,685
14	PA4	Customer Engagement	C-175	\$ 202,649	\$ -	\$ 202,649
15	PA1-3	WM-SDM	C-175	\$ 800,814	\$ -	\$ 800,814
16	PA4	WM-SDM	C-210	\$ 532,351	\$ -	\$ 532,351
17	PA5	WM-SDM	C-210	\$ 51,951	\$ -	\$ 51,951
18	PA6	WM-SDM	C-210	\$ 41,739	\$ -	\$ 41,739
19	PA1-3	Supply Chain	C-210	\$ 648,712	\$ -	\$ 648,712
20	PA4	Supply Chain	C-210	\$ 169,471	\$ -	\$ 169,471
21	PA1-3	Hardware (CapEx)	C-175	\$ 187,720	\$ -	\$ 187,720
22	PA4	Hardware (CapEx)	C-210	\$ 99,384	\$ -	\$ 99,384
23	PA5	Hardware (CapEx)	C-210	\$ 77,385	\$ -	\$ 77,385
24	PA6	Hardware (CapEx)	C-210	\$ -	\$ -	\$ -
25	PA1-3	PP Enhancements (CapEx)	G-012	\$ 34,580	\$ -	\$ 34,580
Non-Cap Ex Investment						
26		Business Enablement & Change Management	C-210	\$ -	\$ 945,850	\$ 945,850
27		Data Management	C-210	\$ -	\$ 100,819	\$ 100,819
28		IS Enabling	C-210	\$ -	\$ 612,215	\$ 612,215
29		Operating Model	C-210	\$ -	\$ 105,126	\$ 105,126
30		Portfolio Office	C-210	\$ -	\$ 2,586,118	\$ 2,586,118
31		Strategic BECM	C-210	\$ -	\$ 856,191	\$ 856,191
32		Software	C-210	\$ -	\$ 1,022,092	\$ 1,022,092
33		Hardware	C-210	\$ -	\$ 277,643	\$ 277,643
34		PP Enhancements	C-210	\$ -	\$ 135,617	\$ 135,617
35		Tech Training - Labor	C-210	\$ -	\$ 1,455,575	\$ 1,455,575
36		Data Migration	C-210	\$ -	\$ 52,590	\$ 52,590
37		Value Assurance	C-210	\$ -	\$ 191,620	\$ 191,620
38		Phase 1	C-210	\$ -	\$ 451,836	\$ 451,836
39		Asset Management	C-210	\$ -	\$ 134,401	\$ 134,401
40		Asset Management / GIS	C-210	\$ -	\$ 161,454	\$ 161,454
41		Work Management (Maximo)	C-210	\$ -	\$ 475,806	\$ 475,806
42		Customer Engagement	C-210	\$ -	\$ 152,720	\$ 152,720
43		WM-SDM	C-210	\$ -	\$ 588,132	\$ 588,132
44		Supply Chain	C-210	\$ -	\$ 212,813	\$ 212,813
45		FY17 Non-CapEx Investment	G-210	\$ -	\$ 1,485,947	\$ 1,485,947
46		Totals		\$ 21,290,685	\$ 12,004,566	\$ 33,295,251

Fiscal Year 2018 Bill Pool Allocators

All US Electric and Gas Distribution Companies--Number of Customers	C-175	RI Gas
All US Gas Distribution Companies--Number of Customers	C-210	3.77%
All US Electric and Gas Distribution Companies--General 3-Point Allocator (1)	G-012	7.37%
		3.49%

- (1) 3-Point Allocator is based on weighting of each company's (1) Net Plant,
(2) Net Margin & (3) Net Operations & Maintenance Expense

The Narragansett Electric Company
Gas Business Enablement
Total forecasted GBE Program spend by jurisdiction

Line	Portfolio Anchor	Workstream	Allocation Code	MA Share	NY Share		
				Total MA	Total NY	NGUSA Parent Co.	Total GBE
Cap Ex Investment							
1	PA1-3	Asset Management	C-210	\$ 6,862,927	\$ 18,832,825	\$ -	\$ 27,740,204
2	PA1-3	Asset Management / GIS	C-210	\$ 14,125,267	\$ 38,761,696	\$ -	\$ 57,094,854
3	PA1-3	Work Management (Maximo)	C-210	\$ 19,245,065	\$ 52,811,135	\$ -	\$ 77,789,270
4	PA4	Asset Management	C-210	\$ 2,769,641	\$ 7,600,280	\$ -	\$ 11,194,992
5	PA4	Asset Management / GIS	C-210	\$ 2,868,336	\$ 7,871,112	\$ -	\$ 11,593,919
6	PA4	Work Management (Maximo)	C-210	\$ 5,730,290	\$ 15,724,712	\$ -	\$ 23,162,044
7	PA5	Asset Management	C-210	\$ 1,866,376	\$ 5,121,596	\$ -	\$ 7,543,962
8	PA5	Asset Management / GIS	C-210	\$ 1,412,406	\$ 3,875,839	\$ -	\$ 5,708,998
9	PA5	Work Management (Maximo)	C-210	\$ 2,182,484	\$ 5,989,040	\$ -	\$ 8,821,682
10	PA6	Asset Management	C-210	\$ 848,670	\$ 2,328,867	\$ -	\$ 3,430,354
11	PA6	Asset Management / GIS	C-210	\$ 600,257	\$ 1,647,188	\$ -	\$ 2,426,260
12	PA6	Work Management (Maximo)	C-210	\$ 660,336	\$ 1,812,055	\$ -	\$ 2,669,104
13	PA1-3	Customer Engagement	C-175	\$ 6,771,766	\$ 12,570,876	\$ -	\$ 21,662,720
14	PA4	Customer Engagement	C-175	\$ 1,680,321	\$ 3,119,291	\$ -	\$ 5,375,307
15	PA1-3	WM-SDM	C-175	\$ 6,640,171	\$ 12,326,588	\$ -	\$ 21,241,751
16	PA4	WM-SDM	C-210	\$ 1,787,022	\$ 4,903,837	\$ -	\$ 7,223,210
17	PA5	WM-SDM	C-210	\$ 174,391	\$ 478,554	\$ -	\$ 704,896
18	PA6	WM-SDM	C-210	\$ 140,110	\$ 384,481	\$ -	\$ 566,330
19	PA1-3	Supply Chain	C-210	\$ 2,177,632	\$ 5,975,724	\$ -	\$ 8,802,068
20	PA4	Supply Chain	C-210	\$ 568,888	\$ 1,561,109	\$ -	\$ 2,299,468
21	PA1-3	Hardware (CapEx)	C-175	\$ 1,556,529	\$ 2,889,488	\$ -	\$ 4,979,300
22	PA4	Hardware (CapEx)	C-210	\$ 333,619	\$ 915,497	\$ -	\$ 1,348,500
23	PA5	Hardware (CapEx)	C-210	\$ 259,770	\$ 712,845	\$ -	\$ 1,050,000
24	PA6	Hardware (CapEx)	C-210	\$ -	\$ -	\$ -	\$ -
25	PA1-3	PP Enhancements (CapEx)	G-012	\$ 373,346	\$ 504,829	\$ -	\$ 990,833
Non-Cap Ex Investment							
26		Business Enablement & Change Management	C-210	\$ 3,175,080	\$ 8,712,860	\$ -	\$ 12,833,790
27		Data Management	C-210	\$ 338,435	\$ 928,713	\$ -	\$ 1,367,967
28		IS Enabling	C-210	\$ 2,055,114	\$ 5,639,517	\$ -	\$ 8,306,845
29		Operating Model	C-210	\$ 352,893	\$ 968,386	\$ -	\$ 1,426,405
30		Portfolio Office	C-210	\$ 8,681,217	\$ 23,822,467	\$ -	\$ 35,089,803
31		Strategic BECM	C-210	\$ 2,874,107	\$ 7,886,950	\$ -	\$ 11,617,248
32		Software	C-210	\$ 3,431,011	\$ 9,415,170	\$ -	\$ 13,868,273
33		Hardware	C-210	\$ 932,005	\$ 2,557,552	\$ -	\$ 3,767,200
34		PP Enhancements	C-210	\$ 455,245	\$ 1,249,257	\$ -	\$ 1,840,119
35		Tech Training - Labor	C-210	\$ 4,886,150	\$ 13,408,275	\$ -	\$ 19,750,000
36		Data Migration	C-210	\$ 176,538	\$ 484,445	\$ -	\$ 713,574
37		Value Assurance	C-210	\$ 643,240	\$ 1,765,140	\$ -	\$ 2,600,000
38		Phase 1	C-210	\$ 1,516,747	\$ 4,162,163	\$ -	\$ 6,130,746
39		Asset Management	C-210	\$ 451,165	\$ 1,238,058	\$ -	\$ 1,823,624
40		Asset Management / GIS	C-210	\$ 541,979	\$ 1,487,265	\$ -	\$ 2,190,698
41		Work Management (Maximo)	C-210	\$ 1,597,211	\$ 4,382,970	\$ -	\$ 6,455,987
42		Customer Engagement	C-210	\$ 512,659	\$ 1,406,809	\$ -	\$ 2,072,189
43		WM-SDM	C-210	\$ 1,974,271	\$ 5,417,675	\$ -	\$ 7,980,079
44		Supply Chain	C-210	\$ 714,382	\$ 1,960,364	\$ -	\$ 2,887,559
45		FY17 Non-CapEx Investment	G-210	\$ 5,715,184	\$ 12,852,145	\$ 89,032	\$ 20,142,308
46		Totals		\$ 41,024,633	\$ 109,746,183	\$ 89,032	\$ 478,284,441

Fiscal Year 2018 Bill Pool Allocators

All US Electric and Gas Distribution Companies--Number of Customers	C-175	Total MA	Total NY
All US Gas Distribution Companies--Number of Customers	C-210	31.26%	58.03%
All US Electric and Gas Distribution Companies--General 3-Point Allocator (1)	G-012	24.74%	67.89%
		37.68%	50.95%

- (1) 3-Point Allocator is based on weighting of each company's (1) Net Plant,
(2) Net Margin & (3) Net Operations & Maintenance Expense

The Narragansett Electric Company
 Gas Business Enablement
 Key Project Implementation Dates

Line	Portfolio Anchor	Workstream	RI-Electric	RI-Gas	MA	NMPC	KEDNY	KEDLI
	Cap Ex Investment							
1	PA1-3	Asset Management	Oct-18	Oct-18	Jan-19	Apr-19	Jul-19	Oct-19
2	PA1-3	Asset Management / GIS	Oct-18	Oct-18	Jan-19	Apr-19	Jul-19	Oct-19
3	PA1-3	Work Management (Maximo)	Mar-18	Mar-18	Jan-19	Apr-19	Jul-19	Oct-19
4	PA4	Asset Management	Apr-20	Apr-20	Jun-20	Apr-19	Jul-19	Oct-19
5	PA4	Asset Management / GIS	Apr-20	Apr-20	Jun-20	Jul-20	Aug-20	Sep-20
6	PA4	Work Management (Maximo)	Apr-20	Apr-20	Jun-20	Jul-20	Aug-20	Sep-20
7	PA5	Asset Management	Apr-21	Apr-21	Apr-21	Apr-21	Apr-21	Apr-21
8	PA5	Asset Management / GIS	Apr-21	Apr-21	Apr-21	Apr-21	Apr-21	Apr-21
9	PA5	Work Management (Maximo)	Apr-21	Apr-21	Apr-21	Apr-21	Apr-21	Apr-21
10	PA6	Asset Management	Jul-21	Jul-21	Jul-21	Jul-21	Jul-21	Jul-21
11	PA6	Asset Management / GIS	Jul-21	Jul-21	Jul-21	Jul-21	Jul-21	Jul-21
12	PA6	Work Management (Maximo)	Jul-21	Jul-21	Jul-21	Jul-21	Jul-21	Jul-21
13	PA1-3	Customer Engagement	Oct-18	Oct-18	Jan-19	Apr-19	Jul-19	Oct-19
14	PA4	Customer Engagement	Apr-20	Apr-20	Jun-20	Jul-20	Aug-20	Sep-20
15	PA1-3	WM-SDM	Oct-18	Oct-18	Jan-19	Apr-19	Jul-19	Oct-19
16	PA4	WM-SDM	Apr-20	Apr-20	Jun-20	Jul-20	Aug-20	Sep-20
17	PA5	WM-SDM	Apr-21	Apr-21	Apr-21	Apr-21	Apr-21	Apr-21
18	PA6	WM-SDM	Jul-21	Jul-21	Jul-21	Jul-21	Jul-21	Jul-21
19	PA1-3	Supply Chain	Oct-18	Oct-18	Jan-19	Apr-19	Jul-19	Oct-19
20	PA4	Supply Chain	Apr-20	Apr-20	Jun-20	Jul-20	Aug-20	Sep-20
21	PA1-3	Hardware (CapEx)	Oct-18	Oct-18	Jan-19	Apr-19	Jul-19	Oct-19
22	PA4	Hardware (CapEx)	Apr-20	Apr-20	Jun-20	Jul-20	Aug-20	Sep-20
23	PA5	Hardware (CapEx)	Apr-21	Apr-21	Apr-21	Apr-21	Apr-21	Apr-21
24	PA6	Hardware (CapEx)	Jul-21	Jul-21	Jul-21	Jul-21	Jul-21	Jul-21
25	PA1-3	PP Enhancements (CapEx)	Aug-17	Aug-17	Aug-17	Aug-17	Aug-17	Aug-17

The Narragansett Electric Company
 Gas Business Enablement
 Service Company Allocation Codes Utilized

Allocation Codes

All US Electric and Gas Distribution Companies--Number of Customers	C-175
All US Gas Distribution Companies--Number of Customers	C-210
All US Electric and Gas Distribution Companies--General 3-Point Allocator (1)	G-012
All US Gas Distribution Companies--General 3-Point Allocator (1)	G-210

- (1) 3-Point Allocator is based on weighting of each companies' (1) Net Plant, (2) Net Margin and
 (3) Net Operations & Maintenance Expense

Fiscal Year 2018 Allocation Percentages

	<u>C-175</u>	<u>C-210</u>	<u>G-012</u>
RIELEC	6.94%	0.00%	7.88%
RIGAS	3.77%	7.37%	3.49%
RI	10.71%	7.37%	11.37%
BOS	9.80%	19.15%	11.04%
COL	2.86%	5.59%	2.51%
MECO/NANT	18.60%	0.00%	24.13%
MA	31.26%	24.74%	37.68%
NMPC	31.95%	16.93%	25.11%
KEDNY	17.83%	34.83%	15.25%
KEDLI	8.25%	16.13%	10.59%
NY	58.03%	67.89%	50.95%
	100.00%	100.00%	100.00%

Fiscal Year 2017 Allocation Percentages

	<u>G-210</u>
RIELEC	0.00%
RIGAS	7.41%
RI	7.41%
BOS	23.29%
COL	5.21%
MECO/NANT	0.00%
MA	28.50%
NMPC	12.44%
KEDNY	30.10%
KEDLI	21.55%
NY	64.09%
	100.00%

Division 3-62

Request:

In implementing the Gas Business Enablement Program, did the Company assume that all non-recurring one-time expenses would be deferred and recovered from all jurisdictions? Would the Company have implemented the program if it thought all one-time expenses would not be recoverable?

Response:

As an initial matter, the Company recognizes and accepts its fundamental obligation to provide safe and reliable service to gas customers. Fulfillment of this obligation requires the Company, in many instances, to take steps to implement systems, conduct business processes and hire, train, and deploy qualified staff to perform utility duties prior to the point where there is approved or assured cost recovery. At the same time, the Company expects that it will be eligible for cost recovery where it has taken reasonable and prudent steps to provide safe and reliable service to customers.

The Gas Business Enablement Program is critical to support safe, reliable, and efficient service to the Company's natural gas customers. During the strategic assessment phase, National Grid identified the required initiatives to support delivery of the program and the desired customer benefits and grouped these initiatives into workstreams. Then, National Grid estimated the work effort necessary for each of these workstreams and developed cost estimates for each workstream. National Grid disaggregated the estimated workstream costs into capital expenditures and non-recurring one-time expenses not eligible to be capitalized consistent with Financial Accounting Standards Board (FASB) accounting guidelines, as explained in the Company's response to Division 3-58.

From a customer perspective, it is irrelevant whether project costs are capitalized or expensed. Customers benefit from the provision of safe, reliable, and efficient gas service. The total project cost will be necessarily incurred to deliver the benefits that will flow from each workstream. Therefore, for the benefits to flow to customers, the costs are appropriately incurred and should be accounted for in the ratemaking process regardless of how those costs must be recorded for accounting purposes.

However, in terms of ratemaking practice, there is a difference that arises in relation to these cost classifications. Capitalized costs will be recoverable in future rates where expensed costs require approval by the Public Utilities Commission (PUC) for recovery because these expenses are not routinely recurring. Where expenses are not routinely recurring, the PUC's approval is required to recover those expenses on an amortized basis through rates. National Grid's expectation in moving forward with the Gas Business Enablement Program was that it would request cost

recovery of the non-recurring expense items in each jurisdiction because those costs are indispensable components of the overall project cost and should be recoverable from customers. Although a risk of cost disallowance may exist, National Grid did not view that risk as great enough to be a prohibitive obstacle to the implementation of a major system upgrade given that the implementation would drive substantial benefits for customers. Accordingly, when National Grid decided to initiate the Gas Business Enablement Program, it did so under the assumption that it would recover these reasonable and prudent (non-recurring) expenses from all jurisdictions.

Programs such as the Gas Business Enablement Program are important strategically to modernize the delivery of utility service and enable the Company to meet customer (and regulator) expectations now and in the future. If the Company is unable to recover the reasonable and prudently incurred costs associated with these types of system advancements, the Company's ability to implement critical operational upgrades necessary for safe, reliable, and efficient service to customers will be greatly impaired, creating a strong disincentive for the Company to develop future strategic investments to meet future customer requirements.

Division 3-63

Request:

To the extent regulators in New York or Massachusetts do not allow recovery of the one-time implementation expenses allocated to those jurisdictions for the Gas Business Enablement Program, will National Grid modify the program to reduce its scope and costs, or will National Grid move forward with the multi-jurisdictional project as planned?

Response:

As discussed in the Company's response to Division 3-62, the non-recurring implementation expenses are an unavoidable cost component in implementing the Gas Business Enablement Program for the benefit of customers. From a customer perspective, it is irrelevant whether project costs are capitalized or expensed. Customers benefit from the provision of safe, reliable, and efficient gas service. The total project cost will be necessarily incurred to deliver the benefits that will flow from each workstream. Therefore, for the benefits to flow to customers, the costs are appropriately incurred and should be accounted for in the ratemaking process regardless of how those costs must be recorded for accounting purposes.

National Grid is moving forward under the assumption that it will recover program costs that are shown to be reasonably and prudently incurred whether those costs are capitalized or non-capitalized, in all jurisdictions.

Division 3-64

Request:

Referring to the testimony of Johnson and Connolly, p. 31, when performing a business case analysis and examining alternatives, did the Company perform any analysis comparing a stand-alone Rhode Island solution to the multi-jurisdictional solution? If yes, please provide a copy of the analysis. If not, please explain why not.

Response:

National Grid's decision to implement an enterprise solution was based on substantial analysis and guidance from National Grid's highly experienced strategic-assessment partner, information obtained through visits to other utilities, including One Gas, Atmos Energy and DTE Energy, and validation of the approach by National Grid's business assurance partner.

As part of its business-case analysis, National Grid completed a high-level analysis to estimate the cost of implementing standalone solutions in each of National Grid's multiple jurisdictions rather than undertaking the enterprise solution. This analysis showed that the \$458 million delivery cost for the enterprise solution would be exceeded by approximately **50 percent**, totaling \$695 million, if National Grid were to pursue separate standalone solutions for each jurisdiction.

The analysis further demonstrated that the estimated allocation of shared project costs of \$37.1 million (\$33.3 million gas and \$3.8 million electric) for Rhode Island's share of the enterprise solution would be exceeded by approximately **130 percent** on a standalone basis, with project costs estimated at \$86.5 million for a standalone solution in Rhode Island. This greater proportion of increase was due primarily to the fact that not all of the project costs scale proportionally to Rhode Island's smaller size. As a result, it was clear that Rhode Island customers would reap a significant benefit from implementation of an enterprise solution, with costs estimated at less than half what a standalone solution would cost.

A summary of the high-level standalone analysis prepared as of March 2016 is included as Attachment DIV 3-64. This analysis was prepared on the basis of the going-forward delivery cost of the project (\$458 million), after the expenditure of approximately \$20 million for the initial strategic assessment that was necessary to develop the project to a conceptual stage.

Given the significant cost reductions available to customers in Rhode Island, Massachusetts, and New York shown by this analysis, National Grid focused its efforts on the design and development of an integrated enterprise solution that would leverage National Grid's scale to provide the greatest benefits for customers across all jurisdictions in which National Grid operates.

BUSINESS CASE DISAGGREGATED SCENARIO

Summary

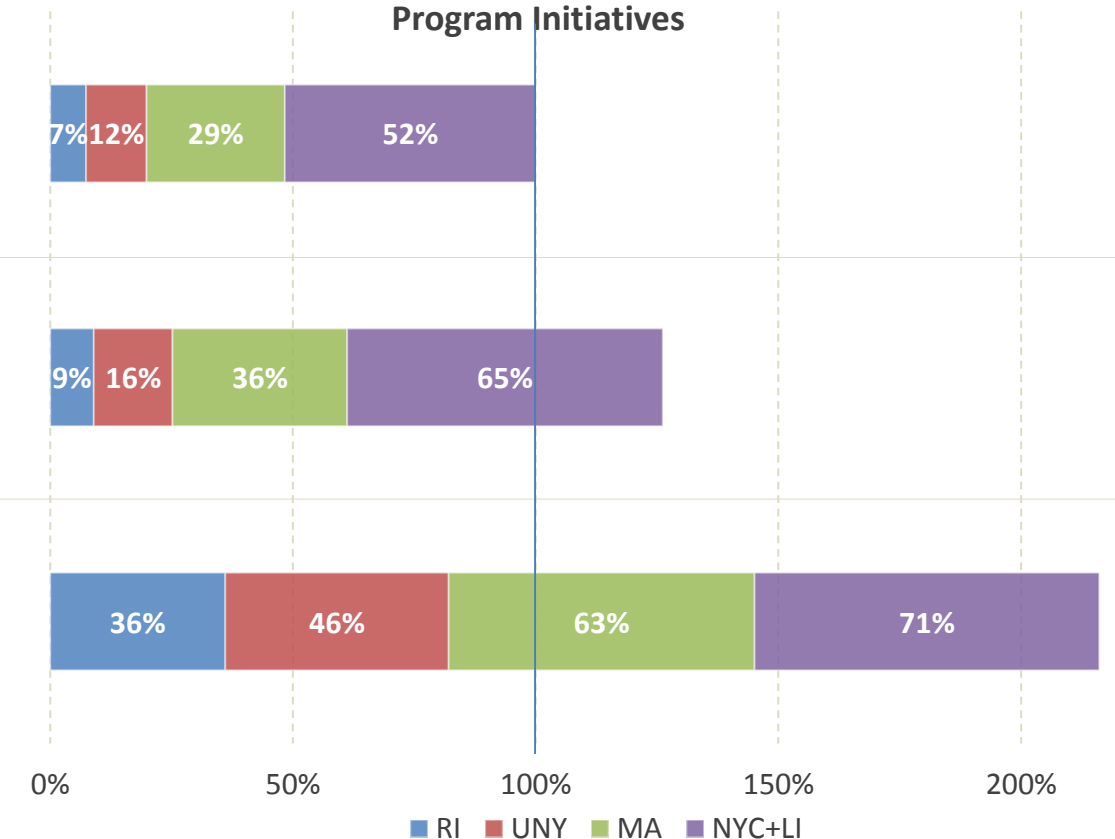
March 16, 2017

Methodology

Three different methods were used to estimate the cost of disaggregating the current, integrated GBE program into four independent, regional GBE programs.

- | Method | Description |
|--------|--|
| 1 | Enterprise, Shared Solutions <ul style="list-style-type: none">Method applied to initiatives that implement enterprise or shared capabilities (e.g., supply chain, IS, asset management)Costs of the disaggregated GBE program initiatives remain the same as those in the integrated program |
| 2 | Lost Economies of Scale <ul style="list-style-type: none">Method assumes a increased effort of 25% due to lost economies of scale (e.g., increased effort to manage four programs vs. one program, increased # of integrations to four separate solutions) |
| 3 | Duplicative Solutions <ul style="list-style-type: none">Method assumes a similar solution (e.g., EAM, GIS) is implemented independently across four regions; reuse of components is limitedIncreased cost due to duplicative efforts (e.g., process architecture, detailed design, testing) and the significant increase in integrations and legacy remediation as a result of four independent solutionsAverage cost increase is approximately 215% for each initiative implementing duplicative initiatives |

Cost of Regional GBE Initiatives Relative to Current Integrated GBE Program Initiatives



Cost Comparison

nationalgrid
GAS BUSINESS ENABLEMENT

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 3-64
Page 3 of 3

After applying the three estimating approaches to each of the GBE initiatives, the cost of four independent, regional GBE programs would be approximately 1.52 times the cost of the integrated GBE program.

	GBE Program	Regional Scenario					
Workstream	All Op Co	RI	UNY	MA	NYC+LI	Total	Cost Ratio
Asset Management	(\$68,743)	(\$15,129)	(\$20,390)	(\$32,282)	(\$43,794)	(\$111,596)	162% ↗
Business Enablement	(\$31,011)	(\$8,295)	(\$10,873)	(\$16,115)	(\$20,239)	(\$55,522)	179% ↗
Customer Engagement	(\$54,857)	(\$5,053)	(\$8,484)	(\$19,436)	(\$35,223)	(\$68,196)	124% ↗
Data Management	(\$31,604)	(\$2,927)	(\$4,914)	(\$11,259)	(\$20,405)	(\$39,505)	125% ↗
Information Services Enabling	(\$45,453)	(\$10,751)	(\$14,264)	(\$21,775)	(\$28,348)	(\$75,138)	165% ↗
Portfolio Office	(\$42,587)	(\$3,765)	(\$6,320)	(\$14,479)	(\$26,240)	(\$50,804)	119% ↗
Regulatory and Compliance	(\$19,000)	(\$1,408)	(\$2,364)	(\$5,415)	(\$9,814)	(\$19,000)	100% =
Supply Chain	(\$10,852)	(\$804)	(\$1,350)	(\$3,093)	(\$5,605)	(\$10,852)	100% =
Work Management	(\$103,175)	(\$34,557)	(\$44,313)	(\$62,047)	(\$72,209)	(\$213,126)	207% ↗
Software	(\$39,753)	(\$2,946)	(\$4,945)	(\$11,330)	(\$20,532)	(\$39,753)	100% =
Hardware	(\$11,105)	(\$823)	(\$1,381)	(\$3,165)	(\$5,736)	(\$11,105)	100% =
Grand Total	(\$458,141)	(\$86,459)	(\$119,598)	(\$200,396)	(\$288,144)	(\$694,597)	152% ↗
Estimated Duration	5 Years	3 Years	3 ½ Years	4 Years	4 ½ Years	n/a	

Division 3-65

Request:

Referring to the testimony of Johnson and Connolly, p. 35, it states that in Rhode Island, the Company is "highly reliant upon paper-based operation."

- a. Please describe the paper-based operation in Rhode Island.
- b. Does this paper-based operation differ from the operations in Massachusetts and New York? If yes, please explain the differences.

Response:

- a. In Rhode Island, the majority of field operations tasks are initiated, processed, completed, and closed-out with paper forms. Unlike its Massachusetts and New York affiliated gas operating companies, the Company does not have a work-management software application to support mandated compliance and preventative maintenance activities, such as inspections and recurring maintenance required on new and existing assets in service. Due dates for these pipeline safety and compliance-related activities are managed, tracked, and reported from paper files and spreadsheets. Further, all planning and execution of construction activities, including leak repairs, new and replacement services and mains are managed with paper work packages with status of the work supported from a locally developed Access database.
- b. Yes. All gas operating companies in both Massachusetts and New York have existing work-management software applications to support the activities described in the Company's response to part (a), above. In Rhode Island, for each of the activities described in the response to part (a), above, the Company's existing applications do not fully serve the needs of the business and require manual intervention, including tracking of activities with paper forms and locally managed spreadsheets to track and report certain activities.