Division 3-23

Request:

Please provide copies of all studies, reports, presentations, and authorization papers justifying or questioning the need to invest in the projects identified in the Technology Modernization Program in Schedule ISP-2.

Response:

Please see Attachment DIV 3-23 for the Technology Modernization Business Case. The program is a multi-year initiative, and the projects shown in Schedule ISP-2¹ representprojects that were deemed the most critical and sufficiently scoped for inclusion in this rate case filing.

¹ See Bates Pages 48-65 of Book 7.

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BUSINESS CASE

Proposed Program: Sponsor: Anuraag Bhargava Lead: Hisham Zahran

Author: Hisham Zahran Date of last business case:

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nationalgrid

Approved By: Steering Group Approval:

EXECUTIVE SUMMARY

Technology Modernization

Goal

Modernize obsolete technology and services that encumber our employees and customers. Enable the implementation of cloud, ubiquitous mobile and big data technologies that will be needed for Growth Playbook Plays (#4,5,6,7,8,9,10) NY REV / MA Grid Mod

Challenge / Opportunity

Elongated period of underinvestment compared with peer utilities

- The fast pace of changes in technology has led to disparate and aged assets with various capabilities and require better consolidation
- Core customer facing and operational processes face a number of key risks and performance issues given current technology

Action Plan

- Acquire, develop insourced talent to drive technology modernization
- · Change our supplier portfolio & relationships
- Implement architecture and technology roadmap Replace aging infrastructure over multiple years
- Develop strategy, asset owner and remediation plan for OT telecom
 Upgrade and rationalize IS and business applications



Investment	Capital	46	66	62	57	58	289		
nvesunent	OpEx Costs	15	21	20	14	14	86		
	Revenue								
Benefits	OpEx Savings	(1.4)	3.6	3.9	3.9	3.9	14.0		
	Avoidance	0.0	3.4	4.9	5.0	5.0	18.4		
Risk Rec	luction		 Almost Certain to Less Likely 						
1	KPI				Impact				
Employe		ont -	4 th Quartile to 2 nd Quartile Eng Suprey						
Employe	e Engagem	ent	4 ^{an} Quartile to 2 nd Quartile Eng Survey						
Test and Environm	Dev ients		 Provi 	sioning f	from 45 o	lays to 5	days		
IS Project Cost and Duration				25% improvement over 3 years					
Mega Pr Performa	ocess ince (SLA)	3	 20-30 critica 	I% uptim I services	ne improv s and ap	ement o	n		
		Kev D	epend	lencies	8				

Sponsor: Anuraag Bhargava

Owner: Hisham Zahran

Section	Investment Description	Strategic Fit	Assumptions & Dependencies	Benchmarking	Alternative Solutions	Recommended Solution	Financials (including benefit sign off)	Assurance & Delivery risk
Complete								
Escalation								

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SECTION 1: INVESTMENT DESCRIPTION

Objective: Move towards a sustained, multi-year investment programme to address IS health and capability challenges while enabling National Grid's strategic business objectives.

There are three investment areas needed to modernize technology and improve information Services at National Grid:

- 1. First is the **infrastructure and networks** that are used to compute, store and transfer data.
- 2. The second is the **business applications** used to generate information and complete business processes. These range from large applications like SAP and Maximo to smaller ones that only a portion of the workforce uses like TapRoot.
- 3. The third is **sourcing renewal** bringing more talent in-house to grow internal IS capabilities.



The investment will be phased to mitigate risk, achieve value and allow for adjustments as business conditions change. The first phase will vet the proposal, ramp and align resources. The second phase will be the implementation of FY18 "Shovel Ready" programs. The third phase, occuring in parallel, will be to develop the architecture and roadmap for technology modernization and Optel. The fourth phase will be the implementation of those programs in FY19-FY22

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Investment Summary

		FY18	FY19	FY20	FY21	FY22	TOTAL
End Usar Compute	Capex		4.20m	3.70m	4.00m	4.00m	15.90m
End Oser Compute	Opex		2.24m	2.16m	1.95m	2.10m	8.45m
Natworking	Сарех		10.17m	6.35m	3.90m	3.70m	24.12m
Networking	Opex		2.81m	1.58m	-0.38m	-0.16m	4.61m
Data Contor/Cloud	Capex		8.85m	11.45m	9.77m	10.32m	40.38m
Dulu Center/Cloud	Opex		3.96m	3.75m	3.33m	3.33m	14.36m
Infrastructura Total	Capex		23.22m	21.50m	17.67m	18.02m	80.40m
initastructure rotai	Орех		9.00m	7.49m	5.66m	5.27m	27.41m
Sourcing	Сарех						0.00
Sourcing	Opex		1.0m	1.40m			2.40m
CNU	Capex		20.00m	21.00m	10.00m	10.00m	61.00m
CINI	Орех		6.5m	6.30m	2.00m	2.00m	16.80m
Application	Capex		12.15m	11.99m	15.75m	15.76m	55.65m
Rationalization	Орех		3.16m	3.16m	4.36m	4.04m	14.72m
Rusiness Innovation	Capex		10.70m	7.9m	13.50m	14.00m	46.10m
business innovation	Opex		2.10m	1.60m	2.70m	3.00m	9.40m
тоты	Capex	46.40m	66.07m	62.39m	56.92m	57.78m	289.15m
IUIAL	Opex	15.00m	21.76m	19.95m	14.72m	14.31m	85.73m

Most IS investments are allocated to all OPCOs and there is lag between cost incurred, test and rate year. In some extreme cases the lag has amounted to seven years (end of life). However, recent rate cases have demonstrated that regulators are willing to approve reasonable IS investments.

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Problem Statement Summary

Infrastructure	Application	IS Sourcing Renewal
 Due to long periods of under investment IS is challenged to: maintain service levels enforce contractual standards with vendors support day to day business requirements secure our data provide effective collaboration between employees meet new business requirements obtain spare hardware in the marketplace develop test and development environments for IS projects 	 The revision and obsolescence of applications creates issues: Operational downtime and inefficiencies As IS replaces infrastructure, it will need to identify, rationalize or remediate old applications interfaces, data bases Many of the applications are maintained at a "best effort" level by vendors, because there is no monitoring capability or resiliency to stop cascading failures. Vendors do not support legacy software and technical components due to age Customization of applications prevents standard upgrades 	 Growing the internal IS capabilities through hiring of talent will be the key for supporting the business' growth plans In addition to ensuring that the talent is built within National Grid, this approach also ensures that knowledge is also retained within National Grid by developing a deeper talent pool This effort will also be supported by an IS re-org which will support the growth of the organization to better meet the business' needs

This play will:

- Support current and evolving business demands
- Improve speed to market of IS projects
- Improve core customer, front office and back office operations
- Enable our employees
- Enable productivity and growth
- Improve employee engagement

Successful Program Outcome:

The program will improve the IS experience for our employees and customers. These improvements will be experienced through improved reliability, use ability, speed and efficiency across all functions. Over time, the investment will allow the functions to take advantage of Advanced Analytics and Mobility. The program will also reduce the risks of system failure which have customer, brand and cost implications. The investments will be proposed as part of OPCO rate cases with a goal to achieve 100% cost recovery. The Optel program would establish and vet a holistic strategy with the US Exec resulting in organizational changes, new operating model and investment decisions.

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Successful Infrastructure Outcomes

Cloud Ready for Advanced Analytics and Mobility

- o SCI- Secure Cloud Interconnect
- o VStig-Faster Internet access
- o SDN-Software defined networks
- DaaS-Desktop as a Service

Data Center of the Future (replaces current vendor and National Grid data centers)

- o AWS-Amazon Web Services
- o Azure-Microsoft Cloud
- Cloud Brokering
- o Orchestration-Infrastructure Provisioning
- Auto Tiered Storage
- Cloud Storage-Box/S3/Azure

More Secure and Resilient Infrastructure and Networks

- Z-Scaler-Cloud Security
- VSTIG P3-Perimeter security improvements
- Network Upgrade Program

Employee Flexibility to Work and Collaborate Anywhere

- Office 365 cloud based Microsoft Suite for mobile devices
- o Dense, pervasive Wireless Networks
- o Virtual Desktop Infrastructure
- o Box (Enterprise File Sync and Storage) Share Point replacement
- Enhanced and Distributed Video Conferencing

Operational Excellence

- o Comprehensive Integration Services
- o Data Visualization
- o Active Directory
- o Call Manager upgrade
- Application Portfolio Management (upgrade cycles)
- IS Monitoring and Diagnostic Tools
- Service Now (Improved Service Desk and Incident Resolution)

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Successful Program Outcome (cont.)

Successful Application Outcomes

Reliability and Resiliency

- Applications are patched for security improvements
- Modern and common technologies (avoid niche suppliers with limited track record)
- Reduce complexity and risk of application estate
- Lower impact and likelihood of failure on US Risk Register

Rationalization and Simplification of Application Estate

- Critical applications and middleware rationalized or upgraded
- Improved user experience and use of modern application functionality (reporting, mobility)
- · Rationalize and decommission of legacy applications and costs
- Drive use of standard application to avoid customization

Capability and User Experience

- Improved user experience and use of modern functionality (reporting, analytics, mobility)
- Move from complex thick clients to thin clients web based leveraging API and Information Bus
- Drive use of standard application to avoid customization
- Integration with Advance Analytics Architecture and Data Lake

Operational Efficiency

- More supplier options for application maintenance contracts
- Ability to leverage offshore resources

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Successful IS Sourcing Renewal Outcomes

Leadership and Resources

- · Asset owner, Vice President and supporting resources
- Improved asset management and operation of IS resources

Strategy and Architecture

- A reorganization of the IS organization will be implemented to better support the business
- Teams will be business focused in order to drive greater impacts from IS projects and deliver faster, more effective IS landscapes and deliver better information to all stakeholders
- Future proof our business

Operational Effectiveness

- Creating IS leads supporting each business tower, leveraging key resources dedicated to each tower
- Deepening our IS skills bench allocated to each business tower
- Driving greater alignment with the business function, each Tower Lead will function as a mini-CIO dedicated to the business, overseeing a robust set of dedicated resources for that business tower.

Risks and Opportunities:

IS assets and applications are listed on the US Executive Risk register. The impact is estimated at ***\$60M - \$100M**" and the likelihood of failure is assessed at ***almost certain**". See bubble #8 below. Business continuity plans have been adjusted to recognize these risks, but it's not plausible test for a realistic incident given the company completes millions of electronic transactions (work orders, regulatory reports, payments, etc.) every week.



Financial impact is based on the jurisdictions sustaining business continuity for extended periods. Increased costs result from inefficiency, overtime, contractor costs, revenue loss or compliance fines. Given the complexity of infrastructure and systems recovery could take multiple days, possibly weeks. The likelihood is based on the frequency and duration of IS infrastructure and system incidents. IS maintains and reports out on these incidents aligned to mega process and underlying cause. There are definitive patterns between incident history and specific systems and infrastructure (see appendix).

The US Executive Risk Register also lists the controls to mitigate risk. It's important to note that all of the controls relate to investment and recommend Growth Playbook and Business Plan funding.

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The program, over time, reduces the likelihood of systems failing, the impact of a failure as well as potential cyber-incidents. Some systems and the underlying technical components cannot be patched because the suppliers do not provide updates. This gap creates vulnerabilities for malware and cyber incidents that hackers look for. Modern technology provides a diagnostic capability to detect performance issues before incidents cascade and disrupt an operation or customer activity.

The next chart highlights the business functions and mega-processes impacted by our Top 10 at-risk applications. Both the applications and the infrastructure they sit on are out dated and un-supported, with higher than average business-impacting downtime.

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	<u>, </u>													
		Tech		Infrastucture	e/Network	Applicatio	n/ Database	Current	Tactical (Implem	mitigations ented/Plan ned)		AM	FY17	Post Mitigation and FY17 INVP
Business Area	Application	score	No. of months where Mega process was impacted out of the past 13 months	Reliabilty(H- 1, IVI-2, L-3)	No. of incident	Reliabilty(H- 1, IVI-2, L-3)	No. of incident	AMRisk	Infrastru cture/ Network	Applicatio n/ Database		Risk-post tactical mitigations	IN/P	AMRisk
	Mobile Work-Field Force Enablement (Mwork-FFE) (JCAPS)	35	12	3	8	3	22	Very High	Y	Y	5	High	N	High
	Maximo-Generation	36	1	1	0	1	0	Low	N	N	2	Low	N	Low
	Ischeduler	27	8	3	2	3	15	Very High	N	Y	5	High	N	High
Operations	STORIVIS	16	з	2	1	3	0	High	N	N	5	High	N	High
	Automited Vehicle Locating System (AVLS)	3	9	3	1	3	9	Very High	Y	Y	5	High	N	High
	Common Work Queue (CVVQ)	44	7	2	1	3	7	High	N	Y	5	High	N	High
	Teamcenter	33	0	3	0	3	0	Very High	Y	N	5	High	Y	Low
	Interruption Distruption System(IDS)	29	6	2	1	2	4	Medium	N	Y	3	Medium	N	Medium
	IVR (CRIS III) aka (Avaya) Interactive Voice Response	17	6	3	3	з	5	Very High	Y	N	5	High	Y	Low
CUSTOMER	IVR (CSS)	11	7	3	3	з	4	Very High	Y	Y	5	High	Y	Low
	Siebel KED	29	3	з	2	3	1	Very High	N	Y	5	High	N	High
	Energy Markets Web	24	0	з	0	з	5	Very High	N	Y	5	High	¥	High
	US Retail Web	19	7	3	0	2	8	High	N	N	5	High	Y	High

Summary of Highest Risk Applications and Performance Reporting

The diagram below shows the relationship between the applications, functions and Jurisdictions. **Major Applications by JDx and Function**



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Solution Strategy:

The solution will be phased to mitigate risk, achieve value and allow for adjustments as business conditions change. The first phase will vet the proposal and ensure all resources are available. The second phase will be the implementation of proposed projects listed in the document – FY18 "Shovel Ready" programs, in addition to implementing the IS Sourcing Renewal effort to increase internal IS staff. The third phase, occuring in parallel, will be to develop the architecture and roadmap for technology modernization. The fourth phase will be the implementation of those programs in FY19-FY22



Solution Strategy: Tech Modernization Phases

FY18 "Shovel Ready" and "No Regrets" Programs

Programs will be delivered with current IS resources, operating model and vendors through FY19. Incremental resources from procurement will be needed to support the projects. The program would encompass three coordinated projects focused on infrastructure, networks and applications. These programs have already been cost estimated by IS for the FY18 investment plan.

Planning and Multi-Year Implementation

Architecture, resourcing and planning of future phases of technology modernization will be established in FY18. Implementation of these programs will occur between FY19 – FY22.

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IS Resourcing Renewal Strategy

The IS Resourcing Renewal strategy will establish a new organizational structure and hire roughly 80 resources in order to deepen the capabilities of IS resources dedicated to each business tower. With full accountability held by a Tower Lead, that person will function as a mini-CIO for that business tower. This person will oversee Strategy, service delivery, program delivery, Architecture and the financials for each tower. This enhanced responsibility will increase accountability for IS performance within their tower.

Key attributes of the solution:

- o Scalable: Meet growing customer, regulatory and functional needs for IS solutions
- o Adaptable: Provide multiple services and capability sets without modification
- o Resilient: Monitoring capability to identify suboptimal performance prior to application failure
- o Latency: Meet the needs of the users to complete activities in a practical time span
- o Efficient: Total cost of ownership, both to build and operate, within first quartile performance
- o Intuitive: Provide users a with simple and straight forward user experience with IS



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SECTION 2: STRATEGIC FIT

The program directly impacts the business' ability (or inability if not funded) to deliver core operational capabilities applicable to each Jurisdiction. It is also a fundamental investment needed for the other Growth Playbook plays – specifically **Advanced Analytics, Customer Experience Transformation and Gas Enablement.** Detailed Strategic fit by Jurisdiction is listed in Appendix I.

Impacts	New York	Massachusetts	Rhode Island	FERC
Objectives	 Improve compliance and operational performance Develop our talent and deliver a resource plan to support long term strategic needs by 2018 	 Deliver customer value and execute on our commitments Strengthen talent and organizational capabilities 	 Leverage technology to meet our customer's current and future needs Exceed the needs of customers, stakeholders and regulators while delivering allowed ROE 	 Enhance flexibility of the grid to enable future energy solutions
Plays	 Advanced Analytics Gas Enablement Customer Experience Accounting & Controls Smart Customer & NES 	 Advanced Analytics Gas Enablement Customer Experience Accounting & Controls Smart Customer & NES 	 Advanced Analytics Gas Enablement Customer Experience Accounting & Controls Smart Customer & NES 	 Advanced Analytics Accounting & Controls
Regulatory	 IS investments approved in KEDNY/ KEDLI forward looking rate case Other NY operating companies lag IS investments 	 100% of IS investments approved in MECO rate case However test year lags current IS investments 	 Last service company rate case was 2011 Significant lag and overspend compared to Cost of Service 	 Monthly update and recovery of IS costs
KPI's	 Gas Compliance Electric Reliability Customer Satisfaction 	 Gas Compliance Electric Reliability Customer Satisfaction 	 Gas Compliance Electric Reliability Customer Satisfaction 	 Gas Compliance Electric Reliability Customer Satisfaction

Summary of Alignment between Technology Modernization and JDx Priorities

The table below highlights the impact of proposed application projects on the business functions and other Growth Playbook Projects . It is important to note that the infrastructure and application projects are required for the other Growth Playbook Programs: Advanced Analytics, Customer Experience, Gas Enablement and Finance Controls. If the technology modernization investments are not made these projects will be challenged to scale or meet user needs and incur incremental costs to provide the necessary infrastructure, networks or supporting applications. For example, Customer Experience will scale SaaS applications and electronics communications with customers across multiple channels. These efforts will create significant for customers but they will also create new demands for computing, network communications, and data storage.

SECTION 3: ASSUMPTIONS AND DEPENDENCIES

Assumptions:

1. Resources on boarded to support phase two multi-year investments and ensure the right level of in-house resources to ensure spans and control as well as technical capability.

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- 2. Incremental procurement resources to support hardware and software purchases
- 3. Sufficient business unit cooperation to support application testing pre/post- infrastructure upgrades
- 4. A Program Management Office is focused on this effort to ensure proper leadership, planning and support throughout
- 5. Multi-year funding commitment as some projects will not be completed within a fiscal year.

Dependencies:

Several other GPB plays and strategic initiatives are dependent on the work described within this document, in order to progress and succeed including:

- a. Advanced Analytics computing, cloud ready and networks. To enable and support these capabilities, several capabilities would need to be stood up or refreshed within the organization. A partial list of the major initiatives proposed within this Tech Modernization business case that would enable Advanced Analytics work include:
 - 1. INVP 4496 Network Program
 - 2. INVP 4606 Data Visualization Expansion
 - 3. INVP 4496 US Network Program
 - 4. INVP 4495 Secure Cloud Interconnect
 - 5. INVP 3899 Azure Core Service Enablement
 - 6. INVP 4706 1327 Interfaces 523 FTS
 - 7. INVP 4498 VSTIG Program
 - 8. INVP 4709 Data Center Consolidation Efforts
- b. Finance Controls SAP infrastructure, compute, cloud ready. To enable and support these capabilities, several capabilities would need to be stood up or refreshed within the organization. A partial list of the major initiatives proposed within this Tech Modernization business case that would enable FInance work include:
 - 1. SAP HANA integration with the cloud environment to allow SAP data exchanges where cloud users need Back Office data with non-SAP data
 - 2. INVP 4496 Network Program
 - 3. INVP 4606 Data Visualization Expansion
 - 4. INVP 4496 US Network Program
 - 5. INVP 4495 Secure Cloud Interconnect
 - 6. INVP 3899 Azure Core Service Enablement
 - 7. INVP 4706 1327 Interfaces 523 FTS
 - 8. INVP 4498 VSTIG Program
 - 9. Additional funding maybe required to scale up the Data Lake platform to meet the DSIP and MA-Grid modernization storage capacity and processing requirements.
- c. **Gas Enablement** computing, application upgrades, networks and mobility, cloud ready. To enable and support these capabilities, several capabilities would need to be stood up or

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refreshed within the organization. A partial list of the major initiatives proposed within this Tech Modernization business case that would enable Gas Enablement work include:

- 1. INVP 4496 Network Program
- 2. INVP 4606 Data Visualization Expansion
- 3. INVP 4496 US Network Program
- 4. INVP 4495 Secure Cloud Interconnect
- 5. INVP 3899 Azure Core Service Enablement
- 6. INVP 4706 1327 Interfaces 523 FTS
- 7. INVP 4498 VSTIG Program
- 8. INVP 4709 Data Center Consolidation Efforts
- 9. Several application upgrades
- d. Customer Experience Transformation cloud ready, integration services, networks. Some basic upgrade work needs to occur to the systems underlying CXT functionality. This includes OMS upgrades, CRIS/CSS upgrades, New Connect gas & electric upgrades work to Storms/Maximo. To enable and support this new functionality, several capabilities would need to be stood up or refreshed within the organization. A partial list of the major initiatives proposed within this Tech Modernization business case that would enable CXT work include:
 - 1. INVP 4496 Network Program
 - 2. INVP 4606 Data Visualization Expansion
 - 3. INVP 4496 US Network Program
 - 4. INVP 4495 Secure Cloud Interconnect
 - 5. INVP 3899 Azure Core Service Enablement
 - 6. INVP 4706 1327 Interfaces 523 FTS
 - 7. INVP 4498 VSTIG Program
 - 8. INVP 4709 Data Center Consolidation Efforts

Inter-	Business	HR / Hiring	Procurement	PEX/	Controls	Technical
dependency	Readiness	& Training		Investment		Accounting
				in Process		
Dependent On	Business Function Availability	IS Insourcing Program and Hiring	Incremental Resources	Sanction and USSC process		Treatment of Software as a Service
Description	Functions ability to support testing of new application or application moves	Hiring of (6) architecture, (8) technical and (5) delivery resources for phase two	(2) incremental resources to support RFI, RFPs, commercial negotiation, and POs	Streamline process and implement program funding		Specific rules and processes for IS and Finance to determine Capex / Opex treatment for SaaS products
Enabler to	Transitioning off legacy application and infrastructure	Implement the program on schedule within budget	Meeting project schedule and deliveries			Capitalization of SaaS investment

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SECTION 4: BENCHMARKING

Benchmarking NG's IT capabilities revealed widening gaps between industry peers. Based on the document "Gartner's IT Key Metrics Data 2016: Key Industry Measures: Utilities", analysis of NG's IT spend and capability against industry standards has shown continued underinvestment for the last four years (sweating the assets).

Companies (and utilities) maintain a governance structure and cadence that requires technology upgrades to occur at a prescriptive frequency. For example, a company may refresh servers every five years and complete major software upgrades every other year alternating between operations, back office and customer systems. This allows the utilities to proactively manage its assets and tie investments to longer term business plans.

The companies also forecast future demand for IS computing and network capacity based on business priorities and initiatives. Utilities undergoing transformation initiatives or replacement of legacy systems, such as Gas Enablement or Customer Experience, should anticipate changes in the demand on underlying infrastructure. For example, utilities that have implemented Advanced Metering Infrastructure and are storing interval read data or outage and restoration notification data; have increased their storage investment 200% per year. Our average storage growth rate over the past two years at National Grid has been 12.5% per year.

Utilities typically employ a governance structure that requires the rationalization of infrastructure and applications at the time merger and acquisition (Duke, Exelon) or choose to operate the company in a federated fashion (Berkshire Hathaway, American Electric Power, Dominion). Most utilities employ common architecture, infrastructure and networks across the operating companies.

Based on Gartner's benchmarks for Medium-sized utilities' spend on IT per revenue \$ (under \$10 Billion in revenue), US investments for fiscal years 2014 through 2016 were below the fourth quartile. Gartner benchmarks cite that utilities on average spend 2.9% of revenue on total information technology between investments, and run the business costs with the middle quartile spanning 1.5% to 4%. US IS spends approximately 1.9% - 2.5%. While this amount sounds meaningful, a majority of the spend has been focused on run costs and tactical investments that do not provide the company with the opportunity to modernize and provide employees with new capabilities. In comparison with the UK, their investment has been 3.7% of revenue and they do not have the number of aged systems.

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1 National Grid US Technology Spend vs Gartner Industry Benchmark

— Medium company benchmark



Last year, National Grid spent over \$14.1mm on Computing Service Data Centers with our vendor. Benchmarked against other companies who pay outside vendors for such services, National Grid spends on average 3% more than the average company on such services in the US – nearly \$500k. This effort would pursue greater efficiencies in our hardware structure to address that 3% gap. There are a variety of pursuits that we would undertake to address greater efficiency in this space. These pursuits include:

- Improve our procurement function

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- Revaluate our vendor selection and relationships
- In-sourcing IS talent for greater control and consistency in quality IS execution

National Grid's annual spend on mainframe services and storage in the U.S. were 3% higher than average across industries. Our Storage and Backup costs for mainframes alone are 23% and 29% higher than the average respectively. At nearly \$9.4mm in total mainframe spend, that represents nearly \$300k of efficiencies we can pursue to reduce overhead associated with mainframe usage.

On the UNIX and Windows server fronts, we also have opportunities to pursue a right-sizing effort to ensure that our 9% average overspend on UNIX and 3% overspend on Windows servers can be addressed. Greater implementation of virtualization, cloud and storage migration would go a long way to increasing our inefficiencies there.

Services provided by our vendor responsible for our communications (LAN/WAN, Security/RAS, Voice calling, Video Conferencing) is 10.2% higher than average, representing a \$2.8mm opportunity to address and refresh our outdated hardware and services to try to drive down inefficiencies which are contributing to that 10.2% over-average cost.

A January 2016 benchmark of the Verizon services performed by an IS industry benchmark firm ISG indicated that our aggregate networking charges are 10% above a Reference Group Mean. This situation presents an opportunity for National Grid to reduce costs in the areas indicated below through the more effective deployment of tradition technologies and further savings with the deployment of more innovative services like software defined networks and cloud based security tools.

US Aggregated Findings - VZ Annual Service Cost **US Delta to TQ Analysis** by Service Type (\$m) Delta to Delta to WAN Service NG (\$m) RGM **RGM (%)** RGM (£m) SECURITY & RAS VOICE \$3 58 \$4 23 -15.41% -\$0.65 VIDEO CONFERENCE LAN \$35.00 \$30.00 \$14.88 \$13.79 7.87% \$1.09 WAN \$1.76 \$1.19 \$25.00 \$5.31 SECURITY \$4.73 \$4.02 17.64% \$3.42 \$0.60 & RAS \$4.02 \$20.00 \$3.42 \$5.31 \$4 73 12.30% \$0.58 VOICE \$15.00 CARRIER \$14.88 \$13.79 \$0.61 \$0.00 \$0.61 \$10.00 SERVICES VIDEO \$5.00 \$1.76 \$1.19 47.51% \$0.57 CONFEREN \$4.23 \$3.58 Ś-CE US NG/VZ US RGM \$30.16 \$27.37 10.19% \$2.79 Overall

The table below provides a summary of the deltas between the US aggregated expenditure and the Mean (RGM) by percentage and US Dollar values. US aggregated charges are 10.2% (\$2.79 M) higher than Reference Group Mean

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Within the Cloud Office space, Gartner analysis indicates in large public enterprises (revenues greater than \$10B) 80% are using Office 365. In migrating to Microsoft Office 365, we would be pursuing some benchmark cost savings as a goal. The reasons why a significant shift to cloud office is occurring varies by industry but is generally driven by the same drivers for National Grid, namely:

- Need for external collaboration
- Need for more internal social collaboration
- Need to move to more mobile based productivity
- Ability to work anywhere, any time
- Ability to remain evergreen

Microsoft Cloud Office drives several hard and soft benefits. Forester conducted a benchmark of Office 365 users and produced a benchmark of a synthetic enterprise organisation of 6000 users finding the total economic impact over three years had an NPV of \$5.6M. This broke down into

- \$2.42M in technology cost savings
- \$2.81M in productivity gains from having a more mobile workforce
- \$90K in compliance and controls
- \$3.2M in production gains through better business intelligence
- \$247K in Enterprise Social.

Application Health

The following 3 tables give an overview of applications capability and health. This shows the support and dependencies between the application work to be done against the various business functions. In many cases the applications do not meet the current capability needs of the Jurisdictions.



Major Customer Applications

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Major Back Office Applications

100			200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200 - 200			
P ECC Fin	BPC	CSS	1. Fina	ancial Services		
BW	CRIS	PowerPlan				Energy Sawy
			Interaction\	Foundation Service	vices	
			Netweaver	Ariba		
200		_				
2. F	leet Services		4. Noi	n-Utility Billing	Services	7. Asset (APC) Services
oel KED	CSS	Geocoder	MITS	Statistics	Readings	Storm Center ABB OMS
CIAP	DOXO	Code 1	HES	FDM - NYC	Entry System	
idForce	CIAC		CSS	EPO Tracking	FDM - LI	
DSM	GCR		MV90	CRIS	IEE - MDMS	
Power	CRIS		WVKS			
rgy Sawy	CDI		5. Supply	Chain Managem	SAP NUR	
			CSS	DualRate	Pitney Bowes	
3. Human	Resource Serv	ices	MBS	Bill Calculator	ISIS	8. Home and Energy Manageme
			Summary	Transportation	Striata	Services
GridForce			- Chilling	Verimove	Tariff 9	GridForce
CRIS	CSS		6.	Work Order Ser	vices	DSM EBB
Maximo	MDSI		CRIS	EDI	Striata	Ceiva CSS
STORMS	MWork		CSS	Experian	EL Serve	Energy Affiliates CRIS
CWQ	iScheduler		E ID	KIOSKS	Direct Day	GTIS Energy Markets
			Constant of Consta	nuoska	Direct Pay	VYCD

Major Operations Applications



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SECTION 5: ALTERNATIVES AND SCENARIOS

Scenario 1: Do Nothing

- a. Continues operating the infrastructure as-is and performing replacements for critical infrastructure as things fail (this has resulted in numerous budget exceptions each year)
- b. Grows the list of systems and services, which are end of life, and no longer supported by our vendors.
- c. Stay on existing Intranet Collaboration and email services
- d. Drive higher RTB costs and Increases security risks from our outdated systems
- e. Does not fully enable the environment to exploit the operational and cost benefits of the latest advances in technology especially around cloud computing and technology.
- f. Not deliver the new capabilities the business needs to move forward and meet all of its regulatory and commercial challenges. Much of the existing services were designed before the emergence mobile devices. This work is required for us to keep pace.
- g. Will not allow our business to progress and actually we will fall behind as we retain physical assets encumbered by the need to procure and deploy physical services rather than being able to leverage the capability of cloud services.
- h. As an example, as the business looks to leverage evergreen cloud services like Salesforce, Office365, and SAP Hana, the current network will constrain our ability to (1) connect to these services in a secure manner and (2) with sufficient bandwidth to effectively utilize the services and grow our capability as the capabilities of the cloud services grow.
- i. Attempting to utilize these services without laying the foundation to support them will result in user frustration given lack of network bandwidth, security challenges and potential end device compatibility issues. Ultimately, this could result in National Grid being unable to meet our regulatory and customer requirements.

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Scenario 2: Alternate Phasing

- a. Prioritize the most critical upgrades ahead of others based on risk this will delay benefit to the business functions.
- b. Alternate phasing will ultimately get us to the end state, but by delivering in phases based on certain constraints it will limit the ability to deliver the full set of capabilities at a specific time. For example, if we delivery Software Defined –Wide Area Network that gives us the opportunity to delivery higher bandwidth and less expensive WAN services at a site but delay the implementation of cloud based security tools, it will improve the user experience to utilize corporate services, but retain the limitations around access to Internet and cloud based services
- c. Alternate Phasing option is rejected due the timing challenges it places on the delivery of a complete solution and potentially inhibits the use of the services being installed, waiting for additional enabling capability to be deployed
- d. Alternate Phasing option creates challenges due to the timing challenges it places on the delivery of a complete solution and potentially inhibits the use of the services being installed, waiting for additional enabling capability to be deployed.

Scenario 3: Alternate Phasing

- a. The lower cost option provides some of the target capabilities but may not be the best fit nor deliver all the target end state capabilities of the higher cost option
- b. Will not meet business timing needs to support their initiatives
- c. The lowest cost option is rejected. Cost is a critical factor in the evaluation of all products and services. However, it is one element of many along with technology architecture, market share, security capability, product roadmap, supplier capability to delivery, and integration with National Grid's existing technology and support model that must be considered
- d. With the lowest cost option, Cost is a critical factor in the evaluation of all products and services. However, it is one element of many along with technology architecture, market share, security capability, product roadmap, supplier capability to delivery, and integration with National Grid's existing technology and support model that must be considered.

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SECTION 6: RECOMMENDED SOLUTION

The recommended solution is to fund the program in full for FY18. The programs have been planned and the necessary resources are available to deliver them. This will enable IS to work through its backlog of technical debt, reduce risk and provide value to our employees. During the FY19 Growth Playbook process IS will provide a holistic roadmap and set of options for Technology Modernization over multiple years.



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High Level Infrastructure and Network Implementation Plan:

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SECTION 7: CUSTOMER IMPACT

The impacts of this program on the Customer are based on two high level areas:

- Increase business and enterprise service performance and availability
- Support Jurisdictional and business function initiatives
- Enable Customer Experience Transformation

Examples of Technology Modernization that Impact Customers

Increased bandwidth and resilience – Delivery of software defined Wide Area Network technology will allow IS to deliver high bandwidth business class service through low cost commodity broadband internet services. In combination with cloud based security tools, this technology will support high speed Internet web browsing and use of high bandwidth cloud services even from the smallest locations. The tangible benefits that the user will experience is faster PC start up times, fast file transfers, more responsive applications, and access to bandwidth intensive Internet and cloud based services like, YouTube, WebEx, and Office 365.

Access anywhere from any device – Delivery of pervasive Wireless Networks with the capacity to support a multitude of devices will be key to supporting a flexible and mobile field worker or customer agent. Everyday more wireless only devices are coming to market that can allow National Grid to deliver services in a more effective and efficient manner (e.g. iPads, specialized tablets, sensors, equipment controllers). The implementation of secure wireless networks that support this environment will be critical to improved efficiencies the business will be challenged to achieve.

Unified Communications – As we move to a more mobile world with people working away from the traditional office, it will be critical to have communications systems in place that ensure clear, consistent, and more personal communications between all parties. This will be achieved through use of a consistent set of easy to use communication tools that provide voice, video, and text communications between parties both within and outside the company. In additional these tools will take advantage of the capabilities of the new device being used to relay real-time information in the form of pictures, videos, and telemetry to staff and systems that can process the information and provide informed feedback to the remote staff.

Virtual Desktop - If we don't augment the current service the Business cannot grow, as planned, new development needs due to physical constraints of the existing offering. In addition, the current architecture is not a sustainable service, presents a single point of failure and high risk from internal attacks. The business should expect longer development times when existing resources begin to fail or current development tools need refresh.

Cloud - The business may lose competitive advantages as they will be limited to existing infrastructure options which lack current-state capabilities, are costly and take a long time to provision relative to hyper scale offerings. While not solely a financial advantage at first, there will be economies at scale. Developer productivity will be constrained in the current environment; agile project approaches will simply not work. IS will be silently encouraging shadow IT start ups, via lack of an internal offering and current speed to deliver, which has compliance and other risks.

Applications - Employees and customers will be able to use applications with more functionality in a more intuitive manner through multiple devices. The Jurisdictions and business functions will be able

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utilize more reliable and resilient applications and leverage their full capability. Application upgrades will enable the Customer Experience Transformation play and provide customers with more options to interact with the company.

SECTION 8: RISKS

The Technology Modernization play will support and address the following key US regional risks, as outlined in the FY 17 Q1 Risk Review document.

Risks Addressed by IS Plays	Key US Regional Risks – June 2016
\checkmark	Catastrophic asset failure resulting in a significant process safety event.
\checkmark	Catastrophic cyber security breach of Critical Network Infrastructure (CNI) systems or business systems data.
\checkmark	Serious injury or fatality to employees, contractors or members of the public due to system operations, maintenance failures, vehicle operations or roadway protection.
	Change in reliability of energy supply, impacting price and ability to meet customer demand.
\checkmark	Failure to secure skills and leadership capacity required to deliver our vision and strategy.
	Uncertainty around our ability to provide appropriate controls attestation over business controls operating in the US.
$\checkmark\checkmark\checkmark\checkmark\checkmark$	There is operational risk to the business from an aging information systems portfolio.
✓	NGUSA could incur significant costs related to regulatory compliance for gas safety.
\checkmark	Failure to effectively respond to threats and opportunities presented by external changes (climate, customer expectations, technologies, competition, etc.).
	US Labor lock out causing major operational disruption.

SECTION 9: FINANCIALS

Include a Cost/Benefit Analysis performed in conjunction with finance business partner.

Costs Overview

The costs of the program are broken down into three areas:

- Shovel Ready Programs
 - Programs that can be delivered with current IS resources, operating model and vendors now through FY19. Incremental resources from procurement will likely be needed.
 - These programs have already been cost estimated by IS and are planned as a scenario of the multi-year and FY18 investment plan.
 - o Confidence level of the cost and resource estimates is high

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- National Grid Labor to complete architecture, planning and delivery of second phase programs for technology modernization, application remediation, upgrades and rationalization.
 - These programs would occur from FY19 FY22.
 - Confidence level of the cost and resource estimates is medium
- The IS Resourcing Renewal strategy will establish a new organizational structure and hire roughly 75 resources in order to deepen the capabilities of IS resources dedicated to each business tower. With full accountability held by a Tower Lead, that person will function as a mini-CIO for that business tower. This person will oversee Strategy, service delivery, program delivery, Architecture and the financials for each tower. This enhanced responsibility will increase accountability for IS performance within their tower.
- National Grid and consulting resources to develop Optel strategy.
 - The labor component would also include establishing an asset owner and team. They would engage a consultant for approximately one year to determine the operating structure, technology roadmap and deployment plan aligned with major initiatives

		FY18	FY19	FY20	FY21	FY22	TOTAL
End Licer Compute	Capex		4.20m	3.70m	4.00m	4.00m	15.90m
End Oser Compute	Opex		2.24m	2.16m	1.95m	2.10m	8.45m
Notworking	Capex		10.17m	6.35m	3.90m	3.70m	24.12m
Networking	Opex		2.81m	1.58m	-0.38m	-0.16m	4.61m
Data Contar/Cloud	Capex		8.85m	11.45m	9.77m	10.32m	40.38m
Data Center/Cloud	Opex		3.96m	3.75m	3.33m	3.33m	14.36m
Infrastructura Tatal	Capex		23.22m	21.50m	17.67m	18.02m	80.40m
inirastructure rotai	Opex		9.00m	7.49m	5.66m	5.27m	27.41m
6	Capex						0.00
Sourcing	Opex		1.0m	1.40m			2.40m
CNU	Capex		20.00m	21.00m	10.00m	10.00m	61.00m
CINI	Opex		6.5m	6.30m	2.00m	2.00m	16.80m
Application	Capex		12.15m	11.99m	15.75m	15.76m	55.65m
Rationalization	Opex		3.16m	3.16m	4.36m	4.04m	14.72m
Business Innovation	Capex		10.70m	7.9m	13.50m	14.00m	46.10m
Dusiness (MNOVALION	Opex		2.10m	1.60m	2.70m	3.00m	9.40m
	Capex	46.40m	66.07m	62.39m	56.92m	57.78m	289.15m
IUIAL	Opex	15.00m	21.76m	19.95m	14.72m	14.31m	85.73m

Financial Summary

Cost Recovery Strategy

Based on MECO and KEDNY/KEDLI rate case outcomes, it's anticipated that 90% to 100% of investments will be recovered in rates. The investments will be made at service company level (assets

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capitalized at the service company) and the expensed to the benefiting operating companies. As the investments are made they will be included in the various operating company forward looking test years and proposed for cost recovery. Most investments will be made at a US level and impact and allocated to NY, MA and RI operating companies based on the G-20 allocator.

Productivity / Cost Savings

Based on the vetting at this point in time, the benefits of these IS investments are expected to reflect the savings in the table on page 2. It is anticipated that these investments will enable National Grid to reduce our current operating costs by virtue of cost avoidance and some RTB savings, which will be better quantified as the individual projects move forward in their project lifecycles. These operating cost reductions will be used to offset incremental Jurisdictional demand for new capability and IS services required to meet objectives.

Some of the greatest benefits are expected to be in the areas of IS capacity & reliability. The investments are expected to yield a 20%-40% improvement in overall reliability of IS Services and core mega processes. Benefits will be achieved across the functions over a three to five year period and are dependent on other Growth Playbook initiatives specifically, Gas Enablement and Customer Experience Transformation. A portion of the benefit will be recognized in year two of the program and incremental benefit will be achieved each year following.

Improvements in network capacity and speed will enable office and field employees to complete tasks and analyse information more efficiently. On average capacity will increase 300% for wide area and local networks and will not be a constraint on cloud services or applications. The network capacity at each office and field location will be sized to support three devices per person with 100% building coverage.

Application improvements will be recognized by the benefitting business functions and Jurisdictions.

SECTION 10: PROGRAM COMPLIANCE WITH THE GOLDEN RULES AND CRITICAL SUCCESS FACTORS

Provide detailed plan to address the golden rules of project management execution of your project and complete detail on the approach to the critical success factors.

Area	Basis/Comment	Plan to Address
Active Sponsorship	Program lead and project/initiative leads	Anuraag Bhargava Sponsor,

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Scope Management	Timeline for implementation of each project in the program	Project Plan, Milestone, CPP Cadence, Commercial Agreements with Vendors
Clear Success Criteria	Defined and measurable	Completion of proposed shovel ready programs. Optel strategy milestones and updates
Rigorous Stage gating	Stage gating ambition articulated but criteria still to be defined	Funding will be phased through Feasibility Assessment, Requirements and Design, Development and Implementation, Testing and Go-Live
Business change/readiness	Business support with application testing as needed for infrastructure changes	IS change management and communications team. Business Relationship Management and Project Teams
Good Governance Controls/Planning	Governance in place Plan to address controls (deficiencies or maintenance)	Project Steering Committee, Golden Rules, CPP reporting
Partner Management	Anticipated consultants or outsourcing and procurement plan to achieve	Consultant for Operational Telecom Strategy
High Performance Team	Resourcing plan including cross functional team members	IS, Procurement, Human Resources



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Appendix I – Strategic Fit by Jurisdiction

Build the Foundation for Change	Expand the Core
Drive a Step Change in Core	Deliver the Future

New York Jurisdictional Priorities

Improve compliance and operational performance	Improving IS resiliency, reporting services through Technology modernization and Advance Analytics will improve compliance . Enabling the implementation of cloud, hosted applications, mobile and analytics will greatly enable operational performance , including the mitigation of our aging workforce.
Deliver an innovative gas growth strategy resulting in 5-6% rate base growth	Re-plat forming and replacing infrastructure and systems will enable growth throughout each business unit. Enabling the implementation of cloud, hosted applications, mobile and analytics will greatly enable operational performance. The investments also support and align with the Gas Enablement program.
Develop our talent and deliver a resource plan to support long term strategic needs by 2018	A great deal of success for the IS plays are dependent on scaling up our talent resources – that includes both in-house talent as well as right-sizing our key service providers for engagement with outside talent. A comprehensive talent acquisition will be a core feature of this play for technology modernization FY19-FY22.
Deliver a regulatory framework that supports the core and growth	NY REV is promoting the capitalization of Software as a Service solutions (SaaS) aligning with IS strategy and broader technology trends.
Key Plays	Advanced Analytics, Gas Enablement and Customer Experience, Accounting & Controls, Smart Customer & NES are dependent on this investment
Regulatory	IS investments approved in KEDNY/KEDLY rate cases. Proposed investments approved in the forward looking rate case. NIMO will lag these investments given test year concluding CY2016

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Massachusetts Jurisdictional Priorities

Increase ROE to 95% of allowable return	Several of the IS plays will enable this MA Priority by modernizing high risk, obsolete technology and services that encumber our employees and customers. Re-plat forming and replacing infrastructure and systems that contribute to application outages, inefficiency and impede growth will greatly improve the value proposition for each future investment in the business by promoting greater ROE through better operational performance throughout the organization.
Deliver on regulatory commitments while transforming the future regulatory paradigm	Re-plat forming and replacing infrastructure and systems will enable National Grid to keep pace with the many changes in our regulatory environment. In particular, enabling the implementation of cloud, hosted applications, mobile and analytics will better support the operational performance needed to deliver results throughout the organization's business groups.
Strengthen talent and organizational capabilities	A great deal of success for the IS plays are dependent on scaling up our talent resources – that includes both in-house talent as well as right-sizing our key service providers for engagement with outside talent. A comprehensive talent acquisition will be a core feature of this play for technology modernization FY19-FY22.
Evolve the energy landscape	As the energy landscape evolves, new technologies and new sources of data will be born. National Grid needs to proactively prepare for this new landscape by ensuring that our technology will anticipate and meet the new demands on our technology resources.
Deliver customer value and execute on our commitments	As rapid technology changes influence our customers' needs, their expectations have changed as well. Implementing a refresh in our technology capability now, will pay dividends to National Grid in the years to come in the form of greater customer satisfaction.
Key Plays	Advanced Analytics, Gas Enablement and Customer Experience, Accounting & Controls, Smart Customer & NES are dependent on this investment
Regulatory	100% of IS investments were approved in MECO rate case, however IS investments continue to be made and regulatory lag will impact ROEs until the next rate case.

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Rhode Island Jurisdictional Priorities

Exceed the needs of customers, stakeholders and regulators while delivering allowed ROE	Several of the IS plays will enable this RI Priority by modernizing high risk, obsolete technology and services that encumber our employees and customers. Re-plat forming and replacing infrastructure and systems that contribute to application outages, inefficiency and impede growth will greatly improve the value proposition for each future investment in the business by promoting greater ROE through better operational performance
Deliver successful regulatory outcomes and influence changing regulatory landscape	Several of the IS plays will enable this RI Priority by modernizing high risk, obsolete technology and services that encumber our employees and customers. Re-plat forming and replacing infrastructure and systems will enable National Grid to keep pace with the many changes in our regulatory environment. In particular, enabling the implementation of cloud, hosted applications, mobile and analytics will better support the operational performance needed to deliver results throughout the organization's business groups.
Leverage technology to meet our customer's current and future needs	A great deal of success for the IS plays are dependent on scaling up our talent resources – that includes both in-house talent as well as right-sizing our key service providers for engagement with outside talent. A comprehensive talent acquisition and replacement plan will be a core feature of the IS plays.
Strategically develop and successfully deliver on gas and electric work plans	As the energy landscape evolves, new technologies and new sources of data will be born. National Grid needs to proactively prepare for this new landscape by ensuring that our technology will anticipate and meet the new demands on our technology resources.
Drive a performance culture and strengthen talent and organization capabilities	As rapid technology changes influence our customers' needs, their expectations have changed as well. Implementing a refresh in our technology capability now, will pay dividends to National Grid in the years to come in the form of greater customer satisfaction.
Key Plays	Advanced Analytics, Gas Enablement and Customer Experience, Accounting & Controls, Smart Customer & NES are dependent on this investment
Regulatory	The last service company rate case for RI was completed in 2011. There is significant lag and overspend compared to Cost of Service and this issue will continue to impact ROEs until a service company rate case is approved.
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FERC Jurisdictional Priorities

Deliver 11% FERC returns and safe, strong business performance	Several of the IS plays will enable this FERC Priority by modernizing high risk, obsolete technology and services that encumber our employees and customers. Re-plat forming and replacing infrastructure and systems that contribute to application outages, inefficiency and impede growth will greatly improve the value proposition for each future investment in the business by promoting greater ROE through better operational performance throughout the organization.
Execute on growth opportunities to obtain a ~\$2B increase in rate base / investment base over the Business Plan period	Several of the IS plays will enable this RI Priority by modernizing high risk, obsolete technology and services that encumber our employees and customers. Re-plat forming and replacing infrastructure and systems will enable National Grid to keep pace with the many changes in our regulatory environment. In particular, enabling the implementation of cloud, hosted applications, mobile and analytics will better support the operational performance needed to deliver results throughout the organization's business groups.
Enhance flexibility of the grid to enable future energy solutions	As the energy landscape evolves, new technologies and new sources of data will be born. National Grid needs to proactively prepare for this new landscape by ensuring that our technology will anticipate and meet the new demands on our technology resources.
Key Plays	Advanced Analytics, Accounting & Controls, Smart Customer
Regulatory	FERC is able to include IS costs in its monthly filing. This provides a good regulatory framework for obtaining recovery on costs as they are incurred.

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APPENDIX II - Cost/Benefit Summary

		YR1	YR2	YR3	YR4	YR5	
	USD \$M	FY18	FY19	FY20	FY21	FY22	TOTAL
Investment	Capital	46.4	66.1	62.4	56.9	57.8	289.6
	OpEx Costs	15.0	21.8	20.0	14.7	14.3	85.7
	Revenue	-	-	-	-	-	-
Benefit	OpEx Savings	(1.4)	3.6	3.9	3.9	3.9	14.0
	Cost Avoidanc€	0.0	3.4	4.9	5.0	5.0	18.4

	USD \$M	FY18	FY19	FY20	FY21	FY22	Cum Savings
OPEX SAVINGS							
Office 2010 to Office 365							
Current Office 2010 Annual cost	3.9	3.9	3.9	3.9	3.9	3.9	
New Office 365 Annual cost		5.4	2.6	2.4	2.4	2.4	
Projected Cost Savings	Орех	(1.5)	1.3	1.5	1.5	1.5	4.3
Replace Vendor T-Systems							
Current Production System cost (BAU)	6.6	6.6	6.6	6.6	6.6	6.6	
New Vendor Production System cost (BAU)		6.5	4.3	4.2	4.2	4.2	
Projected Cost Savings	Орех	0.1	2.3	2.4	2.4	2.4	9.7
TOTAL Projected OPEX Savings		(1.4)	3.6	3.9	3.9	3.9	14.0
COST AVOIDANCE							
Reducing Days to Prepare a Project Test Environn	nent						
Current Test/Dev Environment costs (Projects)	5.8	5.8	5.8	5.8	5.8	5.8	
New Dev/Test Environment costs (Projects)		5.8	3.0	1.9	1.9	1.9	
Projected Opportunity	Type 2	-	2.8	3.9	3.9	3.9	14.5
More Throughput Potential							
T Systems	Type 2	0.0	0.6	1.0	1.1	1.1	3.9
TOTAL Cost Avoidance Opportunity		0.0	3.4	4.9	5.0	5.0	18.4

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INVP	Project Name	Project Descrption
		The provisioning of Strategic Cloud provider(s) will reduce the number of cloud-hosting environment that will need integration, reducing the overall network, security and service management costs
		- The resulting solution will reduce time to market and complexity for
3899	Azure Core Service Enablement	Enterprise Services such as the Strategic Analytics Platform, Mobile
		Application Development Environment, etc.
		- Reduce the the time to market for business solutions
		requiring laaS and PaaS-based services
4261	Service Now - Release 3	Ongoing improvements to SMI (Service Management Integration) processes - extension of channels available for contacting help desk and resolving issues. Benefits include Improves reliability of support processes, improving management of IS related issues will reduce "down time" and therefore improve business productivity.
4265	Office 2010 Upgrade	The current productivity tool is Office 2010 which has entered extended support from Microsoft and is now "n-2" versions old. The benfits of this projects are that this software upgrade will bring improved features, improved security, and support for real time collaboration of documents as well as better cloud integration.
4269	RAS/VPN Re-platform/Mobile	The original Juniper Remote Access SSL VPN (RAS) deployed by Verizon is now 5 years old and doesn't support some of the latest mobile capability or integrate easily with other technologies that have been implemented (Cisco ISE). This Project proposes to replace the existing RAS VPN solution with a more modern platform that has improved mobile VPN capability and improved integration with National Grid technologies. Benefits Include: - Better mobile support - Mobile VPN capability to support deployment and use of mobile applications. - Improved User experience with additional VPN connection modes
4279	Citrix Infrastructure Upgrade (Xenapp and NetScaler)	Citrix is a product for use on PCs and other devices to remotely connect to desktops, applications, and networks. Critical End of Life (EOL) Citrix infrastructure is still hosted in legacy DMZs and needs to be replaced. This unstable environment could cause major incidents and failures due to unsupported hardware and software. This project will determine the new strategic solution that will replace this legacy hardware and software.
4348	SAP Infrastructure Landscape	In addition to providing a permanent set of project environments, this project will also provide us with the capability to do periodic refreshes of the testing systems within our Production Support landscape. Today, our QA systems are seldom (if ever) refreshed. This poses challenges to the Business Process Support and Application Management organizations as they try to resolve system issues or deliver change requests.

Appendix III – Summary of FY18 Infrastructure and Network Projects

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4389	Aging systems upgrade	The purpose of this investment is to provide a funding source for various system stabilization/upgrade efforts that are discovered over the course of a year. These are items that neither the business nor IS has funds for, but are imperative initiatives to keep critical systems running, and providing the level of service that the business expects.
4395	Mobile Device Refresh	This tactical project will replace many of the oldest mobile field devices in the US that are in dire need of an update/replacement over the next fiscal year. These replacements units will allow field technicians to have the equipment and data required to perform their work in a safe and efficient manner. This implementation will virtualize applications that run only on Windows XP, such that they run on Windows 7 devices. Embedded in this project is deployment of 750 units, in order create sustainable infrastructure by replacing a big portion of older mobile devices. The devices will be deployed in iterative manner leveraging practices and release strategies build in Gas Enablement Results Accelerator for Mobile devices. In addition, during the Development and Implementation phase, these , older units will be recovered and returned to inventory or retired.
4489	Active Directory Improvements	Further improvements to Active Directory following on from work in FY17
4490	Application Performance Management (APM)	APM (Application Performance Management) tool and expertise - Select, procure, integrate, and support a dedicated APM tool with a provision for expert level support
4491	4491-ICE Replacement	 This investment is required to replace the current Instant Messaging, Collaboration, and Email (ICE) services with a set of similar, or enhanced, services provided by Office 365. The current ICE platform cannot support the business demand due to limitations in the current functionality and the inability of the current service to be upgraded. Benefits Include: Enhanced storage capability – Office 365 uses cloud based storage, giving ability to share large files securely, benefitting email and SharePoint services. Network File Share – E3 license option gives potential to unlimited storage, increasing collaboration Archiving solution – Global information records management (GIRM) has requirements to archive the information as per data protection act and regulations. Office 365 E3 licenses provide user friendly and common solution for archiving Mobility – Office 365 is designed to support mobility whether by smartphone, tablet or PC External collaboration – The social collaboration features of Office 365 ensure employees feel more involved leading to improvements in employee engagement Agile Task Management – Office 365 has an inbuilt Planner service which eliminates the need to purchase an Agile task Management solution (e.g. Trello) Future Desktop Office Upgrades – E3 licenses come with Pro Plus, helping mitigate future upgrade costs of Office 2010 Potential for future capabilities – Office 365 has many additional

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		features which can be implemented to add further value as required
4495	SCI Connections	Secure Cloud Interconnect is the ability to establish secure and managed connections to specific cloud vendors. It removes the need to traverse the public internet and enables "security protected" and latency sensitive data to access cloud based services in a more effective manner than a dedicated MPLS network In order to use this new service we need to install a new firewall within nationalgrid. This project is to install the firewall
4496	US Network Programme	The US Network Programme consists of the following projects: •TBD Network Data Center Cleanup •4278 Network Improvement Utilization Monitoring with NG Portal •TBD Network Management Portal •TBD Network Refresh •TBD Network Technology Refresh / Invest to Reduce •TBD Network Transformation Completion - CEMS, •TBD Network Transformation Leftovers
4497	US Video Conference Programme	The US Video Conference Programme consists of the following projects: - CMR Implementation - Collaboration Room Upgrade Legacy IP Unit Upgrades Legacy ISDN Unit Upgrades - Syracuse A39/40 Upgrades - Room Upgrades Benefits Include: The video conferencing service support and reporting is unacceptable to National Grid. The VC service support does not sufficiently support user needs and the reporting is inadequate from the standpoint that it does not provide end to end metrics to allow Verizon and National Grid staff to understand the quality of the service delivered and areas to focus on for improvement. This program proposes that NG review the VC support provided by Verizon and make improvements in delivery and end to end reporting
4498	US VSTIG Programme	 The US VSTIG Programme consists of the following projects: TBD US DMZ Risk Avoidance 4274 VSTIG Hardware Refresh •TBD VSTIG Infrastructure Refresh TBD VSTIG Inter-Regional Load Balance •TBD VSTIG Log Logic Refresh •TBD VSTIG Upgrade Future Phases
4499	US Wireless Programme	The US Wireless Programme consists of the following projects: •NG-M Implementation •Wireless Bridge Replacements •Wireless LAN Expansion •Wireless LAN Management Tools •Wireless Network Expansion
4557	SAP Business Objects Report Optimization	This investment should provide funding structure to optimize performance on existing reports

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4568	4568-US CNI-EMS Lifecycle Hardware and Software Upgrade	This investment is to develop requirements and begin the design and implementation stages of the hardware and software refresh of the current ABB Energy Management System (EMS). The server and workstation hardware for the EMS replacement project was purchased in 2010. The hardware is now end-of-life and may constrain the capacity of the associated databases in EMS. The application vendor, ABB, is recommending a hardware refresh for the EMS environments in order to increase the capacity of the databases to accommodate future growth. The NY & NE systems are currently on R5.5 of the EMS Software, and the current mature vendor release is 6.6. The upgrade of the software will allow NG to remain on track with the latest software, while mitigating the risk of future large jumps in release software that may increase financial and functional risks. The current roadmap identifies the next opportunity to upgrade software near 2020-2021.
4578	4578-Travel & Expense Management (T&E) and Global Master Service Provider (MSP) Strategy	This program of work will support the work lead by Global Procurement to develop the category strategy for Global Travel programs which is currently supported by Travel Leaders in US and Capita in UK. In parallel, this program will support process design and tool selection and implementation for Travel & Expense Management and other card programs (i.e. Procurement Card reconciliation & approvals).
4756	4756-IS Sourcing Renewal	Hiring of IS Human Resources to bring more in-house expertise to National Grid
4606	4606-Data Visualisation Expansion	Expanding use of Tableau across more use cases across business area. Identifying requirements for reporting, configuring and building reports.
4632	US Video Conferencing upgrade for RW	Upgrade of Video conferencing units at Reservoir Woods
4722	Hardware and Software Upgrades	Our outsourced contracts include language to keep the hardware and software levels at N-1. However, they do not include a hardware refresh for equipment that goes end of life, nor the testing required supporting the hardware refresh of equipment or the testing required to implement new hardware or software. This project will perform these necessary upgrades.
4727	Virtual Desktop - DaaS	To implement a DaaS offering that is a virtual desktop infrastructure (VDI) hosted by a third-party cloud service provider. DaaS utilizes a multi-tenancy architecture, which means that a single instance of an application is served to multiple users, referred to as "tenants." The service provider is responsible for managing the cloud and the underlying infrastructure. The level of service will vary depending on the company needs.
4715	EUC, network, and data center strategy	A Piece of strategy work to assess the current state and plan against the demands and see if the strategies and plans support achievement of those business strategies. The timing of this is important given the timing of several key strategic supplier contracts.
4710	Data Security	This Data Security project is based around a move to protect data through information rights management and advanced cyber protection both for our end points but also our cloud services. The thinking is it would be delivered using Microsoft Secure Productive Enterprise Plan E5. Another SAAS based subscription product.

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4709	Data Centre Consolidation efforts	A number of applications were not able to move in the timescales of Transformation and so the physical legacy Data Centers have had to be retained while remediation work is carried out on these applications (retained apps). Once all retained applications are remediated and moved to the new Data Center, the legacy Data Centers will need to be decommissioned.
4706	1327 Interfaces - 523 FTS, 340 RDX, 245 MQSI, 253 JCAPS, 44 PM4D, 7 VB	 The primary driver for this project is to mitigate the risks of continuing to be reliant on out of support infrastructure. These risks are : Increased Security risk as out of support infrastructure will not receive security patches. In the event of failure National Grid IS will be unable to meet the agreed Service Level Agreements (SLAs) for many key applications once the middleware infrastructure goes out of support. The majority of these applications currently have Gold or Platinum SLA's. The FTS environment has a single point of failure/no redundancy. The new technology provides functional benefits which will provide productivity improvements enabling improvements in the efficiency of data and file transfer.
4707	Business Innovation Projects 1	 This program provides a funding base and governance structure to allow the IS organization to improve the IS experience for employees and customers who will experience improved reliability, usability, speed and efficiency across all functions. This program will also reduce the risk of failure, which have customer, cost and brand implications. The program includes the following: Big Data Analytics - Setup Data Lake and company wide analytics capability Data Cleansing for reporting and Data Standards compliance - Enable BMS Standards Data Visualization and Online interactive dashboards for quick decision making Process and workflow automation with robotics CRM and SaaS capability for future Customer experience program CIS system upgrade Pilots Rate engine Upgrades Call center capability enhancements for chat, automated agents, multichannel problem solving capability Consumer document management and process simplification Engineering Systems upgrades Network and connectivity upgrades for Field Force, yards and trucks Mobile device capability enhancements with mobile access for applications Increased collaboration with Office 365, Box and One Drive - Work anyplace, anytime, any device Video collaboration for office workers, Field force and flexible workers/ contractors

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4716	FY19 Data Centre Projects	Replacement of legacy aging equipment which are in legacy Data Centers. Although these are in the legacy data centers - there are critical applications that are still in the legacy data centers running on these aged assets.	
		In addition, the expectation is that there will be some services retained in these data centers using the aged infrastructure.	
		Replacement of legacy aging equipment which are in legacy Data Centers. Although these are in the legacy data centers - there are critical	
4719	FY20 Data Centre Projects	applications that are still in the legacy data centers running on these aged assets. In addition, the expectation is that there will be some services retained in these data context using the aged infrastructure.	
4714	EMM Phase2	The Enterprise Mobile Management System (EMM) project will secure corporate data and information stored on mobile devices, mainly by ensuring that policies are enforced on the device. This project will procure the necessary licenses to manage these mobile devices.	
4712	DR Remediation F&A	 procure the necessary licenses to manage these mobile devices. Requirements and design to define migration schedule and cost for each critical Tier 1 through Tier 3 application to remediate them to support service by service DR (41 apps). Design and Build detailed Logical Technical model for the application DR. Deep dive into database layer - Introduce Data Guard or comparable product for Database back up and failover. Develop standards procedures for failover. Deep dive into network layer and IP/firewall requirements. Define standards if necessary. Define/cost DR remediation and testing. 	

Division 3-24

Request:

Referring to the testimony of Bhargava, DeMauro, and Rapivaty (p. 8, line 18 through p. 9, line 2) please identify the "expenditure targets" against which the investments were prioritized.

Response:

Expenditure targets are determined as part of National Grid's corporate budget process. IS uses trend data, new initiatives, and mandated programs to develop its budget. IS conducts two separate budget processes – the Investment Planning Process and the operations and maintenance (O&M) Planning Process – that eventually flow together to create the IS budget for inclusion in the corporate budget. The Fiscal Year 2018 budget for operating expenses is \$223.9 million and for capital expenditures is \$132.8 million.

Below are the detailed steps, timeline, and key stakeholders in the IS Budget Process.

<u>Capital Investment Planning Process (May – November)</u>: IS works with key business contacts to define the technology requirements and associated cost implications/profiles. IS collates and reviews the investment demand, collaborates with the business to categorize and prioritize investments, and produces an IS Project Demand Plan. Consolidated financial information from the investment plan is incorporated with the O&M budget into the IS budget process.

<u>O&M Planning Process (September – November)</u>: IS finance works with the IS functional leads to identify historical operating spend and the impact new investments and performance enhancements will have on spending. Total IS O&M spending is consolidated and compared to the targets set up by US Corporate Finance and adjusted to meet the targets.

IS Capital Investment Planning Process and Timetable

The IS capital budget is the approved amount of capital spend for a twelve-month fiscal year period (beginning April 1 and ending March 31). Below is the timetable for the planning and approval of the IS capital budget.

1. **May/June:** Begin annual investment planning cycle. Review the demand already collected and evaluate for inclusion in plan. Refine estimates and spend profile for inflight multi-year projects.

2. **June – July:** Solicit preliminary capital requirements from business sponsors and IS. Business Relationship Managers (BRMs) liaise with business areas – functional and jurisdictional – to identify requirements, and assess the need and the costs associated with all IT projects.

3. **July – September:** Develop draft of the investment plan. Give priority to mandated work and regulatory obligations. Develop business case and cost estimates for prioritization. Score projects for complexity, risk, and benefit in accordance with process. Review and question the scope, justification, schedule, cash flows, and risk scoring for each project/program. Distribute draft of the investment plan to the business sponsors and IS stakeholder group. Schedule informational/challenge sessions.

4. **October:** Incorporate feedback from the informational/challenge sessions, revise the draft investment plan, and redistribute to business sponsors and IS stakeholder group.

5. **September – November:** Conduct investment plan review. Present the investment plan to the Jurisdictional Presidents, jurisdictional delegates, and functional executives. Focus on financial requirements, remuneration, regulatory obligations, major projects, and other key themes.

6. **Mid-November:** Investment plan consolidated financial information is incorporated with the O&M budget into the IS budget process for final review and approval by US Chief Information Officer (CIO) and Global CIO.

7. **January:** Final budget submitted to Corporate Financial Planning & Analysis. National Grid plc Board approves the consolidated budget.

8. **February – March:** Detail cost center budget loaded into the business planning application (SAP-BPC). The Budget Planning and Consolidation application feeds completed budget into the SAP application.

IS O&M Budget Process and Timetable

1.1 **September:** IS begins the annual O&M planning process. IS Finance works with the functional leads to quantify costs based on demand for labor, contractors, and vendor spend.

1.2 Early October: Corporate Finance begins the annual O&M planning cycle.

2. Late-October: BRMs solicit information from jurisdictions and functional areas on proposed initiatives in the upcoming fiscal year.

3. **Early November:** BRMs aggregate and share the proposed initiatives with Jurisdictional Presidents, stakeholders, and other responsible parties and schedule informational/challenge sessions.

4. **Mid-November:** "Preliminary" O&M is input into the internal Excel based budget model maintained by IS Finance for the corporate budget process. IS Finance conducts O&M review sessions to discuss proposed O&M initiatives and review preliminary draft of budget with US CIO and Global CIO.

5. Late November: Calculate the final rankings from investment plan process (see above) and share list of prioritized initiatives to be incorporated into the final version of the budget.

6. **December:** IS Finance team finalizes IS budget data for review. Corporate Finance conducts budget summit meetings with all Jurisdictional Presidents, functional leaders and senior management.

7. **January:** Final Budget submitted to Corporate Finance. Corporate Finance presents and reviews the final consolidated profit and loss budget, with operating company and functional level detail, to functional leadership and jurisdictional presidents. This is the last opportunity for review, feedback, and challenges to the budget targets that have been set. After jurisdictional and functional approval, the budget must be approved by the jurisdictional Board of Directors and then is presented to the National Grid US Chief Executive Officer and Board of Directors for approval.

8. **February – March:** Detail cost center budget loaded into the business planning application (SAP-BPC). The completed budget from the budget planning and consolidation application is fed into the SAP application.

Roles in the Budget Process

The following are key roles in the IS budget process:

US Sanctioning Committee (USSC) – This committee includes several National Grid executives from the business, jurisdictions and finance with the purpose to review all requested capital investment papers for approval, including the scope and estimated costs for an investment (typically a project in the case of IS). The USSC sanctions individual projects as being prudent investments that has been properly defined with confirmed funding. Formal funding approval occurs during the budget process.

Business Relationship Manager - The BRM is responsible for liaising with the various functional and jurisdictional business areas to assess what capital investments are required from the business perspective.

IS Leadership – The IS organization has a global CIO, US CIO and UK CIO. The US and UK CIOs have direct oversight over their respective budgets and investments and are aligned with the Global CIO's IS vision.

IS Finance – Serves as Business Partner to the IS organization on all financial matters including the review and approval of sanctioning papers and manages the inputs of the budget process.

Finance Leadership – Comprised of the Chief Financial Officer, Vice President US Corporate Finance, functional Vice Presidents and jurisdictional Directors, Vice Presidents, and other executives.

US Corporate Finance – US Corporate Finance coordinates and facilitates the budget process. Its primary responsibilities are to analyze current year performance, rate plan allowance (cost of service), and business plan assumptions for the purpose of providing budget guidance (at the operating company, functional, and National Grid USA levels).

Jurisdictional Presidents – The Jurisdictional Presidents are the primary audience during the budget summit meetings and final approver(s) for projects and other spending that impact their respective jurisdictions.

Division 3-25

Request:

Referring to Schedule ISP-2, please list these projects in order of priority, based on those projects that are most urgent to be completed down to those that are least urgent.

Response:

As noted in the Company's response to Division 3-23, the Technology Modernization investments included in Schedule ISP-2¹ represent the prioritized list of investments that were deemed critical or most urgent. The prioritized list totals \$105.8 million of capital costs from the overall business case total of \$289.1 million. The list includes a combination of enabling foundational investments needed to support strategic initiatives such as the Gas Business Enablement and the Customer Experience programs and a refresh/upgrade of the technology infrastructure to support the National Grid business functions and jurisdictions. The remainder of the Technology Modernization investments will continue to be evaluated and will be raised in future rate case proceedings once the scope and costs of the individual projects are better defined.

¹ See Bates Pages 48-65 of Book 7.

DIV 3-26

<u>Request</u>:

Referring to the testimony of Bhargava, DeMauro, and Rapivaty, p. 9, lines 1-2, please explain the sanctioning process.

Response:

Please see Attachment DIV 3-26, which is a copy of the Procedure Document for IS US Sanctioning.

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national**grid**

Procedure Document for IS US Sanctioning

Date: 11/30/2017

Version No: 2.1

Document Change Control

Version Number	Date of Issue	Author(s)	Brief Description of Change
1.0	3/3/2015	C. Radziewicz	Initial Procedures Document
1.1	4/17/2015	M. Cronin	Section 4.1
1.2	8/9/2016	M. Cronin	Section 3.0
1.3	12/4/2016	M. Cronin	Section 3.0 – PreUSSC Mtg
			Section 4, 1.2 – timeline link
1.4	2/22/2017	M. Hurwitz	
1.5	4/14/2017	M. Cronin	Section 4, 1.2 – RACI Link
1.6	6/7/2017	M. Cronin	Section 4, 1.9 – Readiness Link
1.7	7/27/2017	M. Cronin	Reviewed for updates
1.8	9/7/2017	M. Cronin	Update RACI link
1.9	9/15/2017	M. Cronin	Section 4/ 3.0 – add CIO review
2.0	9/21/2017	M. Cronin	Section 4/ 3.0 – add Pre-USSC
			pre-requisite approval
2.1	11/30/17	M. Cronin	Section 3 - add WF diagram
			Sections 5, 6, 7, 8 - Added

The following is the document control for the revisions to this document.

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1. Introduction

The purpose of the IS US Sanction Procedures is to provide relevant, accurate, and consistent operational information to sanction practitioners and stakeholders. Operational consistency and quality outputs of the process can be achieved by effectively communicating and institutionalizing procedures and guidelines. These achievements provide the necessary information to make informed and accurate decision-making regarding IS US investments.

The IS US Sanctioning Procedures provide a framework to plan, execute and manage the variety of activities associated with the IS US Sanction Processes. The procedures cover the major activities, detail tasks, support templates and outputs for all investment sanction types and are housed on the <u>US IS Sanction Site</u>.

2. Objectives and Target Audience

Effective and open communications is critical to the success of the IS US Sanction process. These procedures intend to outline and detail activities for all practitioners, subject matter experts, reviewers and approvers in the sanctioning throughout the lifecycle of the IS investment.

The key objectives for the procedures are:

- To provide instruction regarding the tasks, roles and responsibilities associated to the Sanction Process
- To provide workflow guidance in terms of the steps, triggers, roles and timelines

3. Sanction Process Overview Diagrams

1.0 High Level Sanction Process Flow



2.0 Detail Sanction Process Workflow



4. Detail Sanction Process Steps

1.0 Preparing the Investment Documentation and Finance/Quality Approvals

- 1.1 Gather the Sanction Team: The Sanction activities begin once it is confirmed that Stage Gate "Proceed to Start-up" activities are complete which includes the complete and signed off Investment Request Summary (IRS). The Business Consultant (BC) will be responsible to coordinate sanction activities for new investments and the Project Manager (PM) will coordinate the sanction activities for all other sanction types. New investments need to be prioritized within the scope of the multi-year Investment Strategy and Roadmap, and specifically current fiscal year plan both for the affected business area and across all business areas. Once a commitment to the sanction and to deliver an investment is made, sanction activities can be initiated.
- 1.2 Assign Roles and Responsibilities: The US IS RACI can assist with identification of the roles and individuals who need to participate in the various sanctioning activities. The sanctioning lead (typically the Business Consultant (BC) or Project Manager (PM)) will identify the individuals who will become participants on the sanction team. The BC/PM will schedule a kick-off meeting to provide information regarding the investment as well as outline the work that needs to be done to build out the investment paper and support documents. An USSC Timeline Projection 2017 can be used to assist in identifying the tasks that need to be completed throughout the sanction lifecycle, the resource assignments and the completion timeframes for the tasks. The Sanction Lead should manage completion of work that will lead up to the sanction sign-off. The USSC, the governing body that sanctions investments equal to or over \$1 million, has scheduled monthly sanction meetings, so the sanction team must be mindful of the deadlines to post investment proposal papers for the targeted USSC meeting. It is highly recommended that the coordinating sanction lead maintain the USSC Timeline to monitor and control the sanction activities throughout the lifecycle of the sanction process.
- 1.3 **Establish Accounting:** For new investments, the BC will need to work with IS Finance to set up the proper accounting for resources participating in the sanction preparation.
- 1.4 **Complete Solution Design and Architectural Reviews:** Collaboration needs to take place with the Solution Design Authority and the Enterprise Governance Board Architecture teams to ensure that the proposals under consideration will align with the IS Application and Infrastructure Roadmaps or be a valid exception to the target architecture.
- 1.5 **Prepare Sanction Documents:** The sanction team will work together to prepare the <u>Investment Proposal</u> and its supporting documentation. It is expected that the team participate, fulfill assigned tasks on time and provide peer review feedback. Existing Solution Delivery Framework (SDF), Governance and Sanction tools, templates, logs, registers, and spreadsheets will be used to create all investment sanction information. The following list should be used for guidance to ensure the proper documents are completed prior to peer review:
 - Stakeholder Analysis
 - Project Classification Worksheet
 - Service Definition A
 - One Page Investment Summary (PowerPoint Slide)
 - Detailed Cost and Resource Analysis; Total Cost of Ownership (TCO) log
 - High level solution options
 - Risk and Issues Log

1.6 **Sanction Papers with License, Hardware, and/or Software Cost:** Per discussions and agreement with Commercial Operations, Regulatory, Finance and Investment Planning, note of the following guidelines when preparing a project that has purchase costs such as license, hardware and/or software:

All of these costs should be included in the total, full, indicative cost of the project. (i.e. Tableau, Box and Concur).

A project will submit for partial sanction for upfront contract costs, licenses, etc., but the initial purchase cannot be a separate project number and sanction from the design/implementation component of the project, regardless of the time gap between the initial purchase and the project. This is consistent with the way gas and electric manage projects that have long-lead materials.

Additionally, Commercial Operations may ask for confirmation of funding and sanction before signing contracts. Commercial Operations will still continue to fund and process without project IDs and sanctions agreements such as annual renewals, increasing capacity/users, and "small" purchases.

Commercial Operations will continue to process (without supporting project sanctions) purchases that only fall in these criteria:

- OpEx cost only (no CapEx associated)
- No incremental work to define requirements and/or design/build and/or implement/train/etc on the use of the license/software/hardware purchase
- Services that are managed by IS
- Are a "small purchase" ('small' to be better defined), and have been approved by EA and DRS at a minimum
- 1.7 **Post documentation to SharePoint:** For new and full investment sanction types, the BC will post the Investment Paper and the related sanction documentation on the IS US SharePoint site. The PM will use this same area to post documentation and workflows for subsequent sanctions, so that the IS US SharePoint site will capture in one place, all sanction historical information per investment.

From a document management perspective, it is required to allow the SharePoint functionality to allow document version control. This will eliminate the need for separate versions of the same document and will officially document version history. It is suggested to insert a description of the changes made to the document when saving and checking the document back into SharePoint.

It is recommended that the Project Manager add a link on the Project SharePoint site to the IS US SharePoint site, so that all sanction documentation and workflow approvals can be easily accessed.

1.8 **Complete Peer Reviews and Initiate First Workflow Approval:** The purpose of the Peer Review is to conduct a final paper walk-thru, with the author and other subject matter experts, to ensure completeness and accuracy before initiating the first workflow. There is no "standard" for conducting a Peer Review; how the Peer Review is managed and who attends is determined by the respective business area. When the team determines that the sanction documentation is accurate and complete, the Sanction Lead (typically the BC or PM) or Business Analyst (BA) will initiate the first workflow via the IS US SharePoint site for the IS Finance representative to review the investment financial information. The IS Finance representative has 3 business days to review and respond within the workflow to approve or reject with comments. A reminder notification will be sent to the IS Finance representative if a response is not received within 3 business days.

1.9 **IS Finance Approval and Initiate BRM/ PDM and PPM Approval:** Once IS Finance provides the approval within the workflow, a notification will be sent to the workflow initiator to then begin the next approval workflow to the associated Business Relationship Manager (BRM) / Portfolio Delivery Manager (PDM) depending on sanction type and to the PPM Analyst. The BRM/PDM and PPM Analyst have 3 business days to review and respond within the workflow to approve or reject with comments. A reminder notification will be sent to the BRM/PDM and PPM Analyst if a response is not received within 3 business days.

The BRM/PDM should review and confirm completion of content and quality items outlined in the <u>IS US Sanction - Readiness Checklist</u>. The PPM Analyst should review and confirm compliance with the paper's standards and formatting rules outlined in the instructions and <u>IS US Sanction - Author Checklist</u>. Their approval of this workflow indicates the items on the checklists are complete and that they are accountable for any stakeholder issues or concerns with the investment proposal deliverables.

1.10 Initiate IS Internal Stakeholder Review and Approval: Once BRM/PDM and PPM Analyst provide approval within the workflow, the Workflow Initiator will be notified of the result and then will start the workflow for internal IS stakeholder review and approval. The Workflow Initiator must indicate the names of the specific IS stakeholders who will need to review and approve the sanction documentation. These roles and names can be found listed as "contributors" to the review activity in the Sanction RACI Model mentioned in section 1.2.

2.0 IS Internal Review and Approvals

- 2.1 **IS Stakeholder Review:** A notification will be sent to each identified IS stakeholder that they have 8 business days to review and approve the investment documentation. A link will be provided within the notification to access the investment paper and support materials. A reminder notification will be sent to the IS Stakeholder if a response is not received within 8 business days.
- 2.2 Weekly ISSC Meeting: The US Planning and Performance Management (PPM) team hosts the weekly IS Sanction Committee (ISSC) meeting. Once the IS Stakeholder workflow is initiated, the Sanction Lead (BC/PM) requests the paper be added to the next week's ISSC meeting agenda. All approving internal IS stakeholders are required to attend as part of the ISSC and to allow the project team to present an overview of each Investment Proposal that is in Internal IS Stakeholder Review workflow, regardless of the investment value. The IS stakeholders will be given the opportunity to ask questions and have any outstanding issues resolved to clear the way for paper approval.

The Sanction Lead (BC/PM) will confirm with the PPM analyst that the investment is ready to be presented at the weekly meeting and should be added to the agenda by noon of the day before the ISSC meeting. It is the decision of the Sanction Lead and the RM/PDM who is accountable, to present the investment and invite any supporting sanction team members to participate in the weekly meeting. If the standard representative stakeholder approvers are not in attendance, and no delegated replacement with authority has been assigned, the investment will be removed from the agenda.

Note 1: If one IS stakeholder rejects the paper within this step of the process, the BC/PM needs to coordinate correction and re-initiate this step in the workflow with the link to revised documentation. It is highly recommended that any document changes are noted when the documents are saved and checked-in within SharePoint to expedite the approval process.

Note 2: Closure papers for a project with an actual spend that does not exceed the last sanction amount by 10% do not get presented at the weekly ISSC meeting. They should obtain all workflow approvals and will then be sent for US CIO sanction signature or progressed to the USSC for sanction signature depending on sanction amount.

2.3 Initiate External Stakeholder Review: Once all IS stakeholders approve the sanction documentation within the workflow, the coordinating Workflow Initiator (usually the BC/PM or BA) will initiate the External Stakeholder Review step within the workflow.

3.0 External Stakeholder Review and Commitment

- 3.1 External Stakeholder Review: A notification will be sent to the RM responsible for the sponsoring business area. *The RM is responsible for approving this workflow for all sanctions whether under the RM or PDM.* If the sanction falls under the PDM, the RM must contact the PDM to ensure all requisite reviews and approvals are complete.
 - > For ISSC level investments less than \$1M, the responsible RM or PDM must ...

Present the investment proposal to <u>all</u> external stakeholders that are involved in the project and therefore have a need to be know and approve the proposed investment. These reviews are scheduled and conducted by the responsible RM or PDM offline;

The objective is to obtain:

- (a) Agreement on the content and commitment of resources
- (b) Approval to proceed to US CIO for final sanction signature

The RM will approve the workflow once all external stakeholders have reviewed/ approved the investment.

- > For USSC level investments greater than or equal to \$1M, the responsible RM or PDM must ...
 - (1) Present the investment proposal to the external stakeholders for their review, edit and approval at the monthly Pre-USSC meeting;

Pre-requisites for submitting investment proposals to the Pre-USSC meeting:

- (a) IS Stakeholder Approval workflow must be initiated
- (b) IS Stakeholder Approval workflow for IS Regulatory must be approved
- (c) IS Stakeholder Approval workflow for IS Finance must be approved

The objective is to obtain:

- (a) Agreement on the content and commitment of resources
- (b) Approval to proceed to the USSC meeting for sanction approval
- (2) Review the investment proposal with the US CIO to notify her/him of the investment being presented to the USSC for sanction approval. This review can take place any time *after* the first "IS Finance Review" workflow" is initiated and *prior* to final "External Stakeholder Review" workflow approval.

This review is:

- (a) best conducted early in the workflow process
- (b) not required for closure papers

The RM will approve the workflow once:

- (a) External stakeholders have reviewed/ approved edits from the Pre-USSC meeting
- (b) US CIO review of investment is confirmed

4.0 Sanction Approval

4.1 Gaining Sanction Approval: When the RM approves the External Stakeholder Review workflow the Sanction Administrator will receive email notification. This notification serves to inform him/her that the investment is ready for sanction approval.

Investments over \$999K in value: the Sanction Administrator will post the Sanction documentation to the USSC site, the Tuesday prior to the scheduled monthly meeting. The Sanction Administrator will receive notification from the USSC board of all sanction approvals and will send a communication to IS Stakeholders of the USSC meeting results. See the <u>USSC Meeting Calendar</u>

Investments \$30k through \$99k in value: the Sanction Administrator will secure the RM's signature to indicate sanction approval. The signed papers will be saved with a .pdf format, and posted by the Sanction Administrator to the IS US Sanction site.

Investments \$100k through \$999k in value: the Sanction Administrator will secure the CIO's signature to indicate sanction approval. The signed papers will be saved with a .pdf format, and posted by the Sanction Administrator to the IS US Sanction site.

Initiate Final Approval: the Sanction Administrator initiates the Final Approval workflow and will indicate approval on behalf of the sanction authority within the workflow and communicate all investment sanction approvals within the weekly Sanction Review meetings. See the <u>Sanction</u> <u>Authority Matrix</u> which outlines the investment value thresholds and the sanction approval authority at each level.

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5. Program Definition

1.0 Program Definition

A program investment proposal is an umbrella for managing multiple related projects from sanction through closure. The objective of this document is to provide a consistent guideline for IS to follow when developing program investment proposals. There are two types of IS programs (1) strategic (2) annual, IS uses the same methodology for both types of programs. *Please keep in mind that a program is not a funding mechanism for multiple unrelated activities.*

1.1 How to Request a Project be Sanctioned as a Program

IS directors, managers or authors should contact the PPM Team director, manager or analyst when evaluating whether a program is the best strategy for managing a collection of related projects;

Strategic Program

Examples:

- Large project that can best be managed as multiple smaller projects, each project must create a unique asset that is put in service on individual project schedules
- Projects that require separate work orders based on work, company and/ or schedule

Annual Program Examples:

- Minor Works Blanket
- Mandate Blanket
- Annual Device/Hardware refresh
- Recurring/ongoing system updates or refreshes

1.2 Obtain Program Strategy ISSC and USSC Approval

PPM director will ensure IS/ USSC guidelines are appropriate for the proposed program and that the proposed sanction governance is approved by the USSC if greater than \$1M. This becomes the agreement to manage as a program and the required sanction governance for both ISSC and USSC.

If approved Program, the Program and Program Project Sanction Governance is as follows . . .

1.3 Program Sanction Governance

- Investment Proposal long form
- Provide an overview of the program and its costs, timelines
- List all projects and related costs to the extent known for tracking purposes;
- Note: projects use the program INVP number with an alpha character suffix (no space)
 Must adhere to standard IS sanction procedures for ISSC, Pre-USSC, USSC, SESC
- Establish and clarify a Program Board and the associated Band A/B owning executive
- If an ISSC paper, the committee will approve program and submit for US CIO signature
- If an USSC paper, the committee will
 - > determine frequency of status reporting
 - ➢ how to handle fiscal year cross-over
 - how to report related project sanction activity
 - approve and route for USSC signature if \$1M to \$24M
 - > approve and submit to SESC for sanction approval and signature if \$25M or greater

Note: a program closure paper is required after all projects have been closed.

1.4 Program Project Sanction Governance

- Investment Proposal short form
- Must adhere to the ISSC workflow process including presentation at the weekly ISSC meeting
- Once the "External Stakeholder" review workflow is approved, the RM/ PDM will submit the approved paper to the program board chair to be signed/ sanctioned
- The RM/ PDM will provide the PPM Analyst with the signed paper for processing. Processing includes (1) complete the "Final Approval" workflow (2) notify National Grid IS leads (3) post the signed pdf to the US IS Sanction site (4) Enter sanction costs in the PPM Sanction Database (5) If there is Capex cost, create Capex "project fund account" and "work order numbers(s)" in Powerplant (6) Provide Capex "work order number(s)" to the National Grid project leads for cascading as appropriate.

Note: a project closure paper is required after each project is complete

1.5 Naming Conventions

- Strategic Program
 - > Title should end with "Program"
 - > Example: INVP 4411 New Customer Connections Program
 - > For Global Programs, the Investment ID should indicate the country of sanction, ex INV 4411US
- Annual Program
 - Title should end with "Program FYxx"
 - Example: INVP 4470 IS Mandated Projects Annual Program FY18
 - > These are not global programs
- Program Project
 - > INVP Number should be the same as the program number with an alpha suffix
 - > Strategic Example 1: INVP 4411A Distributed Generation NY
 - > Annual Example 2: INVP 4470A MA CSS Customer Inquiry Enhancements
 - For Projects within a Global Programs, the Program Project ID includes the country of sanction, ex. INV 4411USA, 4411USB, etc

2.0 Stage Gate A Requirements

2.1 Program Investment Proposal

- Program paper requires an approved SGA form which will result in one Opex account number (Internal Order) being created for the development of the program paper only
- Capital Expense accounting (Work Order) is not created at the Program level

2.2 Project and Program Project Investment Proposals

- Each individual project paper requires an approved SGA form which will result in one Opex account number (Internal Order) being created for developing the individual project paper only. Multiple individual project SGA forms can be submitted up front along with the program SGA form or as needed
- Project specific Capital Accounting (Work Orders) will be created after the Investment Proposal has
 obtained a signature from appropriate person with sanction authority

6. Pre-USSC, USSC & SESC Meeting Edit Resolution

Note: To make these instructions easier to follow I refer to each of the 3 meetings as "USSC". When there is a variance in procedure at the meeting level I will reference the specific meeting name.

1.0 Edit Resolution Procedures

1.1 Objective

the purpose of these guidelines is to provide IS RM/ PDM teams with a set of common instructions for resolving USSC edits received at the monthly meeting(s) quickly and efficiently

1.2 Responsibilities

- IS PPM team is responsible for sanction governance oversight of all IS paper(s) edit resolution
- IS RM/ PDMs are responsible for presentation of their respective paper(s), edit capture and edit resolution as follows;
 - project business stakeholder engagement
 - single point of contact for USSC member communications
 - presenting the paper to the Pre-USSC, USSC, SESC
 - > capture edits during the meeting along with the requestor's name
 - assign edit revisions to an author
 - > author makes revisions and submits the revised paper via email to the requestor(s) to review and approve
 - if there needs to be a meeting with the USSC requestor(s) for any reason the RM/ PDM must facilitate . . . schedule and meet with the USSC requestor(s)
 - once all edits and respective approvals obtained and the revised version on the IS site is considered final, the author (PM, PDM) notifies PPM Analyst via email
 - PPM analyst posts the final revised IS site version to the USSC site and requests USSC technical secretary to progress the paper depending on the meeting that the edits were captured at;
 - Pre USSC next step add to next USSC agenda
 - USSC next step route for signature if less than \$25M else add to next SESC agenda
 - SESC next step route for signature

1.3 Pre-USSC Meeting

Director (RM/ PDM) responsibility

- During the meeting
 - presents the paper
 - capture edits with requestor name
- Offline Edits
 - obtain USSC offline (email) edits before or after the meeting
- > After the meeting
 - assign "author" to make changes
 - when edits complete, IS director submits the revision(s) (via email) to edit requestor(s) for review/approval
 - obtain requestor approvals
 - notify "author" edits approved and request "author" notify PPM Analyst when paper considered final

PPM Analyst responsibility

Attends the meeting in person

- provide IS governance oversight
- enter edits in the US IS site "Edit Log" to supplement IS director's edit list*

After the meeting

- send meeting result email notification to all IS leads
- send separate emails to the IS director listing edits captured & next "edit resolution" steps*
- post the revised IS site version of paper to the USSC site when email notification received from "author"
- request USSC Technical Secretary add the paper to the next USSC meeting's agenda via email

* this step is not part of the standard process; the PPM analyst performs this support to facilitate the resolution of edits

1.4 USSC Meeting

RM/ PDM responsibility

During the meeting

- support the business sponsor (VP) presenting or present
- capture edits with requestor name

After the meeting

- assign "author" to make changes
- when edits complete, IS manager submits the revisions (via email) to edit requestor(s) for review/ approval
- obtain requestor approvals
- notify "author" edits approved and request "author" notify PPM Analyst when paper considered final

PPM Analyst Responsibility for USSC Meeting

Attends the meeting via conference call

- provide IS governance oversight
- capture edits to supplement IS director's edit list*

After the meeting

- send meeting result email notification to all IS leads
- send separate emails to the IS director listing edits captured & next "edit resolution" steps*
- post the revised IS site version of paper to the USSC site when email notification received from "author"
- if < \$25M request USSC Technical Secretary route paper for signature, else, request USSC Technical Secretary add the paper to the next SESC meeting's agenda via email

* this step is not part of the standard process; the PPM analyst performs this support to facilitate the resolution of edits

1.5 SESC Meeting

RM/ PDM responsibility

During the meeting

- support the business sponsor (VP) presenting or present
- capture edits with requestor name

After the meeting

- assign "author" to make changes
- when edits complete, RM/ PDM submit the revisions (via email) to edit requestor(s) for review/ approval
- obtain requestor approvals
- notify "author" edits approved and request "author" notify PPM Analyst when paper considered final

PPM Analyst Responsibility for SESC Meeting

Prior to meeting

- required to post papers on the USSC site
- required to post program status slidedecks on the USSC site
- communicate posting activity to USSC Technical Secretary and IS RM/ PDMs

Does not attend the meeting

After the meeting

- obtain meeting results from RM/ PDM
- send meeting result email notification to all IS leads
- post final revised version on IS site to USSC site when requested by author and notify USSC Technical Secretary

7. USSC Fast Track Request

USSC Fast Track Request Procedure

This process exception is a formal request to the USSC to obtain Pre-USSC, USSC and/or SESC sanction reviews and approvals outside of the published meeting schedules.

The PPM team is the USSC single point of contact for requesting a paper be processed through the Fast Track route. All internal IS reviews (workflows 1-3) MUST BE COMPLETED prior to being eligible for the Fast Track process.

- The PPM team manages the relationship between IS and the USSC chair/ technical secretary
- RM/ PDM submits a fast-track request to the PPM director, manager or analyst via an email briefly stating urgency
- PPM director reviews request with the USSC chair / secretary
- PPM director provides PPM analyst direction based on result
- PPM analyst notifies RM/ PDM of USSC decision
- If fast-track request approved . . .
 - RM/ PDM submits the paper to IS Finance and Regulatory for approval, when both approvals obtained . . .
 RM/ PDM notifies PPM analyst
 - > PPM analyst coordinates the USSC Fast-Track Request process with the USSC technical secretary as follows;
 - submits email request, paper attached, to USSC technical secretary stating reason
 - USSC secretary routes the paper to 5 USSC members for approval
 - The paper is approved when the USSC technical secretary receives 3 approvals
 - USSC secretary notifies the project manager when the paper is approved
 - PPM analyst posts the paper to the USSC site and notifies the USSC technical secretary
 - USSC technical secretary routes the paper for signature

PPM Director	Jen Cooper
PPM Manager	Chris Hantzschel
PPM Analysts	Marty Cronin, Ron Wilson
USSC Chair	Suzan Martuscello
USSC Technical Secretary	Mary Jane Barry
Exception (ISSC or USSC)	Modify "some part" of the standard sanction process
Fast-Track (USSC)	Expedite Pre-USSC, USSC, SESC sanction offline
Utility Service	IS, Electric, Gas, Generation, LNG, Property, SIR
IS Director	Business Relationship Manager, Project Development Manager

Glossary of Terms

8. Exception Request

ISSC / USSC Exception Request Procedure

IS sanction process for exception requests applies to both ISSC and USSC. An Exception Request is required when RM/ PDM seek to modify "some part" of the standard sanction process due to an urgency in order to achieve the target sanction date.

PPM team is the IS/ USSC single point of contact for sanction governance through the request and approval of a sanction process exception.

ISSC Exception

- IS RM/ PDM submits process exception request to PPM director, manager or analyst via email stating urgency
- PPM director consults USSC chair / secretary
- PPM director provides PPM analyst direction
- PPM analyst notifies IS RM/ PDM of result

USSC Exception

- IS RM/ PDM submits process exception request to PPM director, manager or analyst via email stating urgency
- PPM director consults USSC chair / secretary
- PPM director provides PPM analyst direction
- PPM analyst notifies IS director of result

Division 3-27

Request:

Regarding the "annual" process identified in the testimony of Bhargava, DeMauro, and Rapivaty, p. 8, lines 17-18, please provide copies of the three-year plans (if any) that identified the needs of the business when such annual processes took place in 2014, 2015, and 2016. Please provide a list of all the projects that were identified for implementation in each of the three-year planning processes and state whether such projects were implemented.

Response:

Please see Attachment DIV 3-27 for the annual investment for 2014, 2015, and 2016.

Attachment DIV 3-27 includes the list of annual investment plan projects, project budgets, and which of those projects have been implemented. Throughout the year, business critical projects emerge that may take priority over some annual investment plan projects. Therefore, resources and budget dollars are reallocated to fund emerging business critical projects when necessary and, consequently, less critical projects may be deferred until future periods. The annual investment plan projects shown in Attachment DIV 3-27 that were not implemented were substituted for other business critical projects that emerged during each respective year.

FY14 Annual Investment Plan

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		Budget	Budget	Budget	
<u>INVP</u>	Project	<u>CapEx</u>	<u>OpEx</u>	<u>TotEx</u>	Implemented?
1041	INVP1041-NY EMS Replacement	3,000,000	200,000	3,200,000	Implemented
1043	INVP1043-NE EMS REPLACEMENT	4,900,000	130,000	5,030,000	Implemented
1134	INVP_1134 - Content Management and Data Archival	800,000		800,000	
1182	INVP_1182 - Annual EPM initiatives	1,200,000	200,000	1,400,000	
1185	INVP_1185 - Distribution/Outage Management System	6,000,000	300,000	6,300,000	Implemented
1227	INVP_1227 - NERC CIP Compliance	500,000	50,000	550,000	
1298	INVP1298 - FSSC Minor Works- BP382		750,000	750,000	Implemented
1407	INVP_1407 - Desktop Refresh - COF	560,000		560,000	
1518	INVP1518 InternetMinorWrks-BP385		75,000	75,000	Implemented
1549	INVP_1549 - Non-Inter'l Collect Sys (ITRON/PP4/MVRS)	1,000,000	50,000	1,050,000	Implemented
1643	INVP_1643 - Regulatory Placeholder - Customer Systems	2,000,000	150,000	2,150,000	
1652	INVP_1652 - Rhode Island RTU (Remote Terminal Unit) Upgrade	100,000		100,000	
1695	INVP1695-NW Strat Minor Wks- BP236		900,000	900,000	Implemented
2204	INVP_2204 - Contact Center Operational Efficiencies	2,000,000	100,000	2,100,000	
2366	IN 2366 LI CNI Direct Hw Upgr	250,000		250,000	Implemented
2495	INVP2495-GMS Telvent DNA -NIMO Gas	1,901,000	55,000	1,956,000	Implemented
2575	INVP_2575 - Front Office Programme	55,600,000		55,600,000	
2576	INVP_2576 - US FO Mobile Devices	11,000,000		11,000,000	
2577	INVP2577-GIS CONSOL ESRI & ARCFM	1,800,000	200,000	2,000,000	Implemented
2582	INVP2582-LI Gas Cust Cnv CAS to CSS	14,000,000	300,000	14,300,000	Implemented
2853	INVP_2853 - Customer & Shared Services Minor Works Programme		900,000	900,000	Implemented
2858	INVP_2858 - NERC CIP Standards to EF Barrett PS.	400,000		400,000	Implemented
2859	INVP_2859 - NERC CIP Standards to Port Jefferson PS.	400,000		400,000	Implemented
2881	INVP_2881 - Infrastructure Upgrades (routers/switches etc)	400,000	100,000	500,000	Implemented
2892	INVP_2892 - UST NERC CIP (US Transmission NERC Critical National Infrastructure) Compliance		75,000	75,000	
2901	INVP_2901 - US Data Storage Organic Growth	320,000		320,000	Implemented
2909	INVP_2909 - US Gas & Electric CNI Data Centre	8,000,000		8,000,000	
2923	INVP_2923 - Opex Minor Works		480,000	480,000	Implemented
2924	INVP_2924 - Strategic developments	450,000		450,000	
2927	INVP2927-Desktop Aged Asset Refresh	3,840,000		3,840,000	Implemented
2931	INVP_2931 Computing Refresh	400,000		400,000	
2932	INVP_2932 Storage Refresh	581,000		581,000	
2935	INVP2935-US Mobile Device Refresh	2,329,500		2,329,500	Implemented
2938	INVP_2938 - Intranet Web Site Service Development	485,000		485,000	
2940	INVP2940-GRC Enterprise Risk & Comp	1,360,000	200,000	1,560,000	Implemented
2950	INVP_2950 - Mobile Access	300,000		300,000	
2951	INVP2951-Legal Hold Review- BP383	2,000,000	400,000	2,400,000	Implemented
2959	INVP_2959 - Credit and Collections - Bad Debt Mitigation Initiatives	1,000,000		1,000,000	
2960	INVP_2960 - Customer Energy Solutions - CRM (Customer Relationship Management)	3,000,000		3,000,000	
2967	INVP_2967 - ESM Server/Desktop Security (EPS) -CNI	990,000	175,500	1,165,500	
2968	INVP_2968 - Digital Rights Management (SI)	380,000	40,000	420,000	
2972	INVP_2972 - Network Access Control (NS) -CNI	500,000	50,000	550,000	
2980	INVP_2980 - Access Control for Data Management (AC)	2,010,000	201,000	2,211,000	

FY14 Annual Investment Plan

		Budget	Budget	Budget	
INVP	Project	<u>CapEx</u>	<u>OpEx</u>	<u>TotEx</u>	Implemented?
2984	INVP_2984 - Single Point of Failure (AA)	2,312,000		2,312,000	
2997	INVP_2997 - Earned Value Management System (EVM)	90,000		90,000	Implemented
3011	INVP_3011 - GIS Integration Programme	250,000		250,000	
3024	INVP_3024 - Web Site Refresh	560,000	100,000	660,000	
3124	INVP_3124 - Implementation of Global HR	320,000		320,000	
3136	INVP3136-New England Gas Leak Rechecks	300,000	100,000	400,000	Implemented
3237	INVP_3237 - Street Light Tracking Improvements	250,000	50,000	300,000	Implemented
3294	INVP_3294 - PowerPlant Leased Asset Module	500,000	200,000	700,000	Implemented
3324	INVP_3324 - AMAG Instance for TWIC Authentication	50,000	20,000	70,000	Implemented
3357	INVP_3357 - Telecoms Minor works	160,000	160,000	320,000	Implemented
3382	IN 3382 USNY C-Cure Conv to AMAG	550,000		550,000	Implemented
3393	INVP 3393 Ehancement of Reservior W	142,000		142,000	Implemented
3412	INVP3412-New Sec Ctr	1,345,000		1,345,000	Implemented
3425	INVP3425-Wireless Network - Expansion	320,000		320,000	Implemented
3429	INVP_3429 - US WAAS deployment	240,000	240,000	480,000	
3430	INVP3430-Mobility - (MDM) Mobile Device Management / (EMM)	1,280,000		1,280,000	Implemented
3431	INVP_3431 - IS tools	480,000		480,000	
3432	INVP_3432 - Portfolio Management	800,000		800,000	
3434	INVP_3434 - Core Social and Collaboration Infrastructure		320,000	320,000	
3435	INVP_3435 - Service Delivery Project Start-up		160,000	160,000	
3438	INVP_3438 - Web start up & Minor enhancements		160,000	160,000	
3439	INVP_3439 - Mobile & Social Web services	320,000		320,000	
3465	INVP_3465 - US Systems Mandates	8,000,000	1,989,221	9,989,221	
3617	INVP 3617 Equip Replacement Minor Wks	418,000		418,000	
3618	INVP 3618 Verint Encoder Project	248,000		248,000	
1332A	INVP_1332 - Gas Distribution Application - Infrastructure Upgrades (Minor Works)		900,000	900,000	
3277B	INVP_3277B - WebPortal for ArcGIS Implementation	1,360,000	370,000	1,730,000	
					-
Grand Total		156,051,500	10,850,721	166,902,221	<u>-</u>

Division 3-28

Request:

Referring to the testimony of Bhargava, DeMauro, and Rapivaty, p. 7, lines 14-15:

- a. Please identify each of the "external partners" utilized in the delivery model.
- b. Describe the role of each such partner during the test year.
- c. State how much was paid to each of the partners during the test year.
- d. Please provide an estimate of how much will be paid to each external partner during the Rate Year.
- e. Please provide an estimate of how much will be paid to each external partner during the Rate Year solely in connection with implementation of the Technology Modernization Program.

Response:

a. Please see below for a list of the primary external partners utilized in the information services delivery model and the role each partner played during the test year.

External Partner	Services Provided During Test Year
IBM Corp.	Application Maintenance - day to day support of existing applications
WIPRO Ltd.	Application Maintenance - day to day support of existing applications
IBM Corp. / WIPRO Ltd.	Internet, Collaboration, and Email - function provides email, web conferencing, instant messaging and collaboration tools, such as SharePoint, operated on vendor-owned and hosted infrastructure.
Verizon	Networks and Communication- manage the company's networks and telecommunication services.
DXC (Computer Sciences Corp.)	Data Centers - provides data center services (e.g., servers, data storage); management of hardware, software and storage and provides security, back-up capability, and disaster recovery services.
DXC (Computer Sciences Corp.)	End User Devices - proviside and support end user devices (e.g., laptops) and deployment and maintenance of the operating systems and applications that run on those devices.
Xerox	Managed Print - manage the support services for a refreshed and standardized fleet of print devices, enabling increased security for printing, copying, faxing, and scanning.

- b. Please see the Company's response to part a. above.
- c. Below is a list of payments to the external partners during the rate year.

		Test `	Test Year	
External Partner	Service	Actua	Actual (\$M's)	
IBM Corp.	Application Maintenance	\$	7.4	
WIPRO Ltd.	Application Maintenance	\$	8.4	
IBM Corp. / WIPRO Ltd.	Internet, Collaboration and Email	\$	4.2	
Verizon	Networks & Telecom	\$	32.9	
DXC (Computer Sciences Corp.)	Data Centers	\$	13.1	
DXC (Computer Sciences Corp.)	End User Devices	\$	7.6	
Xerox	Managed Print	\$	3.1	

d. Please see Attachment DIV 3-28-1 for a breakdown of the operating expenses for Information Services (IS) in the historic Test Year and Rate Year. National Grid IS is forecasting no incremental operating expenses in the Rate Year, and no operating expenses have been included in this rate case proceeding.

Please note that IS forecasts its operating expenses by functional group (*i.e.* Commercial Management), not by external partner. The expenses for each of the external partners are embedded in the functional groups because they are responsible for managing these costs. In addition, there are operating expenses related to the investment plan. These operating expenses represent expenses that cannot be capitalized according to accounting standards. The maintenance and support expenses will be absorbed into the functional groups once the investment goes into service. Please see Attachment DIV 3-28-2 for the operating expense details related to each IS capital investment. If an investment generates savings, the savings are included on the list and used to offset other expenses.

e. As noted in part d. of this response, IS does not prepare its project estimates on an external partner basis because the level of partner involvement is often not known until the project begins in earnest; therefore, the cost estimates are done at the project level. Regarding the rate case proceeding, the operating expenses estimates for Technology

Prepared by or under the supervision of: John Gilbert, Daniel DeMauro, and Mukund Ravipaty
Modernization are included in the Investment Plan line on Attachment DIV 3-28-1, and the projects details are included on Attachment DIV 3-28-2. The capital cost estimates are included in Schedule ISP-1. As noted above, IS' overall operating expenses are in line with historic Test Year levels, so no incremental funding for operating expense were included in the rate proceeding for the Technology Modernization program.

The Narragansett Electric Company d/b/a National Grid RIPUC Docket No. 4770 Attachment DIV 3-28-1 Page 1 of 1

Narragansett Electric & Gas d/b/a National Grid Total Information Services Incremental Operating Expenses Excluding Labor & Burdens(\$Millions)

	HTY	Rate Year	
	Ending	Ending	
Operational Cost	June 30, 2017	Aug. 31, 2019	Comments
Commercial Management	17.7	18.7	The operating costs for Commercial Management are forecasted to be
			higher in the Rate Year compared to the HTY due primarily to the
			purchase of additional software licenses (SAP Hanna, Concur and
			Microsoft Azure).
Cyber Security	5.4	5.6	Increase due to inflation factor of 3%.
Physical Security	6.1	6.8	Incremental costs in the Rate Year compared to the HTY (+0.5M) due
			to forecasted higher break/fix costs for security equipment plus a 3%
			inflation factor. A milder than usual winter in the HTY kept break/fix
			costs lower than usual.
Apps Maintenance	14.9	16.6	Addition of SAP Max Attention at the end of the HTY has increased
			cost by \$1.2M annually in addition to a 3% inflation factor.
CNI Ops	18.9	19.5	Increase due to inflation factor of 3%.
Data Centers	30.1	31.0	Increase due to inflation factor of 3%.
Networks & Telecom (Excludes CNI network costs that are included in	32.7	33.2	Rate Year increase driven by network upgrades (+\$1.0M) plus a 3%
CNI Ops)			inflation factor. The circuit assessment initiative will reduce costs
			from the HTY (-\$1.5M).
Email & Xerox	7.2	7.4	Increase due to 3% inflation factor.
Enterprise Service Delivery	7.8	8.0	Increase due to inflation factor of 3%.
Administration	7.7	8.0	Increase due to inflation factor of 3%.
Subtotal Operational Cost	\$148.6	\$154.8	
IS Investment Plan - Including Labor & Burdens (1)	38.0	32.1	see Attachment DIV 3-28-2
Investment Plan	\$38.0	\$32.1	
Total IS Opex	\$186.6	\$186.9	
Total Incremental IS Opex Costs from HTY	N/A	\$0.3	

(1) Excludes Gas Business Enablement (GBE)

The Narragansett Electric Company d/b/a National Grid RIPUC Docket No. 4770 Attachment DIV 3-28-2 Page 1 of 4

9/01/18- 8/31/19

Naragansett Electric Company d/b/a National Grid

IS Investment Plan Operating Expenses

	1		T	1						Rate Y	ear
Investment Name	Programs	INVP #	Bill Pool	In Service Date	Amortization Period	FY19 OPEX	FY19 RTB	FY20 OPEX	FY20 RTB	OpEx	RTB
INVP 3614D1 Ent Network Security	Cyber Security 1	3614D1	G020	1/31/18	84		3,841,685		3,841,685	· ·	3,841,685
IT/OT Discovery and Implementation Phase 1	Cyber Security 2	3683X11	G020	10/1/20	84	500,000	-	500,000	83,340	500,000.00	34,725
Identity & Access Management: Privileged Access Management	Cyber Security 2	3683X5	G020	3/1/18	84	640,000	104,699		104,699	373,333.33	104,699
Identity & Access Management: Shared Area Access Management	Cyber Security 2	3683X5	G020	3/1/21	84	2.50.000	10.000		co. 000	-	-
US CNI Security Enhancements Phase 1	Cyber Security 2	3683X6	G020	3/1/19	84	350,000	40,000	150.000	60,000	204,166.67	48,333
Big Data Security Analytics Phase 1	Cyber Security 2	3683X/	G020	3/1/21	84	200.000		150,000	250.000	62,500.00	145 022
US CNI Intrusion Dataction/Provention Phase 1 (CNI IDS Pafrach)	Cyber Security 2	3683X13	G020	3/1/19	84	200,000	-		25,000	10,000.07	145,855
US CNI Intrusion Detection/Prevention Phase 2 (CNI IDS Refresh)	Cyber Security 2	3683X1	G020	12/1/18	84	180,000	-		25,090	105,000.00	10,457
Enhanced DLP Gateway and Endpoint	Cyber Security 2	3683X8	G020	3/1/21	84					-	
Identity & Access Management (RBAC)	Cyber Security 2	3683X5	G020	3/1/20	84			150,000	185,896	62,500,00	77,457
Identity & Access Management: Fine Grain Access Management (Unified			G 0 0 0	2/1/10		1 50 000	100.100		100.400	,	,
Platform)	Cyber Security 2	3683X5	G020	3/1/18	84	150,000	100,432		100,432	87,500.00	100,432
Threat Behavior Modeling	Cyber Security 2	3683X15	G020	3/1/20	84			100,000	17,875	41,666.67	7,448
vStig Scaling Upgrades	Cyber Security 2	3683X12	G020	3/1/19	84	100,000	-		400,000	58,333.33	166,667
Big Data Security Analytics - Phase 2	Cyber Security 2	3683X7	G020	3/1/21	84					-	
Data Visualization	Cyber Security 2	3683X16	G020	3/1/20	84					-	-
Cloud Security (Cloud Access Security Broker)	Cyber Security 2	3683B	G020	12/1/17	60		60,500		60,500	-	60,500
Security Research Lab	Cyber Security 2	3683X14	G020	3/1/20	84			50,000		20,833.33	-
Risk Based Authentication - 2FA token alternative (Multi Factor			G020				15,530		15,530		
Authentication)	Cyber Security 2	3683X2		3/1/18	84		,	10 500		-	15,530
Security Incident Event Management Phase 4	Cyber Security 2	3683X4	G020	3/1/21	84	140.000	120.000	12,500	120.000	5,208.33	-
Enhanced Phishing Protection	Cyber Security 2	3683X3	G020	12/1/18	84	140,000	120,000		120,000	81,000.07	120,000
Situation Intelligence & Cyber Intelligence: Phase 2	Cyber Security 2	2682	G020	10/1/20	84	120.000	2 957		5 714	70.000.00	- 4.049
Shuation Intelligence & Cyber Intelligence, Flase 1	Cyber Security 2	2683V4	G020	12/1/20	84	120,000	2,037		3,714	70,000.00	4,040
Domain Based Security Phase 2 (Network Segregation)	Cyber Security 2	3683X13	G020	3/1/21	84					-	
Perimeter Enhancements	Cyber Security 2	50051115	G020	10/1/18	84						
Internal PKI (Public Key) Infrastructure	Cyber Security 2		G020	10/1/18	84					-	-
Enterprise Centralized Patch Management	Cyber Security 2		G020	12/1/18	84					-	-
Firewall Rule Clean up	Cyber Security 2		G020	12/1/18	84	125,000				72,916.67	-
Sustainable Red-Team Service Model	Cyber Security 2		G020	10/1/18	84	208,000				121,333.33	-
Removable Media Control Pilot	Cyber Security 2		G020	10/1/18	84	175,000				102,083.33	-
Application Security As a Service	Cyber Security 2		G020	9/1/19	84			100,000		41,666.67	-
Continuous review of Reference Security Architecture	Cyber Security 2		G020	8/1/19	84					-	-
GPS Project	Cyber Security 2		G020	3/31/21	84					-	-
INVP 4401 SAP/PowerPlan/Front Office Maintenance of Business (MOB) - FY	FY18 Plan	4401	G020	3/31/18	84	-	-	-	-	-	-
INVP 3932 Call Center Customer Contact Center/SDC Technology Upgrade Imp	FY18 Plan	3932	C175	9/1/18	84	547,000	642,000	-	642,000	319,083.33	642,000
INVP 4481 US MDS-Energy Accounting System (EAS) migration to wholesale	FY18 Plan	4481	G186	10/1/18	84	265,000	2/5,000	-	2/5,000	154,585.55	2/5,000
INVP 3/3/ US CNI GMS SCADA Upgrade &	F I I 8 Plan	3/3/	C210	2/21/19	84	517,000	174,000	256,000	011,000	285,250.00	330,083
INVP 4348 US SAP: Initastructure Landscape	F I I 8 Plan EV 18 Plan	4348	G020	5/51/18	84	10.280	930,000	-	1 251 000	11 205 00	930,000
INVP 4568 US CNI EMS Lifectule Hordware and Software Ungrade	EV18 Plan	4408	U149	3/21/18	84	19,580	(2,000)	-	(2,000)	58 333 33	(2,000)
INVP 4662 - Concur Licenses	FY18 Plan	4662	G020	1/31/18	84	100,000	(2,000)	-	(2,000)	-	(2,000)
INVP 3976 IDS Next Generation 2.0	FY18 Plan	3976	G186	3/31/18	84	-	-	-			
INVP 4399 ESSC&HR Systems (Non-SAP) Operational	FY18 Plan	4399	G020	3/31/18	84	-	-	-	-	-	
INVP 3718 New Medical System	FY18 Plan	3718	G020	3/31/18	84	-	105,000	-	105,000	-	105,000
INVP 4403Annual Ariba upgrades - FY18	FY18 Plan	4403	G020	3/31/18	84	-	-	-	-	-	-
INVP 3924 Host Transition	FY18 Plan	3924	G020	3/31/18	84	-	-	-	-	-	-
INVP 3982 Substation Monitoring-DobleARMS	FY18 Plan	3982	G381	1/1/18	84	5,000	80,000	-	80,000	2,916.67	80,000
INVP 4466 Gas Capital Investment Planning Tool	FY18 Plan	4466	G210	1/17/18	84	5,000	112,000	-	112,000	2,916.67	112,000
INVP 4480 US Control-Gas System Operating Procedure (SOP) Upgrade	FY18 Plan	4480	G210	10/2/17	84	-	36,000	-	36,000	-	36,000
INVP 4554 Nightcrawler Asset Update	FY18 Plan	4554	G210	3/31/18	84	-	2,000	-	2,000	-	2,000
INVP 4697-HP Exstream upgra to v9.5	FY18 Plan	4697	G020		84					-	-
INVP 4402 US SAP Regulatory Requirements, Reporting & Rate Case support -	FY18 Plan	4402	G020	3/31/18	84	-	-	-	-	-	-
INVP 4188 Aging System Stabilize	FY18 Plan	4188	G148	3/31/18	84					-	
INVP 4398 Storms/ISched Upgrade	FY18 Plan	4398	G160	4/23/18	84	72,000	294,000	-	294,000	42,000.00	294,000
INVP 4487 Changes to ACIS for PMCC Civil Vendor Billing	FY18 Plan	4487	G186	7/31/18	84	-	29,000	-	29,000	-	29,000
INVP 5980 Cascade Electric Application Upgrade Project	F 1 18 Plan	3986	G198	10/31/17	84	-	15,000	-	15,000	-	15,000
INVE 4001 Escaler	r 1 16 Plan EV19 Blan	4081	G020	10/2/1/	84		27.000		27.000	-	-
INVE 5400 US WIDS-IIION Enterprise Edition (IEE)	r 1 to rian FV18 Plan	2480 2484	C172	3/31/18	84	-	27,000	-	27,000	-	27,000
INVP 4390 Plastic Fusion II	FV18 Plan	4200	G207	3/31/10	84	-	264.000	-	264.000	-	264,000
INVP 4651 Operation Telecommunication Optimization	FY18 Plan	4651	G327	3/31/18	84	-	204,000	-	204,000		204,000
INVP 4669 US SAP: Max attention	FY18 Plan	4669	G020	5,51,10	84	_		-	_	-	_
INVP 4692 - Experian NetConnect Upgrade	FY18 Plan	4692	G020	İ	84					-	-

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IS Investment Plan Operating Expenses

			-	-		-				Rate Y	ar
Investment Name	Programs	INVP #	Bill Pool	In Service Date	Amortization Period	FY19 OPEX	FY19 RTB	FY20 OPEX	FY20 RTB	OpEx	RTB
INVP 4395 US Mobile Device Refresh	FY18 Plan	4395	G020	3/31/18	60	-	300,000	-	300,000	-	300,000
INPV 4462 Computapole Enhancements to Support Inspection Types	FY18 Plan	4462	G186	3/1/18	84	-	50,000	-	50,000	-	50,000
INVP 4394 NE Gas Leak Recheck (next Phase)	FY18 Plan	4394	G310	8/31/18	84	-	75,000	-	75,000	-	75,000
INVP 4469 Informatica Upgrade/Microstrategy Replacement Program	FY18 Plan	4469	G020	5/1/18	84	15,000	443,000	-	443,000	8,750.00	443,000
INVP 3956 WIFI for Fleet Services Diagnostic Laptops	FY18 Plan	3956	G352	0/20/17	84	-	40,000	-	40,000	-	40,000
INVP 4404 Data Visualization INVP 4404 LIS CNL OMSEssalDoint Infrastructure Unorode	F I I 8 Plan	4404	G020	5/22/17	84	-	506,000	-	506,000	-	506,000
INVP 4214 FERC Wholesale Customer System	FY18 Plan	4214	G220	3/31/18	84		142 000		142 000		142 000
			0220	5/51/10			112,000		112,000		112,000
INVP 4570 US CNI Tech Services-Network Equipment Lifecycle Replacements	FY18 Plan	4570	G186	3/31/19	84	-	30,000	-	30,000	-	30,000
INVP 4914 US CNI-EMS Lifecycle Hardware and Software Upgrade	FY18 Plan	4914	U186	8/1/19	84	1,302,155				759,590.42	-
INVP 4704Q Customer Bill Redesign	FY18 Plan	4704Q	H173	3/31/19	84	27,000	a 100 000	190,000	-	94,916.67	-
INVP 4144 HRIS Simplification Programme	FY18 Plan	4144	G020	5/2/19	84		2,400,000		2,400,000	-	2,400,000
INVP 4144 HRIS Simplification Programme (Customer Benefits)	FY18 Plan	4144	G020	5/2/19	84		(1,164,360)		(1,164,360)	-	(1,164,360)
INVP 4597 Ariba TLS and CI Updale INVP 4550 Customer Experience Transformation Tech Program	F 1 18 Plan Growth Play Book Finance	4397	G020	8/28/17	84	-	-	-	-	-	477.000
INVP 4217 US SAP: Business Planning	Growth Play Book-Finance	4217	G020	3/31/19	84		477,000	-	4/7,000	-	-
INVP 4222 Governance Risk & Compliance (GRC) Optimization/Upgrade	Growth Play Book-Finance	4222	G020	3/1/19	84					-	-
INVP 4563 US SAP: FERC on Hana (FOH)	Growth Play Book-Finance	4563	G020	3/31/19	84	724,000			-	422,333.33	-
Regulatory Mandates - FY19	Mandate		G020	3/31/19	84	5,864,000		-	-	3,420,666.67	-
Regulatory Mandates - FY20	Mandate		G020	3/31/20	84	-		6,000,000		2,500,000.00	-
Regulatory Mandates - FY21	Mandate		G020	3/31/21	84	-		-	-	-	-
Regulatory Mandates - FY22	Mandate		G020	3/31/22	84	-		-	-	-	-
INVP 4479 US Control-Gas Electronic Bulletin Board (EBB) Upgrade	Mandate	4479	G210	5/1/18	84	193,000	779,000	-	779,000	112,583.33	779,000
Regulatory Mandates - FY18	Mandate	4124	G020	3/31/18	84	-		-	-	-	-
INVP 4124 Auto Remote Net Meter	Mandate	4124 4411 A+D	C198	11/30/17	84	-	-	-	-	-	-
INVP 4400 Annual HR & Payroll Mandatory Service Pack Unorade (HRSP) - FV	Mandate	4411A+D	G020	8/14/17	84	-	-	-	-		-
INVP 4411D New Gas Connections	Mandate	4411D	C210	10/31/18	84	136 000	-		-	79 333 33	_
INVP 4421 - New Arrearage Forgiveness Plan	Mandate	4421	G316	10/31/17	84					-	-
INVP 4555 RI Renewable Energy Program changes	Mandate	4555	5360E	2/28/18	84					-	-
INVP 4391 - Operations MW	Minor Works	4391	G148		84	-	-	-	-	-	-
INVP 4477-Customer FY18 Minor Works (former Customer & Digital)	Minor Works	4477	C175		84	-	-	-	-	-	-
INVP 4741-US Control Center Operations Minor Works-FY18	Minor Works	4741	G148		84	-	-	-	-	-	-
INVP 4742-Network Strategy FY18 Minor Works	Minor Works	4742	G186		84	-	-	-	-	-	-
INVP 4354-US FSSC Minor Works INVP 4740 Customer Systems Regulatory and Onergational Regulatory and H	Minor Works Other Mandata	4554	G020		84					-	-
RI Electric Only Physical Security Replacements - EV18	Physical Security	4/40 N/A	5360E	3/31/18	84					-	-
RI Gas Only Physical Security Replacements - FV18	Physical Security	N/A	5360G	3/31/18	84					_	_
All Companies Physical Security Replacements - FY18	Physical Security	N/A	G020	3/31/18	84					-	-
New England Companies Physical Security Replacements - FY18	Physical Security	N/A	G285	3/31/18	84					-	-
RI Electric Only Physical Security Replacements - FY19	Physical Security	N/A	5360E	3/31/19	84					-	-
RI Gas Only Physical Security Replacements - FY19	Physical Security	N/A	5360G	3/31/19	84					-	-
All Companies Physical Security Replacements - FY19	Physical Security	N/A	G020	3/31/19	84					-	-
New England Companies Physical Security Replacements - FY19	Physical Security	N/A	G285	3/31/19	84					-	-
RI Electric Only Physical Security Replacements - FY20	Physical Security	N/A	5360E	3/31/20	84					-	-
All Companies Physical Security Replacements - FY20	Physical Security	N/A N/A	5360G	3/31/20	84					-	-
All Companies Physical Security Replacements - FY20	Physical Security	IN/A N/A	G020	3/31/20	84					-	-
RI Electric Only Physical Security Replacements - FV21	Physical Security	N/A	5360E	3/31/20	84						
RI Gas Only Physical Security Replacements - FY21	Physical Security	N/A	5360G	3/31/21	84					-	-
All Companies Physical Security Replacements - FY21	Physical Security	N/A	G020	3/31/21	84					-	-
New England Companies Physical Security Replacements - FY21	Physical Security	N/A	G285	3/31/21	84					-	-
INVP 4761 US Foundation Hosting Renewal	Tech. Modernization	4761	G020	3/31/18	84	-	(2,261,000)	-	(2,559,000)	-	(2,385,167)
INVP 4564 US SAP: Enhancement Pack 9 Upgrade	Tech. Modernization	4564	G020	3/31/20	84	2,427,000	-	592,000	-	1,662,416.67	-
INVP 4377 Data Center Decommission Melville	Tech. Modernization	4377	G020	3/31/19	84	-	-	-	-	-	-
INVP 4489 Active Directory Improvements	Fech. Modernization	4489	G020	12/31/18	84	500,000	-	-	-	291,666.67	-
INVP 4362 Legacy DMZ migration to vSTIG	Tech. Modernization	4362	G020	12/31/18	84	300,000	-	-	-	175,000.00	-
INVP 4529 Service Now Deployment - Kelease 2	Tech. Modernization	4529	G020	3/31/18	60	-	- (1.207.000)	-	(1 516 000)		(1 200 250)
INVP 4490 Application Performance Management (APM)	Tech Modernization	4491	G020 G020	12/31/18	84	350.000	100,000	320.000	(1,516,000)	233,333.33	(1,388,230)
INVP 4706 1327 Interfaces - 523 FTS, 340 RDX, 245 MOSL 253 JCAPS, 44	r com modernization	4470	0020	12/01/10		550,000	100,000	520,000	100,000	557,500.00	100,000
PM4D, 7 VB	Tech. Modernization	4706	G020	6/30/19	84	400,000	125,000	150,000	125,000	295,833.33	125,000
INVP 4710 Data Security	Tech. Modernization	4710	G020	3/31/20	84	300,000	-	300,000	-	300,000.00	-
INVP 4562 US SAP: Business Warehouse (BW) Consolidation to HANA Enterp	Tech. Modernization	4562	G020	3/31/19	84	810,000	11,000	-	43,000	472,500.00	24,333
INVP 4493 Monitoring and Alerting	Tech. Modernization	4493	G020	3/31/20	84	300,000	120,000	260,000	120,000	283,333.33	120,000
INVP 4758 Critical App Resiliency Remediation	Tech. Modernization	4758	G020	3/31/18	84	-	-	-	-	-	-

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		1	1							Rate Y	ear
Investment Name	Programs	INVP #	Bill Pool	In Service Date	Amortization Period	FY19 OPEX	FY19 RTB	FY20 OPEX	FY20 RTB	OpEx	RTB
Move to public and private managed cloud	Tech. Modernization	4831	G020	3/31/20	84	150,000	-	300,000	-	212,500.00	-
INVP 4727 Virtual Desktop - DaaS	Tech. Modernization	4727	G020	12/31/19	60	300,000	100,000	300,000	100,000	300,000.00	100,000
Contract Re-bid Enterprise Services	Tech. Modernization	3427	G020	3/31/19	84	600,000	-	-	-	350,000.00	-
Contract Re-bid Networks	Tech. Modernization	3426	G020	3/31/19	84	600,000	-	-	-	350,000.00	-
Policy Based/Trust based Network Access	Tech. Modernization	TBD	G020	3/31/20	84	200,000	40,000	200,000	40,000	200,000.00	40,000
INVP4756-IS Sourcing Renewal	Tech. Modernization	4756	G020	3/31/18	84					-	-
Legacy Email Infrastructure	Tech. Modernization	4268	G020	12/31/19	84	250,000	-	250,000	-	250,000.00	-
Migration of Oracle to Linux	Tech. Modernization	4830	G020	12/31/20	84	100,000	-	150,000	-	120,833.33	-
DR Remediation F&A	Tech. Modernization	4/12	G020	3/31/18	84	-	-	-	-	-	-
INVP 47/8 - Dev Test to Cloud	Tech. Modernization	4778	G020	9/30/18	84	250,000	-	-	-	145,833.33	-
INVP 4560 US SAP: Dynamic Storage Tiering	Tech. Modernization	4560	G020	//5/18	84	464,000	1//,000	-	236,000	2/0,666.6/	201,583
Network Management Capability - Next Generation	Tech. Modernization	4833	G020	12/31/20	84	150,000	15,000	150,000	45,000	150,000.00	27,500
Dilited Communications (From Accenture Study)	Tech. Modernization	43/6	G020	12/31/19	84	200,000	(200.000)	200,000	(200.000)	200,000.00	(200.000)
DR Delevite 2 Anna Demodiation	Tech. Modernization	4497	G020	6/1/19	84	150,000	(300,000)	-	(300,000)	87,500.00	(300,000)
DR Priority 2 Apps Remediation	Tech. Modernization	4824	G020	12/31/19	84	100,000	-	100,000	-	100,000.00	-
Network Autometion DNA Conton	Tech. Modernization	462J	G020	2/21/20	04 94	-	-	200,000	40.000	41,000.07	16 667
SharePoint 2007 Decommission	Tech Modernization	3667	G020	12/21/10	84	- 100.000	-	200,000	40,000	100.000.00	25,000
Cloud Rosed Secure Internet Access Zecolar	Tech Modernization	4822	G020	2/21/10	84	200,000	600.000	100,000	800,000	116 666 67	683 333
Cloud Orchestration Self cervice and Broker	Tech Modernization	4022 TPD	G020	3/31/19	84	100,000	000,000	100.000	300,000	100,000.07	085,555
INVP 4279 Citrix Infrstructure Ungrade (Xenapp and NetScaler)	Tech Modernization	4279	G020	3/31/19	60	100,000	-	100,000		100,000.00	
INVP 3899 Cloud Broker - Hybrid Enablement	Tech Modernization	3899	G020	12/31/17	84		-			_	
INVP 4606 Data Visualisation Expansion	Tech Modernization	4606	G020	6/30/19	84		253.000		337.000	_	288 000
INVP 4709 Data Center Consolidation efforts	Tech Modernization	4709	G020	3/31/19	84	100.000	-		-	58 333 33	200,000
Hicksville Fiber	Tech Modernization	4828	G020	3/31/19	84	100,000				58 333 33	
SD-WAN Core, automation, orchestration tools and pilot sites	Tech. Modernization	4837	G020	3/31/19	84	100,000	100.000	-	100.000	58,333,33	100.000
Virtualized Branches	Tech. Modernization	4843	G020	3/31/20	84	100.000	(250,000)	-	(750,000)	58,333,33	(458,333)
INVP 4261 Service Now - Release 3	Tech. Modernization	4261	G020	3/31/18	84	-	-	-	-	-	-
INVP 4759 MTC and Syracuse Boardrooms & Auditoriums	Tech. Modernization	4759	G020	3/31/18	60	-	50,000	-	50,000	-	50,000
Network Transformation Continuation-Substations	Tech. Modernization	4835	G020	12/31/20	84	20,000	10,000	20,000	20,000	20,000.00	14,167
INVP 4676 Hix D/C Improvement Server Refresh	Tech. Modernization	4676	G020	3/31/18	60	-	-	-	-	· -	· -
INVP 4461 Unix51 Interface Migration	Tech. Modernization	4461	G020	9/30/18	84	50,000	-	-	-	29,166.67	-
Wireless LAN Management Tools	Tech. Modernization	4284	G020	3/31/19	84	50,000	60,000	-	50,000	29,166.67	55,833
INVP 4392 PPMI	Tech. Modernization	4392	G020	12/31/17	84	-	-	-	-	-	-
INVP 4386 Verizon Audio to Webex	Tech. Modernization	4386	G020	3/31/18	84	-	-	-	-	-	-
Network Transformation Continuation-Risk Avoidance	Tech. Modernization	4834	G020	3/31/20	84	20,000	15,000	20,000	45,000	20,000.00	27,500
INVP 3901-Virtual Desktop Offshore	Tech. Modernization	3901	G020	3/31/18	84	-	-	-	-	-	-
INVP 4687 Network Tx-NB/MTC	Tech. Modernization	4687	G020	12/31/17	60	-	-	-	-	-	-
INVP 4274 VSTIG Hardware Refresh	Tech. Modernization	4274	G020	3/31/18	60	-	-	-	-	-	-
INVP 4725 MWORK and Netmotion Risk Avoidance	Tech. Modernization	4725	G020	12/31/18	84	20,000	-	-	-	11,666.67	-
INVP 4714-EMM Phase2	Tech. Modernization	4714	G020	3/31/18	60	-	225,000	-	225,000	-	225,000
INVP 4760 Mainframe DR Machine	Tech. Modernization	4760	G020	3/31/18	60	-	-	-	-	-	-
Network Transformation Continuation-Substations and Security Sites	Tech. Modernization	4836	G020	12/31/20	84	20,000	30,000	-	60,000	11,666.67	42,500
VC - MetroTech Auditorium VC	Tech. Modernization	4840	G020	9/30/18	84	20,000	10,000	-	10,000	11,666.67	10,000
VC - Syracuse A39/40	Tech. Modernization	4841	G020	6/30/19	84	10,000	10,000	10,000	20,000	10,000.00	14,167
INVP 4269 RAS/VPN Re-Platform/Mobile	Tech. Modernization	4269	G020	3/31/18	60	-	-	-	-	-	-
INVP 4575 Software Defined Networking	Tech. Modernization	4575	G020	6/30/17	60	-	-	-	-	-	-
INVP 42/0 RSA Re-platform	Tech. Modernization	4270	G020	3/31/18	84	-	-	-	-	-	-
INVP 4288 AD Data Cleanse	Tech. Modernization	4288	G020	12/31/17	84	-	-	-	-	-	-
INVP 4267 - WAN Bandwidth Upgrades	Tech. Modernization	4267	G020	3/31/18	84	-	180,000	-	180,000	-	180,000
INVP 4680 WAP Density deployment	Tech. Modernization	4080	G020	3/31/18	84	-	180,000	-	180,000	-	180,000
INVP 4631 Box Endotement	Tech Modernization	4031	G020	6/30/17	84	-	-	-	-	-	-
INVP 4607 Application monitoring, Network/1DS, Operations monitoring	Tech. Modernization	4677	G020	12/21/17	04 94	-	-	-	-	-	-
INVE 4095 Enterprise Labs	Tech. Modernization	4093	G020	0/20/18	04 94	-	100.000	-	100.000	-	100.000
INVE 4079 Cisco Finne INIVE 4726 Orchestration and Salf Service	Tech Modernization	4079	G020	3/30/18	84	-	100,000	-	100,000	-	100,000
Lagacy Migration of Wab Access Portal User to V7 DSA Service	Tech Modernization	4720	G020	3/31/18	84	-	-	-	-	-	-
INVP 4707 Business Innovation Projects 1	Tech. Modernization	4707	G020	3/31/19	84	794 647		-	-	463 544 20	-
INVP 4715 EUC, network, and data center strategy	Tech. Modernization	4715	G020	12/31/17	84	771 429	-	-		450,000,00	-
INVP 4716 FV19 Data Center Projects	Tech Modernization	4716	G020	3/31/19	84	250,000	100.000			145 833 33	58 333
INVP 4720 FY20 Edge Projects	Tech. Modernization	4720	G020	3/31/20	84	250,000	- 100,000	1.000 000	-	416.666.67	-
INVP 4713 EMM Licenses	Tech. Modernization	4713	G020	12/31/18	84	-	-	-	132,000	-	55,000
INVP 4719 FY20 Data Center Projects	Tech. Modernization	4719	G020	3/31/20	84	-	-	500.000	200,000	208.333.33	83,333
INVP 4582 Enterprise Data Management Platform	Tech. Modernization	4582	G020	6/1/20	84	450.000	-	450.000		450,000,00	-
INVP 4708 Business Innovation Projects 2	Tech. Modernization	4708	G020	3/31/21	84	673.723	-	794.647	-	724,107,87	-
INVP 4728 Business Innovation Projects 3	Tech. Modernization	4728	G020	3/31/21	84	673,723	-	794,647	-	724,107.87	-
INVP 4577 Call Manager Upgrade	Tech. Modernization	4577	G020	12/31/17	60	-	(1,100,000)	-	(1,100,000)	-	(1,100,000)

9/01/18- 8/31/19

Naragansett Electric Company d/b/a National Grid

IS Investment Plan Operating Expenses

										Rate	Year
Investment Name	Programs	INVP #	Bill Pool	In Service Date	Amortization Period	FY19 OPEX	FY19 RTB	FY20 OPEX	FY20 RTB	OpEx	RTB
INVP 4749 VSTIG Hardware Refresh - IDS Card Replacement	Tech. Modernization	4749	G020	3/31/18	60	-	240,000	-	240,000	-	240,000
Network Data Center Cleanup	Tech. Modernization	4832	G020	3/31/20	84	-	50,000	-	50,000	-	50,000
Log Logic (from VSTIG Programme) (INVP 4664)	Tech. Modernization	4674	G020	3/31/18	84	-	(100,000)	-	(100,000)	-	(100,000)
Legacy DMZ Firewalls (from VSTIG Programme) (INVP 4665)	Tech. Modernization	4688	G020	3/31/18	84	-	40,000	-	-	-	23,333
EMM Single Sign on	Tech. Modernization	4826	G020	12/31/18	84	-	100,000	-	100,000	-	100,000

Total	26,404,056	9,615,342	14,849,794	11,798,407	21,589,780	10,524,953

Total OPEX & RTB

32,114,733

Division 3-29

Request:

Referring to the testimony of Bhargava, DeMauro, and Rapivaty (p. 18, lines 9-12), regarding expiration of the external partner contracts, please explain how National Grid will manage its IT services after the expiration of the current external partner contracts over the next two years. How will the Company insure that it obtains new services at reasonable cost? How has the Company taken into account the expiration of the contracts in its three-year estimate of costs filed in this case?

Response:

- a. National Grid Information Services (IS) maintains visibility of all supplier contracts through National Grid's Commercial Management function. Contract and service performance are controlled within a formal commercial & supplier hierarchical governance framework, chaired at the highest level by the Chief Information & Digital Officer. Contract expiration is routinely addressed through either a negotiated contract extension, or when necessary, as part of replacement/strategic sourcing initiatives. These are both controlled and governed in accordance within strict regulatory, legal, and procurement policy guidelines.
- b. The sourcing and replacement of supplier contracts is conducted through a formal market engagement process in accordance with National Grid's procurement policy. National Grid Procurement operates a gated and structured governance approvals process to obtain all external IS services, ensuring that the most economically advantageous outcome is delivered. Consistent with procurement guidelines, National Grid IS seeks to ensure that maximum value is achieved by balancing the business demand with opportunities presented by emerging technologies and market conditions. This ensures that a high quality of service is maintained without compromise on price, service or quality.
- c. The review and potential re-tendering of the outsourced agreements is in it very early stages. Therefore, any cost increases or decreases were not factored into this rate case proceeding since the information is not yet known and could not be reasonably estimated at this point. The only incremental costs included in the proceeding were for four full time equivalent positions within the Commercial Management function to assist with the renewal and re-tendering of the contracts. The Company plans to hire these individuals by the end of the this fiscal year.

Division 3-30

Request:

With respect to the Technology Modernization Program projects identified in Schedule ISP-2, please explain how the Company assures the projects will be developed at reasonable cost. Did or will the Company conduct competitive bidding processes to award contracts for each of the individual projects? If so, please describe. If not, please explain why not.

Response:

The majority of the Technology Modernization projects will engage one or more framework partners (i.e. Verizon, DXC) to implement the solutions and upgrades. A "Framework Partner" is a supplier who was selected as a result of a competitive bidding process and awarded a "Framework" agreement with agreed rates and terms under which projects could be direct assigned (single sourced) or competitively tendered among other Framework Partners. Please see the Company's response to Division 3-31 for the framework partners used on each of the Technology Modernization projects.

At this point, there is one project that is participating in a competitive bid process - the US Foundation Hosting Renewal - INVP 4671. If additional vendor solutions or services are required outside of the framework partner agreements on any of the Technology Modernization projects, Information Services will adhere to the Corporate Procurement Policy.

Division 3-31

Request:

For each project identified in Schedule ISP-2, please identify the role of any external partners and how much is estimated to be paid to each external partner for work performed on each project.

Response:

National Grid's IS delivery model utilizes external partners, each of which performs a specific IS function. The specialized IS functions are as follows:

- <u>IBM and Wipro Application development and maintenance</u>: Full range of application service, including development of new applications and day-to-day support of existing applications;
- <u>IBM</u> <u>Internet</u>, <u>collaboration</u>, <u>and</u> <u>e-mail</u>: Email, web conferencing, instant messaging, and collaboration tools, such as SharePoint, operated on vendor-owned and hosted infrastructure;
- <u>Verizon Networks and communications</u>: Managed single network service that consolidates National Grid's Local Area Network, Wide Area Network, telephony, and video and audio conferencing;
- <u>CSC (DXC)</u> <u>Data center and client services/enterprise services</u>: Data center services (*e.g.*, servers, data storage); management of hardware, software, and storage located in data centers providing security, back-up capability, and disaster recovery services; client services, such as the provision and support of end user devices (*e.g.*, laptops), and deployment and maintenance of the operating systems and applications that run on those devices; and
- <u>Xerox Managed print</u>: Managed support service for a refreshed and standardized fleet of print devices enabling increased security for printing, copying, faxing and scanning.

Please see Attachment DIV 3-31 for the estimated amounts to be paid to each external partner for

any work performed on Technology Modernization projects reflected in Schedule ISP-2.

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TECHNOLOGY MODERNIZATION INVESTMENTS

Project/INVP	In Service	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
#	Date(s)			
US Win7 Refresh Phase 3 - INVP 4307	December 2017	The End User Device Refresh-Windows 7 project will transition the remaining users from XP to the current standard operating system of Windows 7. Currently, there are approximately 6000 users that rely on XP due to legacy applications. XP is no longer in support and Microsoft has stopped producing security patches, thus posing reliability and security risks to the company. This project will remediate the legacy applications to work on Windows 7 and upgrade the users laptops to Windows 7	Leslie Crook	External Partners: • IBM - \$1,299,719 • CSC - \$3,827,322 • Verizon - \$36,206 • WIPRO - \$252,213
Office 365 (ICE Replacement) - INVP 4491	December 2018	This investment is required to replace the current instant messaging, collaboration, and email (ICE) services with a set of similar, or enhanced, services provided by Office 365. The current ICE platform cannot support the business demand due to limitations in the current functionality and the inability of the current service to be upgraded.	Dan Castonguay	External Partners: • DXC - \$288,889 • IBM - \$178,000 • Verizon - \$82,717 Other external vendors: • Accenture - \$1,995,431 • SHI - \$34,300.00

Project/INVP #	In Service Date(s)	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
WAP Density Deployment - INVP 4680	March 2018	This project will deploy new wireless access points in high density configurations to improve wireless capacity and coverage at 30 identified U.S. sites. In addition, it will decommission and replace currently unsupported wireless bridge equipment to migrate risks associated with failure of that equipment.	Joe George	External Partners: • Verizon - \$1,269,361
Wireless Network - INVP 4364	March 2018	This project will replace end of life equipment, decommission legacy wireless networks, and install or expand the current coverage and capacity of the Wireless Local Area Network (WLAN) at various National Grid sites that have been identified as a priority. The project will also strengthen the stability of the wireless network by providing current supported equipment with additional capacity. In addition this project will renew the outdoor (Yard) wireless network for these prioritized sites by replacing out of support access points at field locations to ensure Wi-Fi vehicle communications remain supportable.	David Todd	External Partners: • Verizon - \$2,016,462

Project/INVP	In Service	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
#	Date(s)			
		<u></u>	~	
US VSTIG	March	The purpose of the Verizon Secured	Gary	External Partners:
Bandwidth	2018	Telecommunications Gateway (VSTIG)	Stimpson	• Verizon - \$514,342
Ph2 - INVP		network services is to connect National Grid		
4280		securely to the internet and other external		
		business partners. Due to the growth of these		
		services, and other demands within the VSTIG		
		environment, an upgrade is now required. The		
		utilization of National Grid's two VSTIGs are		
		reaching the capacity limits of the network		
		hardware, which, if not addressed, will lead to		
		poor network performance, impact key business		
		processes, and result in the potential loss of		
		gateway services (such as internet access, cloud		
		services and guest wireless internet access).		
		This "phase 2" project builds upon the		
		additional capacity provided by the phase 1		
		VSTIG upgrade, which will only alleviate the		
		most pressing capacity constraint issues. Phase		
		2 will enable the network capacity to be		
		increased up to 1gb/s per VSTIG. This capacity		
		will meet the National Grid demands in the		
		short to medium term. It will also be an enabler		
		for other projects that are dependent upon the		
		capacity increase, such as legacy De-Militarized		
		Zone (DMZ) migration. Wide Area Network		
		(WAN) and cloud services		

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Project/INVP	In Service	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
#	Date(s)			
US Video	December	The current video conferencing units at	John Braziel	External Partners:
Conferencing	2017	Reservoir Woods (Waltham) are on aged		• Verizon - \$1,005,000
upgrade for		technology that does not provide a consistent		
Reservoir		user interface. This project will replace the		
Woods office		Video Conference units in Reservoir Woods		
- INVP 4632		with the current Video Conferencing platform		
		of CISCO's Call Manager. This upgrade will		
		provide consistent integration with the rest of		
		the Video Conferencing estate.		

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Project/INVP #	In Service Date(s)	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
Unix51 Interface Migration - INVP 4461	September 2018	At National Grid, a majority of the file transfers are facilitated through the UNIX 51 File Transfer Service (FTS) tool. There are over 70 third parties receiving and sending critical data to National Grid via this service. UNIX 51 is running on aged technology and infrastructure without any support. The business critical interfaces that utilize UNIX 51 from the Customer Related Information System (CRIS) and Customer Service System (CSS) systems to numerous third parties are at risk of failure with no viable contingency plan in place. This investment will provide a centralized expandable environment - Comprehensive Integration Services (CIS) - for additional interfaces to be implemented.	Bill Brosnan	 External Partners: IBM - \$141,000 Wipro - \$716,000 Verizon - \$120,000 DXC - \$42,000 Other external vendors: Energy Services Group, plus potential other Trading Partners - \$42,000
Enterprise Labs - INVP 4693	December 2017	The project is an initiative to construct and equip an Enterprise Laboratory, which will be available as a Proving Ground to accelerate the speed of innovation and new technology integration into the Enterprise. The E-Lab will be used to perform trials, tests, and showcase technologies for our customers.	Dan Castonguay	External Partners: • Verizon - \$250,000

Project/INVP	In Service	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
#	Date(s)			
# US Network Improvement - INVP 4289	Date(s) March 2018	This project will migrate four of the existing legacy network sites onto the new Verizon service. This will provide business users on-site with a supportable, more reliable service with greater availability and lower outage times. This will allow us to leverage Verizon's capacity management process which is tightly aligned with National Grid's problem, incident, and change management processes. This in turn should allow us to proactively identify network bottlenecks leading to greater availability and lower outage times.	David Todd	External Partners: • Verizon - \$1,116,790

Project/INVP	In Service	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
#	Date(s)			
Mobility (MDM) Mobile Device - INVP 3430	December 2017	This project will implement an Enterprise Mobility Management (EMM) service that will allow National Grid to secure and manage mobile apps and content across a variety of mobile devices. National Grid has over 4000 mobile devices that are used by the workforce to store information and gain access to network applications, such as email. In addition, Time Transformation project (Time entry system) will be integrated between mobile devices and our backend systems (<i>i.e.</i> , iPhone, iPad, making external and internal apps available to NG via NG site - push and pull) to enable our workforce to work in a more flexible and efficient manner. Due to the growing use of mobile devices, it is more critical than ever that we have a way to manage these devices so that we can comply with internal corporate policy, distribute applications, and secure the data on these devices through a central EMM platform.	Amit Kapur	External Partners: • IBM - \$175,000 • WIPRO - \$75,000 • Verizon - \$70,000

Project/INVP #	In Service Date(s)	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
Hicksville Data Center Improvement (Forward Proxy Upgrade) - INVP 4676	March 2018	Replace end of life proxy appliances with new appliances that support higher throughput capacity. All internet proxy services will be migrated to the new infrastructure and the old hardware decommissioned. If capacity is reached, there will be performance issues that affect services and applications that utilize the Internet.	Chris Gatland	External Partners: • Verizon - \$1,031,904
Call Manager Upgrade - INVP 4577	October 2017	This project will refresh the Cisco Call Manager hardware and software used for managing the Internet Protocol (IP) telephony estate – call distribution and voice mail. This project will also consolidate the call manager from two clusters to one cluster and provide monthly Run-the-Business savings under an updated financial model.	Ginnelle Davidson	External Partners: • Verizon - \$322,182
Legacy DMZ Firewalls - INVP 4688	March 2018	New firewalls will be purchased to support the legacy internet gateway at the Metrotech and Henry Clay Boulevard data centers.	Chris Gatland	External Partners: • Verizon - \$462,941

Project/INVP	In Service	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
#	Date(s)			
Log Logic - INVP 4674	March 2018	This project will replace the Logging services in the VSTIG which are at the end of their useful life and, are currently being supported by Verizon on a best endeavors basis only. The Log Logic service will be replaced by the new Cisco Hyperflex service.	Ginelle Davidson	External Partners: • Verizon - \$335,093
VSTIG Hardware Refresh - INVP 4274	March 2018	Within the VSTIG (Verizon Secure Telecommunications Gateway) solution, the Reverse Proxy (Bluecoat) servers have reached end of life and are no longer supported by Verizon as of February 2017. From that point, any support provided would be on a best endeavors basis only meaning contractual service level agreements (SLAs) cannot be guaranteed. This project will procure, install, and transition the replacement Bluecoat reverse proxy servers which will be fully supported for five years and provide an increase in bandwidth to the existing servers.	Chris Gatland	External Partners: • Verizon – \$552,642

Project/INVP #	In Service Date(s)	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
Refresh of network equipment at Verizon supported Sites (transformed sites-core infrastructure sites) - INVP 4645	October 2017	This project is a replacement of aged, unsupported network infrastructure across Verizon Supported sites (Non Reservoir-Woods sites ONLY).	Ginelle Davidson	External Partners: • Verizon - \$298,889
PPMI - INVP 4392	December 2017	This project will improve the IS Project and Portfolio management (PPM) capability in the US with the introduction of the Microsoft Project Online tool to manage Projects, Portfolios, Programs and provide status reporting via a centralized view.	Richard Pedley	No external partner costs

Project/INVP #	In Service Date(s)	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
Network Tx- NB/MTC - INVP 4687	December 2017	This project will replace aged network infrastructure at the Metrotech and Northborough sites. This infrastructure is largely unsupported project today. Once completed, the new equipment will be brought under Verizon Support Contract.	Ginelle Davidson	External Partners: • Verizon - \$224,430
NG Labs - INVP 4705	March 2018	This project will equip ngLabs with the necessary hardware and software to serve as proving ground for technology innovation and proof of concept projects. The mission is to bring current and emergent tech in house, execute technology scouting, and partner with the business to create products and solutions to address their needs.		No external partner costs

Project/INVP #	In Service	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
π	Date(s)			
SharePoint 2007 Decommissio n - INVP 3667	December 2019	This project will migrate the SharePoint 2007 sites and applications onto a new service as the current service is no longer able to meet service level and functional requirements. Failure of the aged and out of support infrastructure would result in many business processes and teams being unable to access shared data held on the service.	Project not started	Project not started – external partner estimates will be available once project is sanctioned
Mobile Application Development Platform (MADP) – INVP 3996	March 2019	This platform will contain the frameworks and tools needed for the development and deployment of custom mobile applications.	Project not started	Project not started – external partner estimates will be available once project is sanctioned
Service Now – Release 3 – INVP 4261	March 2018	This is a continual project to improve the Service Management Integration (SMI) processes, including the extension of channels available for contacting help desk and resolving issues.	Project not started	Project not started – external partner estimates will be available once project is sanctioned

Project/INVP #	In Service Date(s)	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
WAN Bandwidth Upgrades - INVP 4267	March 2018	This is to rollout and deploy additional Wireless Access Points and increase the bandwidth of WAN at selected US sites.	Project not started	Project not started – external partner estimates will be available once project is sanctioned
RAS/VPN Re- Platform/Mob ile - NVP 4269	March 2018	The original Juniper Remote Access SSL VPN (RAS) deployed by Verizon is now five years old and doesn't support some of the latest mobile capability or integrate easily with other technologies that have been implemented (Cisco ISE). This Project proposes to replace the existing RAS VPN solution with a more modern platform that has improved mobile VPN capability and improved integration with National Grid technologies.	Joe George	No external partner costs identified at this time

Project/INVP #	In Service Date(s)	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
RSA Re- platform - INVP 4270	March 2018	The existing Managed One Time Password service (MTOP) has been eliminated by Verizon and National Grid is one of the last customers on the service. This project will migrate this service to the current RSA product which provides one time passwords via RSA token or a smartphone app, but also includes a risk based authentication engine that can increase of decrease the password requirements based on your location, device, and access required.	Project not started	Project not started – external partner estimates will be available once project is sanctioned
4279 - Citrix Infrastructure Upgrade (Xenapp and NetScaler) - INVP 4729	March 2018	Upgrade/rationalization of Global Citrix infrastructure		External Partners: • IBM - \$6,674

Project/INVP	In Service	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
#	Date(s)			
Wireless LAN	March	This project is to develop a service level for	Project not	Project not started – external
Management	2019	WLAN and implement the tools required to	started	partner estimates will be available
Tools – INVP		measure the use, understand		once project is sanctioned
4284		capacity/utilization, support connectivity issues		
		and troubleshooting, and help plan for		
		additional growth of the service.		

Project/INVP	In Service	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
#	Date(s)			
Legacy DMZ migration to vSTIG - INVP 4362	December 2018	Our internet gateway services are currently comprised of the new strategic service vSTIG and a legacy DMZ service. The internet gateway connects National Grid securely to the internet and other external business partners. The legacy services are currently supporting a significant number of business critical systems and network traffic flows. The hardware and software that make up the legacy network services are experiencing operational issues that are impacting users. This legacy hardware no longer meets the required specifications and cannot be easily restored in the event of a failure, and National Grid does not have a contracted repair Service Level Agreement (SLA) for this equipment from our Network Service Provider. To resolve these issues, this project will migrate all legacy service to the new vStig service.	Chris Gatland	External Partners: • CSC - \$246,629 • Verizon - \$994,617 • IBM - \$168,480 • WIPRO - \$168,213

Project/INVP #	In Service Date(s)	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
Data Centre Migration and Capacity Increase Melville - INVP 4377	June 2019	This project will migrate equipment from the Melville Data Center to the company's primary data centers and increase capacity in support of the legacy applications that will remain.	Ginelle Davidson	External Partners: • DXC - \$1,884,426 • Verizon - \$922,874 • IBM - \$119,427 • WIPRO - \$93,998
Active Directory Improvements - INVP 4489	December 2018	Active Directory (AD) is a key service that supports core authentication for all National Grid computers and servers logging onto the corporate network in both the United States (US) and United Kingdom (UK). Therefore, AD provides access to all Information Systems (IS). The scope of this initiative is to implement a refreshed global AD infrastructure and support services. The new AD environment will unify all global applications that use the AD service. It is critical that National Grid can ensure that the AD service is reliable and supports core authentication requirements to all current and proposed applications.	Deb Gears	No external partner costs Other external vendors: • Pontoon: US PM services - \$111,000.00 • Microsoft Professional services - \$1,113,000.00

Project/INVP #	In Service Date(s)	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
Application Performance Management (APM) - INVP 4490	December 2018 December 2020	This project will implement an Application Performance Management tool to capture and report on application issues.	Project not started	Project not started – external partner estimates will be available once project is sanctioned
Monitoring and Alerting - INVP 4493	March 2018 March 2019 March 2020 March 2021	 Build a centralized Application Performance Monitoring platform to collect, present and store data from an end user experience to achieve the following: *Step-change reduction in incident MTTR (Mean Time To Recover): •Earlier detection of performance issues •Fewer false alarms (P1/P2) by having empirical evidence of scale of problem (#users impacted, impact of slowdowns) •Real-time dashboards shared with customer will build transparency showing good performance as well as the true scale of slowdowns/outages 	Brian Detota	No external partner costs identified at this time

Project/INVP	In Service	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
#	Date(s)			
US SAP: Business Warehouse (BW) Consolidation to HANA Enterprise Cloud (HEC) - INVP 4562	March 2019	 This investment is to consolidate National Grid Business Intelligence (BI)/Business Warehouse (BW) to HANA Enterprise Cloud (HEC). This will: Consolidate the reporting solutions onto a single platform to reduce costs, including infrastructure hosting and application support costs. Simplify the reporting solution for the business users. Increase cross functional reporting capabilities. 	Project not started	Project not started – external partner estimates will be available once project is sanctioned

Project/INVP	In Service	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
#	Date(s)			
US SAP: Enhancement Pack 9 Upgrade - INVP 4564	March 2020	The Upgrade Project will apply the latest SAP service packs for Enterprise Central Component (ECC), Supplier Relationship Management (SRM), Process Integration (PI), Portal, Business Planning and Consolidation (BPC), and Solution Manager to ensure that the SAP application stays within current vendor support and mitigates the risk of system failure by remaining current every two years on the SAP core application.	Project not started	Project not started – external partner estimates will be available once project is sanctioned
Data Visualization Expansion - INVP 4606	June 2019	This investment will expand the use of the Tableau, reporting platform across more use cases and business areas. Tableau provides data visualizations and analytics that aid management in the development of strategic and operational Plans.		No external partner costs identified at this time

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Project/INVP #	In Service Date(s)	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
1327 Interfaces - INVP 4706	June 2019	This project will migrate legacy interfaces to new supported middleware services that support file transfers (SAP PI and Oracle Fusion), The current technology is unsupported and is at risk since security patches are no and longer being provided.	Milena Passarelli	External Partners: • CSC (DXC) - \$70,850 • WIPRO - \$4,688,792 • IBM - \$48,000 • Verizon - \$70,000
Business Innovation Projects 4707 4708 4728	March 2018 March 2019 March 2020 March 2021	The Business Innovation Program will deliver a series projects that include: Big Data Analytics, Process, and Workflow automation with Robotics, CSS system upgrade pilot, and Mobile device capability enhancements. Additionally, application rationalization will be covered under the scope of this investment.		No external partner costs identified at this time. As additional projects are sanctioned external partner costs will be updated
Data Center Consolidation - INVP 4709	March 2019	This project will consolidate legacy data centers as remediation work is carried out on legacy applications (retained apps). Once all retained applications are remediated and moved to the new data center, the legacy data centers will be decommissioned.	Project not started	Project not started – external partner estimates will be available once project is sanctioned

Project/INVP	In Service	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
#	Date(s)			
Data Security	March	This project is based around a move to protect	Project not	Project not started – external
- INVP 4710	2019	data through information rights management	started	partner estimates will be available
	March	and advanced cyber protection both for end		once project is sanctioned
	2020	points and cloud services. The project will be		
	2020	delivered using Microsoft Secure Productive		
	March	Enterprise Plan E5, a SAAS based subscription		
	2021	product.		
	December	The Entermine Mahile Management System	A mit V annu	Esternal Darte and
	December	(EMM) project will secure corporate data and	Ainit Kapur	External Partners: \bullet IBM - \$170,000
INVP 4713	2018	(EMM) project will secure corporate data and information stored on mobile devices, mainly		• WIPRO - \$71 500
11 11 4/15		by ensuring that policies are enforced on the		• Verizon - \$50,000
		device. This project will procure the necessary		• • • • • • • • • • • • • • • • • • • •
		licenses to manage these mobile devices		
EMM Phase2	March	Rollout of EMM to all corporate mobile devices	Amit Kapur	External Partners:
– INVP 4714	2018	across the US (about 6000 users).		• IBM - \$170,000
				• WIPRO - \$71,500
				• Verizon - \$50,000

Project/INVP	In Service	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
#	Date(s)			
MWODK and	December	Notes at an will be the startesic direction for the	Ducient	Droject not started external
MWORK and	December	Netmotion will be the strategic direction for the	Project not	Project not started – external
Netmotion	2018	MWork application. It is used when mobile	started	partner estimates will be available
Risk		field workers move in and out of wireless		once project is sanctioned
Avoidance –		coverage areas and roam between networks, the		
INVP 4725		product maintains and secures their data		
		connections in order to maximize worker		
		productivity. This project will implement a new		
		solution for MWork that replaces the current		
		Birdstep product with Netmotion.		
Virtual	December	This project will implement a cloud based	John Braziel	No external partner costs
Desktop –	2019	desktop as a service (DaaS) offering,		identified at this time
DaaS - INVP				
4727				Other external vendors:
				• VMWare - \$268,000
VSTIG	March	Refresh of the IDS cards in VSTIG to support	Ken Little	External Partners:
Hardware	2018	connectivity up to 10Gb. In addition this		• Verizon - \$155,994
Refresh - IDS		project will increase of the MPLS port speed to		
Card		the VSTIG from 1Gb to 1.5Gb and modify		
Replacement -		various VSTIG networks (VRFs) to support		
INVP 4749		pent up network bandwidth demand.		
		Point of motion outdition domained		

Project/INVP #	In Service Date(s)	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
MTC and Syracuse Boardrooms & Auditoriums - INVP 4759	March 2018	This project will upgrade and install new Video Conference units.	John Braziel	External Partners: • Verizon - \$260,727
Mainframe DR Machine - INVP 4760	March 2018	This project will upgrade and improve the performance and capacity profile of National Grid's Mainframe Disaster Recovery platform. This investment will help to avoid potential adverse impact to systems operating on the mainframe.	Heather Cortez	No external partner costs identified at this time

Project/INVP #	In Service	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
"	Dute(3)			
US Foundation Hosting Renewal - INVP 4671	March 2018	To address its growing business environment, National Grid must enhance its SAP and HANA application hosting services. Currently the application hosting support is provided by T-Systems out of Houston, Texas and SAP HANA services are provided by SAP HANA Enterprise Cloud (HEC) out of Virginia. This project and the new vendor will consolidate these two datacenters under one platform for both primary and Disaster Recovery (DR) in the US. The service provider will supply Platform as a Service (PaaS) for SAP and HANA applications, and ancillary applications including PowerPlan, Open Text, uPerform, and SABRIX. National Grid IS will work with the provider to move the SAP application portfolio to a new datacenter. The new provider was selected through a formal Request For Proposal (RFP) process supported by INVP 3924.	Dave Petrick	External Partners: • IBM - \$50,000 • WIPRO - \$909,000 • Verizon - \$201,000 • DXC - \$20,000

Project/INVP #	In Service Date(s)	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
Dev Test to	September	The project will move Development and Test	Project not	Project not started – external
4478	2018	infrastructure	stated	once project is sanctioned
DR Priority 2 Apps Remediation - INVP 4824	December 2019	Implement the supporting technology tools that National Grid and our suppliers can utilize to design and deploy Disaster Recovery services for Priority 2 Applications.	Project not started	Project not started – external partner estimates will be available once project is sanctioned.
DR Priority 3 Apps Remediation – INVP 4825	December 2020	Implement the supporting technology tools that National Grid and our suppliers can utilize to design and deploy Disaster Recovery services for Priority 3 Applications.	Project not started	Project not started – external partner estimates will be available once project is sanctioned.

Project/INVP #	In Service Date(s)	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
EMM Single Sign on - INVP 4826	December 2018	This project will implement VMWare's Workspace One to support single sign on to mobile apps. This will eliminate the need to login more than once to access National Grid mobile apps which are expected to grow significantly in the next few years.	Project not started	Project not started – external partner estimates will be available once project is sanctioned.
Hicksville Fiber - INVP 4828	March 2019	This project will replace the aged multi-mode fiber optic plant that supports the Hicksville campus with an optimally routed single mode fiber optic cable plant. The project will also include the associated replacement of the Hicksville LAN switches' multimode fiber interfaces (GBICs) with single mode fiber interfaces as part of the migration to the new fiber facilities.	Project not started	Project not started – external partner estimates will be available once project is sanctioned.
Migration of Oracle to Linux – INVP 4830	August 2021	This project will migrate Oracle Database applications that reside on expensive Unix P- Series hardware, to less expensive Wintel/Linux based hardware.	Project not started	Project not started – external partner estimates will be available once project is sanctioned.
Project/INVP	In Service	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
--	------------------	---	------------------------	--
#	Date(s)			
Network Transformatio n Continuation- Risk Avoidance - INVP 4834	March 2020	This project will replace aged networking equipment including telephone PBXs.	Project not started	Project not started – external partner estimates will be available once project is sanctioned.
Network Transformatio n Continuation- Substations – INVP 4835	December 2020	National Grid's Transformation project with Verizon included only the office locations and did not include the substations that require card key access and therefore these sites were left on the legacy network. This project is to refresh the network equipment and migrate these sites over to the standard network environment to ensure operational reliability and management under the standard support model.	Project not started	Project not started – external partner estimates will be available once project is sanctioned.

Project/INVP #	In Service Date(s)	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
Network Transformatio n Continuation- Substations and Security Sites – INVP 4836	December 2020	National Grid's Transformation project with Verizon included only the office locations and did not include the Security sites that require card key access and therefore these sites were left on the legacy network. This project is to refresh the network equipment and migrate these sites over to the standard network environment to ensure operational reliability and management under the standard support model.	Project not started	Project not started – external partner estimates will be available once project is sanctioned.
SD-WAN Core, automation, orchestration tools and pilot sites – INVP 4837	March 2019	This project will build and deploy the SD-WAN core infrastructure and tools in the Network data centers which in turn will be used to support the deployment of the SD-WAN to the branch locations.	Project not started	Project not started – external partner estimates will be available once project is sanctioned.

Project/INVP #	In Service Date(s)	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
VC - Metrotech Auditorium – INVP 4840	September 2018	Currently there are not adequate video conferencing facilities in the Metrotech auditorium. This project will upgrade and install new Video Conference units.	Project not started	Project not started – external partner estimates will be available once project is sanctioned.
VC - Syracuse A39/40 – INVP 4841	June 2019	Install new video conferencing equipment in various rooms throughout the Syracuse Office Complex. Focus on deployment at standard conference rooms given recent deployments of video conferencing at large rooms in Syracuse (auditorium and boardroom).	Project not started	Project not started – external partner estimates will be available once project is sanctioned.
Virtualized Branches – INVP 4843	March 2020	In coordination with the SD_WAN core infrastructure project, this project will build and deploy the SD-WAN environment at the branch locations. This will support the delivery of WAN automation, application based routing and use of the Internet for network transport.	Project not started	Project not started – external partner estimates will be available once project is sanctioned.

Project/INVP #	In Service Date(s)	Description of Project/Customer Benefits	Project Mgr	Cost Estimate
Cloud Orchestration, Self-service and Broker - INVP 4981	March 2019	This project will provide the capability for users to provision Cloud storage and launch applications without going through an external cloud service provider. Cloud orchestration will arrange or coordinate the ability to automate tasks.	Project not started	Project not started – external partner estimates will be available once project is sanctioned.
Lincoln Control Room Telephony Replacement	March 2020	Replacement of aged telephony equipment in the Lincoln CNI control room.	Project not started	Project not started – external partner estimates will be available once project is sanctioned.

Request:

With respect to each of the Technology Modernization Program projects identified in Schedule ISP-1, please provide the allocator used to estimate the cost to Narragansett Electric's distribution businesses for each of the projects. Please also explain why the chosen allocator is reasonable for each.

Response:

The purpose of the Technology Modernization Program is to modernize obsolete Information Systems (IS) technology and services that inhibit employee performance and affect service to customers. The Technology Modernization Program directly impacts the Company's ability to deliver core operational capabilities applicable to each jurisdiction by fixing the foundational assets upon which IS operates. These enhancements will be experienced through improved reliability, use ability, speed, and efficiency across all functions while reducing the risk of system failure. The IS infrastructure assets, applications, and services that the Technology Modernization Program intends to address are National Grid USA Service Company, Inc. (Service Company) assets that transcend the business. Therefore, each benefitting company is allocated its share of the expenditures using a FERC-approved G-020 Cost Allocation Method.

The FERC-approved G-020 Cost Allocation Method used to allocate Service Company costs associated with the investments in the Technology Modernization Program is based on the 3-Point Formula (Net Plant, Net Margin, Net O&M), as depicted in Attachment DIV 3-32.

<u>G - General Allocator, 3-Point Formula</u>

G-020

Description:

The purpose of this sheet is to provide a listing of the companies that make up the G-020 FERC approved allocator used to allocate Service Company charges based on the 3-Point Formula (Net Plant, Net Margin, Net O&M).

	Alloc.	SAP	SAP Co.	SAP		3 Pt.	3 Pt.				
Description	Code	Co./Seg.	Code	Segment	ent Company Description Allocation % Allocation % Net Marc		nent Company Description		Net Margin	Net Plant	Net O&M
All KeySpan											
and NG											
Companies	Companies G-020 5020R 5020 PARENT National Grid USA Parent		0.09%	0.09%	\$-	\$-	\$ 10,678,534				
	G-020	5040R	5040	PARENT	KeySpan Energy Corp.	0.01%	0.01%	\$-	\$-	\$ 669,841	
	G-020	5210E	5210	NYELEC	Niagara Mohawk Power Corp Electric Distr.	15.72%	15.72%	\$ 1,198,921,609	\$ 4,264,491,304	\$ 619,066,340	
	G-020	5210G	5210	NYGASD	Niagara Mohawk Power Corp Gas	4.75%	4.75%	\$ 346,680,591	\$ 1,491,438,437	\$ 165,095,195	
	G-020	5210T	5210	NYTRAN	Niagara Mohawk Power Corp Transmission	5.59%	5.59%	\$ 385,690,791	\$ 2,415,788,723	\$ 106,731,443	
	G-020	5220G	5220	NYGASD	KeySpan Energy Delivery New York	12.38%	12.38%	\$ 993,070,386	\$ 3,676,541,909	\$ 416,418,656	
	G-020	5230G	5230	NYGASD	KeySpan Energy Delivery Long Island	8.51%	8.51%	\$ 668,892,495	\$ 2,981,821,126	\$ 225,375,331	
	G-020	5310E	5310	MAELEC	Massachusetts Electric Company	20.02%	20.02%	\$ 1,598,840,493	\$ 2,680,685,854	\$ 1,159,865,088	
	G-020	5310T	5310	FRTRAN	Massachusetts Electric Company - Transmission	0.17%	0.17%	\$ 17,339,390	\$ 52,007,344	\$ 4,203,096	
	G-020	5320E	5320	MAELEC	Nantucket Electric Company	0.27%	0.27%	\$ 22,878,224	\$ 68,758,022	\$ 10,060,149	
	G-020	5330G	5330	MAGASD	Boston Gas Company	9.03%	9.03%	\$ 716,665,901	\$ 2,406,613,994	\$ 347,617,727	
	G-020	5340G	5340	MAGASD	Colonial Gas Company	2.04%	2.04%	\$ 161,327,519	\$ 581,444,275	\$ 73,390,098	
	G-020	5360E	5360	RIELEC	Narragansett Electric Company	6.60%	6.60%	\$ 574,052,546	\$ 926,658,890	\$ 353,600,201	
	G-020	5360G	5360	RIGASD	Narragansett Gas Company	2.85%	2.85%	\$ 231,782,063	\$ 761,289,647	\$ 106,868,890	
	G-020	5360T	5360	FRTRAN	Narragansett Electric Company - Transmission	1.77%	1.77%	\$ 133,930,510	\$ 862,645,421	\$ 13,013,773	
	G-020	5410T	5410	FRTRAN	New England Power Company - Transmission	5.00%	5.00%	\$ 378,086,156	\$ 2,221,166,435	\$ 69,879,050	
	G-020	5411F	5411	FRELEC	NE Hydro - Trans Electric Co.	0.17%	0.17%	\$ 16,753,717	\$ 31,800,443	\$ 7,178,838	
	G-020	5412F	5412	FRELEC	New England Hydro - Trans Corp.	0.11%	0.11%	\$ 11,910,006	\$ 4,272,818	\$ 6,000,534	
	G-020	5413F	5413	FRELEC	New England Electric Trans Corp	0.01%	0.01%	\$ 1,374,412	\$0	\$ 204,770	
	G-020	5420G	5420	FRGASO	NG LNG LP Regulated Entity	0.17%	0.17%	\$ 8,230,443	\$ 82,150,480	\$ 3,828,666	
	G-020	5430P	5430	FRPGEN	KeySpan Generation LLC (PSA)	4.04%	4.04%	\$ 464,650,405	\$ 594,113,557	\$ 156,428,992	
G-020 5431P 5431 FRPGEN KeySpan Glenwood		KeySpan Glenwood Energy Center	0.13%	0.13%	\$ 11,845,255	\$ 38,062,111	\$ 4,152,842				
G-020 5432P 5432 FRPGEN KeySp		KeySpan Port Jefferson Energy Center	0.15%	0.15%	\$ 13,342,875	\$ 45,737,978	\$ 4,298,071				
G-020 5820R 5820 PARENT		PARENT	Keyspan Energy Trading Services	0.00%	0.00%	\$-	\$ 308,494	\$ 158,770			
G-020 5825N 5825 NONREG Tra		Transgas Inc	0.08%	0.08%	\$ 3,982,586	\$ 7,837,743	\$ 6,208,446				
	G-020	5840N	5840	NONREG	KeySpan Energy Development Corporation	0.18%	0.18%	\$ -	\$ 74,017,254	\$ 10,567,625	
	G-020	5850N	5850	NONREG	KeySpan Services Inc.	0.16%	0.16%	\$ 14,478,322	\$ 6,613,711	\$ 11,009,061	
					Total	100.00%	100.00%	7,974,726,692	26,276,265,968	3,892,570,026	

Request:

Referring to Schedules ISP-1 and ISP-2,

- a. When did the project identified INVP 4307 US Win 7 Refresh Ph3 first commence?
- b. Please explain why the project identified as INVP 4307 US Win 7 Refresh Ph3 involving the transition of 6000 users of Windows to Windows 7 was not completed prior to 2017.
- c. Please provide the number of users who had already transitioned to Windows 7 prior to the commencement of the project to transition the last 6000 users to Windows 7.
- d. Please provide a timeline of how the transition of the National Grid organization has been implemented, with number of users fully transitioned.
- e. Please identify the method and reasoning for the allocation of the total cost of this project to Rhode Island.

Response:

- a. This project commenced in June 2016.
- b. This was the final phase of the Windows XP to Windows 7 migration. It involved devices with more challenging and aged applications that were deferred from previous phases. In the planning stage, a target of completing by the end of Fiscal Year 2017 (March 2017) was set. This was not achieved because of the time needed to remediate and test the older XP applications that would allow the devices to run in a Windows 7 environment.
- c. Two previous phases moved 2400 and 3300 devices respectively to Windows 7. In total, 11,700 devices were migrated from Windows XP to Windows 7 across all National Grid jursidictions.
- d. The migration of Windows XP to Windows 7 was delivered through several Information Services (IS) investments that ran from 2012 to 2017:
 - 2012 Phase 1 IS Transformation (INVP2934) Delivered a refresh of National Grid's laptops and desktops of which approximately 2400 were Windows XP devices.
 - 2014 Phase 2 Desktop Refresh (INVP 2927) This phase refreshed an additional group of laptops and desktops that were outside the scope of the Phase 1 project since devices were less than 3 years old. Approximately, 3300 of these devices were Windows XP.

- 2015 End User Device Refresh Windows 7 Phase 3 Assessment (INVP4266) This project reviewed the 35 legacy software solutions that could not run on Windows 7 devices causing approximately 6000 users to remain on Windows XP. The project developed a remediation plan of each of the 35 applications.
- 2016 Phase 3 US Windows 7 Refresh (INVP 4706) This is the final migration of the 6000 users noted above.
- e. Rhode Island is receiving 11.2 percent of the total costs. The total costs field was included in Schedule ISP-1 (Bates Pages 24-46 of Book 7) for presentation purposes only. The actual allocated amounts to Rhode Island are shown in the Rate Year, Data Year 1, and Data Year 2 columns for each of those years.

Request:

Referring to Schedules ISP-2, and the project identified as WAP Density Deployment - INVP 4680, please identify the location of each of the 30 U.S. sites referenced in the description.

Response:

Please see Attachment DIV 3-34 for the list of the 30 sites. The list includes a combination of training centers used to support multiple jurisdictions and National Grid's field offices.

The Narragansett Electric Company d/b/a National Grid RIPUC Docket No. 4770 Attachment DIV 3-34

nationalgrid

US Wireless Project INVP4680 – Steering Committee Meeting April 28, 2017

Sites

Wireless Density TIP FY18 - Additional 30 Sites

#	Region		Address	
	Region			
# <	-	-		
1	UNY	1125 Broadway	Albany, NY	
2	UNY	5215 Western Turnpike	Altamonte, NY	
3	NE	44 River St	Beverly, MA	
4	NE	39 Quincy Ave	Braintree, MA	
5	DNY	651 Court Street (Red Hook	Brooklyn, NY	
6	DNY	8302-8624 Ditmas Ave (Car	Brooklyn, NY	
7	DNY	287 Maspeth Ave	Brooklyn, NY	
8	UNY	98 Dewey Ave	Buffalo, NY	
9	NE	Country Road	Cataument, MA	
10	NE	220 Victory Road	Dorchester, MA	
11	DNY	600 Stewart Ave	Garden City, NY	
12	UNY	636 Quaker Rd	Glens Falls, NY	
13	DNY	288 Pulaski Rd	Greenlawn, NY	
14	UNY	100 Fairview Av	Hudson, NY	
15	DNY	89-67 162 ST (Queens)	Jamaica, NY	
16	DNY	127-11 Farmer's Blvd (Springfie	Jamaica, NY	
	DNY	127-11 Farmer's Blvd (Springfield) -	Jamaica, NY	The second second
16 - A		Aca Verselated Aver		
17				
18		7437 Henry Clay Blvd		
10 4	UNY	Training Contor	Liverpool, NY	
10-A		775 Dutton St		
19				
20		25 Hub Drive -		
20 - A	DNY	Training Center	Melville, NY	
21	NE	449 Southwest Cutoff	Millbury, MA	
21 - A	NE	449 Southwest Cutoff - Training Center	Millbury, MA	
22	DNY	460 East Main St.	Patchogue, NY	
23	UNY	20 Pine Street	Potsdam, NY	
24	DNY	117 Doctor's Path	Riverhead, NY	
25	UNY	5835 Success Dr	Rome, NY	The second se
26	UNY	734 Broadway	Schenectady, NY	. Alter and a second and
27	UNY	300 Seneca Street	Schenectady, NY	A set of the set of th
27 - A	UNY	300 Seneca Street - Training Center	Schenectady, NY	
28	NE	127 White's Path	South Yarmouth, MA	<u> </u>
29	UNY	21625 NYS Rt 232	Watertown, NY	6
30	NE	10 Union St	Webster, MA	

1

Request:

Referring to Schedules ISP-1, and the project identified as Wireless Network - INVP 4364, please identify the location of the National Grid sites identified as a "priority" in the description that states: "replace end of life equipment, decommission legacy wireless networks, and install or expand the current coverage and capacity of the Wireless Local Area Network (WLAN) at various National Grid sites that have been identified as a priority."

Response:

Please see Attachment DIV 3-35 for the Wireless Network (INVP 4364) sanction paper. The prioritized list of sites is shown in section 4.5 of the sanction paper. The sites are a combination of offices and field worker locations (*i.e.* yards).

Title:	Wireless Network Improvement	Sanction Paper #:	USSC-16-197+
Project #:	4364	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	June 8, 2016
Author:	Jazz Mistry	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	Neil Beasant

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of Wireless Network Improvement in the amount \$1.810M with a tolerance of +/- 10% for the purposes of full implementation of the project.

This sanction amount is \$1.810M broken down into:

\$1.570 - Capex \$0.240 - Opex

1.2 **Project Summary**

This is a policy driven project to replace end of life equipment, decommission legacy wireless networks, and install or expand the current coverage and capacity of the Wireless Local Area Network (WLAN) at various National Grid sites that have been identified as a priority. The project will also strengthen the stability of the wireless network by providing current supported equipment with additional capacity. In addition this project will renew the outdoor (Yard) wireless network for these prioritize sites by replacing out of support access points at field locations to ensure Wi-Fi vehicle communications remain supportable.

WLAN Work to be implemented for:	Number :			
New Office Sites	8			
Existing Office	5			
Existing Yard	8			
Existing Office & Yard	2			
New Office & Yard	1			

Summary of Project Scope (see section 4.5 for full details)

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title		Estimate Amount (\$M)
INVP 4364	Project Type	Wireless Network Improvement		1.810
			Total	1.810

1.4 Associated Projects

Not applicable

1.5 **Prior Sanctioning History**

Not applicable

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
3/31/2017	Closure Paper

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
O Mandatory	This policy driven investment predominately supports the "Operational Excellence" objective. The improvements
Policy- Driven	will support the US business through the provision of standardised wireless services, centrally supported and consistent across all of the US sites. It also enables the
O Justified NPV	continual upgrade of the central management system by ensuring that the site level wireless infrastructure is at revision levels which can be supported
O Other	

1.8 Asset Management Risk Score

Asset Management Risk Score: 42

Primary Risk Score Driver: (Policy Driven Projects Only)

Reliability
CEnvironment

t OHealth & Safety

Page 2 of 18

fety ONot Policy Driven

Attachment DIV 3-35.docm/ IS v12 Nov2015 Uncontrolled When Printed



1.9 Complexity Level

○ High Complexity ○ Medium Complexity ● Low Complexity ○ N/A

Complexity Score: _9____

1.10 Process Hazard Assessment

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

O 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 (\$)
FY17 - Capex	⊙Yes ONo	O Over ⊙ Under O NA	n/a
FY17 - Opex	⊙Yes ONo	⊙ Over ○ Under ∩ NA	\$0.240m

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

The shortfall in the Opex is being funded by the underspend in the FY17

1.13 Current Planning Horizon

				Current	t Planning I	Horizon		
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6+	
\$M	Prior Yrs	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	Total
CapEx	0.000	1.570	0.000	0.000	0.000	0.000	0.000	1.570
OpEx	0.000	0.240	0.000	0.000	0.000	0.000	0.000	0.240
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	1.810	0.000	0.000	0.000	0.000	0.000	1.810

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	March 2016
Begin Requirements and Design	June 2016
Begin Development and Implementation	October 2016
Move to Production	February 2017
Project Complete	March 2017
Project Closure	March 2017

1.15 Resources, Operations and Procurement

Resource Sourcing										
Engineering & Design Resources to be provided	Internal		Contractor							
Construction/Implementation Resources to be provided	Internal			Contractor						
Resource Delivery										
Availability of internal resources to deliver project:	O Red	O Amber		Green						
Availability of external resources to deliver project:	O Red	O Amber		Green						
Opera	ational Impact	t								
Outage impact on network system:	○ Red	O Amber		Green						
Procurement Impact										
Procurement impact on network system:	○ Red	O Amber		Green						

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

None identified at this stage

1.17 Climate Change

Contribution to National Grid's 2050 80% emissions reduction target:	Neutral	O Positive	O Negative
Impact on adaptability of network for future climate change:	Neutral	O Positive	O Negative

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The Narragansett Electric Company d/b/a National Grid RIPUC Docket No. 4770 Attachment DIV 3-35

US Sanction Paper

1.18 List References

1	INVP4364 – TCO Log
2	INVP 4364 - USSC Master Report

2 <u>Decisions</u>

The US Sanctioning Committee (USSC) at a meeting held on June 8, 2016:

- (a) APPROVED this paper and the investment of \$1.810M and a tolerance of +/-10%.
- (b) APPROVED \$0.064M per year increase (for 5 yeasr) on current RTB impact.
- (c) NOTED that Lee Denny has the approved financial delegation.

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

Christopher Kelly

Senior Vice President US Sanctioning Committee Co - Chair Person

3 Sanction Paper Detail

Title:	Wireless Network Improvement	Sanction Paper #:	USSC-16-197+
Project #:	4364	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	June 8, 2016
Author:	Jazz Mistry	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	Neil Beasant

3.1 Background

National Grid's work force has become mobile and team oriented. They require network connectivity as they move throughout the campus and work individually or in teams. Use of mobile devices has become widespread. These devices no longer have wired connections and therefore wireless local area networking (WLAN) is becoming a key enabler to support this mobile teaming approach extending to and including the contractor workforce.

The rapid end user adoption of these services demonstrates that this has become critical office infrastructure which meets the needs of end users in accessing corporate systems and collaboration tools away from their desks and a traditional wired LAN environment. Both within the office and the immediate external surroundings (Yards) can be covered by conventional WLAN technology enabling these office locations to be productive environments for all of National Grid's employees.

The current Wireless LAN (WLAN) infrastructure comprises two core components; Wireless Access Points (WAPs) and Wireless Controllers. The wireless access points provide the short range radio connection from the end user's device to the local fixed network infrastructure (a LAN Switch), while the wireless controllers provide a centralized management overlay holding the configuration data for the WAPs and pulling data from the WAPs for reporting purposes. Because the WAPs and Wireless Controllers need to be in constant communication they need to also be at the same support levels, in terms of software, hardware and feature levels. For this reason it is not possible to upgrade one and not the other.

National Grid Yards have become dependent on the use of the wireless networks (WLAN) for communications to their vehicles and transmit large data files over the WLAN rather than the mobile network, however many of these WLAN Access Points are no longer supported and are at risk of failure.

As National Grid continues to leverage 3rd party expertise to support our business objectives, providing "guest" Wi-Fi access capability at our locations enables those contractors to operate as though they were in their own offices and provide enhanced levels of support and collaboration in ways which would not have been possible previously. Providing this guest Wi-Fi access in a consistent way across all of our sites ensures that even the most mobile of our contractor workforce suffer no loss of productivity as they move from site to site as their access will follow-them in a secure and consistent way. As guest Wi-Fi has become business critical, it also needs to be provided on current and supportable infrastructure across the enterprise.

The current environment is a mix of both the legacy/EOL and transformed wireless infrastructure. This results in an inconsistent experience for the current users who are not presented with the same wireless credentials in every location. Post project, the benefit of having a consistent wireless service across sites are that it improves reliability through simplifying the management overhead and enables the use of low cost and highly reliable components as well as a consistent end-user experience. The introduction and development of these wireless connectivity services enables the delivery of National Grid's business objective of "Operational Excellence" ensuring the workforce have access to all their business critical services across all NG locations. The future development of these services will be such that these levels of service will be available ubiquitously, whether within or outside of National Grid Office's and this project is a stepping stone on the path to achieving that objective and delivering service excellence in the area of network connectivity.

3.2 Drivers

- The key driver is to provide a common and standardize environment for wireless users on National Grid Sites.
- Mitigate security risks associated with aged and non-standard environments.
- Reduce the incentive for technically able employees to put up their own wireless service, thus creating additional security risks.
- Operate a current and supportable WLAN capable of meeting user availability requirements.

3.3 **Project Description**

An initial activity in BAU has completed work to identify legacy equipment that needs to replace and upgraded, legacy WLANs that need to be decommissioned, and prioritize sites that require immediate upgrading and brought into support. (See section 4.5 for "In Scope WLAN".)

The project will action these priorities onto the Verizon WLAN and current channels. The project will also decommission legacy network infrastructure associated with these sites.

The implementation work includes:

- Identify, design, and implement WLAN controller replacements
- Decommission legacy WLAN controllers
- Carry out site survey work which will produce detail designs on a site per site basis.
- Prioritizing of sites based of the output from the survey
- Liaise with the stakeholder of implementation plan and communicate the decision to the business users
- Carry out implementation activities to migrate the legacy system onto Verizon's supported platform
- Identify, plan and execute the decommission of legacy WLANs and Service Station Identifiers (SSIDs).

Note: The SSID is what the end users use to know which wireless LAN (WLAN) service they are connecting to. The National Grid standard SSIDs are ng-c, ng-g, nd-x.

3.4 Benefits Summary

- Enhanced security. The deployment of a current, supportable and common infrastructure will enable centrally monitored usage, track any illicit or improper access, and enable a common set of software security upgrades. Elimination of security risks associated with legacy WLANs/SSIDs.
- Simplified Management and Support Model for WiFi Services
- Enhanced Service Levels for service availability and performance
- Consistency in the use of services across National Grid Locations
- Leveraging of the central investment in the management infrastructure to ensure an overall lowered "cost of ownership"
- Upgrades essential parts of the management infrastructure as individual components go "end of life"
- The ability to extend the range of service to outdoor locations within National Grid sites.
- User clarity and ease of use
- Expanded WLAN coverage, capacity and expandability

3.5 **Business and Customer Issues**

None

3.6 Alternatives

Alternative 1: Do Nothing

This is not an option as many of the wireless access points and WLAN controllers have reached their "End of Life" and will no longer be supported by the vendor, Cisco, or Verizon, the service provider. In addition, the wireless controllers cannot be upgraded until all the Wireless Access Points have reached a certain supportable revision level, hence why the replacement of the EOL Wireless Access Points has become critical. In addition, the legacy WLANs/SSIDs have security risks that are mitigated by migration to the Transformed infrastructure.

Alternative 2: Delay the implementation

As the Wireless Access Points have reached end of life, delaying the upgrade will put the service at risk for some and potentially all sites. The service providers and vendors would no longer be contractually obliged to provide support in the event of failure and business impact from this loss of service would be extremely likely. Business users on failed sites would either need to revert back to the wired network, assuming there are enough network ports to support all users, or utilize unsupport alternatives, such as mobile broadband and remote access services, which present both security, useability and cost risks. In addition, there are known secutiry risks associated with the legacy Constitution and guest networks that would remain unresolved.

Alternative 3: Partial implementation – Reduce scope and reduce business benefits for legacy network decommissioning.

The scope of this project could be limited to only ensure that "end of life" Wireless Access Controllers (WAPs) are replaced, ensuring continuity of support from the vendor. However, due to the issue associated with the current wireless controllers, not being able to support the latest release of WAPs on their current software version, it would be necessary to replace the WAPs, not with the latest version, but with a later version which is still supported by the vendor and which can be controlled and managed by the wireless controllers. This approach may prove advantageous for the 2016/17 budget, but would increase the overall cost of ownership, as the new WAPs would by definition be supported for a shorter period, and therefore need upgrading more often. Also, the next WAP upgrade will require the wireless controllers to be upgraded.

3.7 Safety, Environmental and Project Planning Issues

Not applicable

3.8 Execution Risk Appraisal

r		ty	Imp	oact	Score						
Numbe	Detailed Description of Risk / Opportunity	Probabili	Cost	Schedule	Cost	Schedule	Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan	
1	There is a risk that the priorities of the project may have to change if there is a failure in one of the services before project is complete	3	4	1	12	3	Accept	Carry on with the project as normal.	None after project completion.	Prioritise the site that has failed to be completed ASAP.	
2	Survey exposes the site is more complex / expensive to transform than originally thought	2	3	4	6	8	Mitigate	Manage the site survey closely to maximise the warning of risk being realised.	None after project completion.	Re-schedule site priority and parallel as much of the work as possible t bring back into original time line. Costs if above the 15% sanction threshold, will be mitigated by reviewing the scope to ensure we fit in the maximum number of sites within the sanctioned budget.	
3	Supplier resources not available in sufficient quantity to complete within required timescales.	2	4	5	8	10	Mitigate	Arrange quotes for extra 3rd party resources.	Project timeline at risk.	Bring in extra 3rd party resources to enable project timeline to be met. Costs if above the 15% sanction threshold, will be mitigated by reviewing the scope to ensure we fit in the maximum number of sites within the sanctioned budget.	

3.9 **Permitting**

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

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

3.10.2 Customer Impact



3.10.3 CIAC / Reimbursement

N/A

Attachment DIV 3-35.docm/ IS v12 Nov2015 Uncontrolled When Printed

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

						Current Planning Horizon						
						Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
			Project									
	Project		Estimate									
	Number	Project Title	Level (%)	Spend (\$M)	Prior Yrs	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	Total
			Est Lvl (e.g. +/- 10%)	CapEx	0.000	1.570	0.000	0.000	0.000	0.000	0.000	1.570
1		Wireless Network Improvement		OpEx	0.000	0.240	0.000	0.000	0.000	0.000	0.000	0.240
	INVP 4364	wheless wetwork improvement		Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	1.810	0.000	0.000	0.000	0.000	0.000	1.810	

	CapEx	0.000	1.570	0.000	0.000	0.000	0.000	0.000	1.570
Total Brainat Sanation	OpEx	0.000	0.240	0.000	0.000	0.000	0.000	0.000	0.240
Total Project Sanction	Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Total	0.000	1.810	0.000	0.000	0.000	0.000	0.000	1.810

Summary Analysis of RTB Costs												
All figures in \$ millions	Yr.1 15/16	Yr. 2 16/17	Yr. 3 17/18	Yr.4 18/19	Yr. 5 19/20	Yr.6+	Total					
Forecast of RTB Impact												
RTB if Status Quo Continues	-	0.064	0.191	0.191	0.191	0.397	1.034					
RTB if Project is Implemented	-	0.089	0.255	0.255	0.255	0.529	1.382					
Net change in RTB	-	0.025	0.064	0.064	0.064	0.132	0.348					
RTB Variance Analysis (if Project is Implemented)												
Net Δ RTB funded by Plan(s)	-	-	-	-	-	-	-					
Variance to Plan	-	0.025	0.064	0.064	0.064	0.132	0.348					
Total RTB Costs - by Cost T	ype (if	Project i	is Implei	mented)								
App.Sup SDC 1	-	-	-	-	-	-	-					
App.Sup SDC 2	-	-	-	-	-	-	-					
App.Sup other	-	-	-	-	-	-	-					
SW maintenance	-	-	-	-	-	-	-					
SaaS	-	-	-	-	-	-	-					
HW support	-	0.089	0.255	0.255	0.255	0.529	1.382					
Other: IS	-	-	-	-	-	-	-					
All IS-related RTB (sub-Total)	-	0.089	0.255	0.255	0.255	0.529	1.382					
Business Support (sub-Total)	-	-	-	-	-	-	-					
Total RTB Costs	-	0.089	0.255	0.255	0.255	0.529	1.382					

3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

		Current Planning Horizon										
	Prior Yrs	Yr. 1	Yr. 1 Yr. 2 Yr. 3 Yr. 4 Yr. 5 Yr. 6 +									
\$M	(Actual)	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	Total				
CapEx	0.000	1.600	0.000	0.000	0.000	0.000	0.000	1.600				
OpEx	0.000	0.240	0.000	0.000	0.000	0.000	0.000	0.240				
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Total Cost in Bus. Plan	0.000	1.840	0.000	0.000	0.000	0.000	0.000	1.840				

Variance (Business Plan-Project Estimate)

			Current Planning Horizon										
	Prior Yrs	Yr. 1	Yr. 1 Yr. 2 Yr. 3 Yr. 4 Yr. 5 Yr.										
\$M	(Actual)	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	Total					
CapEx	0.000	0.030	0.000	0.000	0.000	0.000	0.000	0.030					
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	0.030	0.000	0.000	0.000	0.000	0.000	0.030					

3.11.3 Cost Assumptions

- This project will is managed by National Grid Project Manager
- Verizon are the main supplier
- The cost assumes 8% uplift on the original Verizon proposal to cover US Sales Tax self-certification scheme as these will be added to their invoices & become an additional cost to the project.
- Implementation of this project will increase the current RTB by \$64k per year for 5 years.

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 *NPV Summary Table* N/A

3.11.4.2 NPV Assumptions and Calculations

3.11.5 Additional Impacts

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
Business Executive Sponsor	John Gilbert
Head of BRM/Strategy	Graham Pool
Head of PDM	Tom Cunningham
Relationship Manager	Graham Pool
Program Delivery Manager	Lee Denny
IS Finance Management	Chip Benson/Chris Pearce
IS Regulatory	Dan DeMauro
DR&S	Muks Ravipathy
Service Transition	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	
Finance	Benson, Chip	All	
Regulatory	Zschokke, Peter	All	
	Patterson, James	New England - Electric	
Invidicational Delegate(s)	Harbaugh, Mark	New York - Electric	
Junsuicuonal Delegate(s)	Hill, Terron	FERC	
	Brown, Laurie	Gas - NY	
	Iseler, David G.	Gas - NE	
Procurement	Art Curran	All	

4 Appendices

4.1 Sanction Request Breakdown by Project

N/A

4.2 **Benefiting Other Operating Companies**

This project will benefit all of the listed companies below

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

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

4.3 NPV Summary

N/A

4.4 Customer Outreach Plan

N/A

4.5 Current Prioritized WLAN in scope

	New or Existing	Deployment Capacity
Site – Where WI AN Work to be Completed	WIAN	Deployment capacity
Site Where WEAR Work to be completed	Now Office	Building Covorage 1.5 dovices per
Bay Shore - OFFICE ONLY	New Onice	liser
Buy Shore Office Oner	New Office	Building Coverage 1.5 devices per
	New Onice	licer
	Now Office	Building Covorage 1 5 dovices per
Fredonia - OFFICE ONLY	New Once	user
	Now Office	Building Covorage 1 5 dovices per
Olean - OFFICE ONLY	New Once	licer
	New Office	Building Coverage 1.5 devices per
Gloversville - OFFICE ONLY	New Once	user
	Now Office	Building Coverage 1 E devices per
Malden, MA (Medford St) - OFFICE ONLY	New Onice	Building Coverage 1.5 devices per
	Now Office	user Building Coverage 1 E devices per
Northampton - OFFICE ONLY	New Office	Building Coverage 1.5 devices per
	New Office	user
North Kingstown - OFFICE ONLY	New Office	Building Coverage 1.5 devices per
		user
	Existing Office	Address gaps, building Coverage 1.5
Northboro - OFFICE ONLY		devices per user
Corrections to MTC second floor - OFFICE	Existing Office	2 th Floor Coverage 1.5 devices per
UNLY		user
Hicksville - Office & Yard	Existing Office	Yard Like for Like, Office-Limited
	and Yard	expansion
Malden, MA (Commercial St) - SITE YARDS &	Existing Yard	Yard Like for Like, Office 1.5 devices
OFFICE		per user
	Existing Yard	Yard Like for Like, Office 1.5 devices
Bellmore, NY - SITE YARDS & OFFICE		per user
	Existing Yard	Yard Like for Like, Office 1.5 devices
Roslyn, NY-SITE YARDS & OFFICE		per user
Staten Island, NY (Gulf Ave) SITE YARDS &	Existing Yard	Yard Like for Like, Office 1.5 devices
OFFICE		per user
	Existing Office	Yard Like for Like, Office- Coverage in
Brentwood, NY (Office 1 AP) & Yard	and Yard	one office area
	Existing Yard	Yard Like for Like, Office 1.5 devices
Hewlett, NY - SITE YARDS & OFFICE		ner user
Amesbury, MA- MESH +MWORK - SITE YARD	Existing Yard	Yard Like for Like, Office 1.5 devices
Amesbury, MA- MESH +MWORK - SITE YARD & OFFICE OFFICE	Existing Yard	Yard Like for Like, Office 1.5 devices per user
Amesbury, MA- MESH +MWORK - SITE YARD & OFFICE OFFICE Waltham, MA (Newton St) - SITE YARDS &	Existing Yard Existing Yard	Yard Like for Like, Office 1.5 devices per user Yard Like for Like, Office 1.5 devices
Amesbury, MA- MESH +MWORK - SITE YARD & OFFICE OFFICE Waltham, MA (Newton St) - SITE YARDS & OFFICE	Existing Yard Existing Yard	Yard Like for Like, Office 1.5 devices per user Yard Like for Like, Office 1.5 devices per user
Amesbury, MA- MESH +MWORK - SITE YARD & OFFICE OFFICE Waltham, MA (Newton St) - SITE YARDS & OFFICE Haverhill 185 Water St - Electric - (MWORK) -	Existing Yard Existing Yard New Office and	Yard Like for Like, Office 1.5 devices per user Yard Like for Like, Office 1.5 devices per user MWORK Yard, Office 1.5 devices per

West Roxbury – Rivermoor St – Add – New Site – Office and Yard	Existing Yard	Yard Like for Like, Office 1.5 devices per user
ADDITIONAL SITES - INFRASTRUCTURE:		
Governour - transform remaining FAT WAPs	Existing Office	Like for Like AP replacement
Pulaski - transform remaining FAT WAPs	Existing Office	Like for Like AP replacement
Wilmington - transform remaining FAT WAPs	Existing Office	Like for Like AP replacement

Request:

Referring to Schedule ISP-1, p. 1 of 23, and the project identified as Regulatory Mandates, it states: "This investment is for Regulatory Mandates of a project size that may not be known at the beginning of the fiscal year. The funding will be used to comply with walk-in Mandates and will be used for substitution based on a priority assessment with the business." Please provide a more complete description of this project, its purposes, and how it relates to regulatory mandates in Rhode Island. Please identify the method and reasoning for the allocation of the total cost of this project to Rhode Island.

Response:

Every year, there are a number of information services (IS) projects that are initiated as a direct result of, or are driven by, the need to comply with regulations, laws, tariffs, orders, agreements, or other matters promulgated by federal, state, or local governmental agencies. Please see Attachment DIV 3-36 for a listing of IS projects in progress that are categorized as regulatory mandates. Attachment DIV 3-36 also includes the cost estimates associated with these projects and the percentage allocation to the Company, if any. Based on historic information and forward-looking regulatory agendas, National Grid has forecasted in its three-year investment plans the need to budget approximately \$20 million per year across all regulatory jurisdictions for IS projects resulting from future regulatory mandates. The FERC-approved G-020 Cost Allocation Method has been used to estimate the expected future allocation of National Grid USA Service Company, Inc. costs associated with the forward-looking investments to comply with regulatory mandates, which is based on the 3-Point Formula (Net Plant, Net Margin, Net O&M), as shown in Attachment DIV 3-32. The Regulatory Mandates funding base will be used in the Rate Year and Data Years to fund IS projects required to comply with new regulatory requirements.

The Narragansett Electric Company d/b/a National Grid RIPUC Docket No. 4770 Attachment DIV 3-36 Page 1 of 1

Budget

FY18 Mandated Projects As of 12-7-17

FY18 Mandated Projects

		Cost	Mandate	FV18	Allocator	% Allocation to BL
INVID	Project Name	Category	Wandate	1110	Anocator	70 Anocation to Ki
4298	INVP4298-NY REV Clifton Park Demo Information Systems readiness	Capex	Yes	229,755	5210	0%
4748	INVP 4748 DG IOAP Phase 2 Feasibility Study	Capex	Yes	-	5210	0%
5023	INVP5023 DG IOAP Phase 2 Screens A & B	Capex	Yes	327,000	5210	0%
5159	INVP5159 NMPC Rate Case	Capex	Yes	359,000	5210	0%
4347	INVP 4347 NYC Leave on for Landlord Program	Capex	Yes	573,180	5220	0%
4448	INVP4448 - Low Income Order	Capex	Yes	2,156,633	5220	0%
4448	INVP4448 - Low Income Order	Capex	Yes	2,463,000	5220	0%
4746	INVP4746 NACHA Changes for CRIS	Capex	Yes	87,000	5220	0%
4764	INVP4764 CRIS ESCO Calculation for Terminated Customers	Capex	Yes	202,000	5220	0%
4821	INVP4821 NY Tax Remittance & Reporting Corrections	Capex	Yes	350,000	5220	0%
4555	INVP 4555 Rhode Island Renewable Programs	Capex	Yes	1,272,000	5360	100%
3839A	INVP3839A-NY Retail Access Mandate Phase 2	Capex	Yes	1,528,567	C-170	0%
4449	INVP4449 - EPA File	Capex	Yes	700,000	C-175	11%
4448	INVP4448 - Low Income Order	Capex	Yes	1,922,115	C-195	0%
5132	INVP5132 NACHA Changes for CSS	Capex	Yes	168,000	C-195	0%
4124	INVP4124-Automate Remote Net Metering	Capex	Yes	1,520,436	C-198	14%
4137	INVP4137-New England (NE) Retail Access Mandates	Capex	Yes	227,000	C-277	0%
4411	INVP4411 - New Customer Connections Program	Capex	Yes	2,281,000	C-284	27%
4383	INVP4383 - NY Community Choice Aggregation Report	Capex	Yes	551,447	C-436	0%
4400	INVP 4400 HR & Payroll Mand Svc Pck	Capex	Yes	1,126,000	G-020	11%
4402	INVP4402-US SAP Regulatory Requirements, Reporting & Rate Case support - FY18	Capex	Yes	-	G-020	11%
3718	INVP 3718 New Medical Systems	Capex	Yes	385,000	G-027	11%
4584	INVP4584 Electric DRMS Integration	Capex	Yes	362,000	G-198	15%
4451	INVP4451 - Gas Transportation System Phase II (GTIS)	Capex	Yes	587,000	G-225	0%
4421	INVP4421 - New Arrearage Forgiveness Plan	Capex	Yes	447,000	G-316	100%
	Total amount of identified mandated projects across all National Grid operating companies	Capex		\$ 19,825,133		
	Total budget for mandated projects across all National Grid operating companies			\$ 20,000,000		

Request:

Referring to Schedule ISP-1, and the project identified as INVP 3932 Call Center Customer Contact Center/SDC Technology Upgrade Implement Solution, the description states in part: "National Grid also has multiple vendors supporting the technology and is seeking to consolidate support to one vendor with this project." Please explain the procurement process that will be used to consolidate to one vendor and quantify the annual cost savings that will result from the consolidation. Please also explain why this project was not commenced in earlier years than is now proposed.

Response:

An extensive requirements gathering phase was conducted under INVP 2204F - Customer Contact Center/SDC Technology Upgrade Analysis to identify current and future expectations of National Grid's Customer Contact Center environments. This feasibility and analysis exercise resulted in the development and issuance of a Request for Proposal (RFP) in accordance with National Grid's procurement processes for replacement of the systems. The equipment purchase and associated work were competitively bid. An RFP was submitted to six contact center vendors. Avaya, Genesys, and Verizon responded to the RFP. During the down-select process, two final vendors (Genesys & Verizon) submitted projected costs for their proposed solutions. National Grid chose Verizon's proposal as the winning bid based on the following criteria: solution fit (business functionality, technical requirement, security services, service management); experience and responsiveness (industry experience, relevant utility experience, approach, responsiveness); and commercial terms (project cost, overall strength of proposal, additional cost potential).

The U.S. Customer Contact Centers and Service Delivery Center are currently operating on core technologies that are no longer supported by their respective vendor. Third-party vendors are in place to manage the day-to-day support. The ability to triage all issues is not possible in the current environment because National Grid would not be able to resolve any previously undiagnosed issue since replacement parts for many components of the supporting infrastructure have been discontinued by the manufacturer and are, therefore, no longer available for purchase. Upgrading the technologies will enable the Company to minimize the risk of outages and facilitate continued customer access to the Customer Contact Centers through the automated systems. With the new solution there is an increase in the net run-the-business cost because the

Company is largely migrating from an unsupported on-premises model to a Software-as-a-Service platform.

For several years, the Company has operated these systems and the underlying infrastructure assets in a manner to derive the greatest value at the lowest possible costs to customers. However, because replacement parts are no longer readily available and the core technologies are no longer supported by their respective vendor, their continued utilization poses an unacceptable risk to operations on behalf of National Grid's customers. The objective of the project is to mitigate operational risks while enabling modern technology for customer engagement with National Grid.

Request:

Referring to Schedule ISP-1, and the project identified as INVP 4914 US CNI-EMS Lifecycle Hardware and Software Upgrade, please explain what risks are present to Rhode Island because the current systems are 8 years old. Please identify the method and reasoning for the allocation of the costs of this project, half of which is located in the electric control centers in New York.

Response:

The existing computing hardware and software supporting the New York and New England CNI Energy Management System (EMS) is near end-of-life and at risk of running unsupported versions of operating systems and software. A capacity limitation of the current configuration is limiting the system's ability to respond to growing demands, including in the distributed generation area. Running the EMS systems on this hardware and software leaves National Grid at risk of losing visibility of the grid and potentially losing control of remotely operated devices and equipment. A failure could cause both reputational and financial impacts to National Grid from both our regulators and governmental agencies.

National Grid has a significant number of network and security-related devices within the Critical National Infrastructure (CNI) environment that are also at End of Support, or will be at End of Support in 2018. Running the network on this hardware and software leaves National Grid at risk of potential irrecoverable hardware failures or cyber threats due to outdated versions of software. Failure of the CNI networks could cause System Operators to lose control of electric transmission and distribution assets.

These mission-critical computing assets require a refresh of infrastructure hardware and software to continue operating at the highest level of availability. The IS delivery team has determined that, because of the interdependence of the EMS systems and CNI networks, deployment of refreshed assets must be performed concurrently. Hardware and software purchased under investments "INVP 4568-EMS Lifecycle Hardware and Software Upgrade" and "INVP 4570-Tech Services-Network Equipment Lifecycle Replacements" will be deployed under this investment.

Key Business Drivers for the INVP 4914 US CNI-EMS Lifecycle Hardware and Software Upgrade include:

- Maintain EMS reliability in support of Control Center Operations;
- Preserving reputation of National Grid by maintaining system availability;
- Accommodate increasing requirement for electric system data driven by distributed generation program growth;

- Maintain EMS on the latest supported hardware and software, which preserves manufacturers support through maintenance agreements;
- Safeguard the reliability of networks and therefore the Company's ability to effectively operate EMS, provide timely and accurate regulatory reporting, and provide customer facing outage information during storms; and
- Without an upgrade to supported levels of networking hardware and software, National Grid will not be able to deploy security patches, leaving National Grid vulnerable to cyber threats and at risk of NERC CIP non-compliance.

Benefits of this investment include:

- Increase the reliability and integrity of the EMS application and CNI networks in New York and New England;
- Deliver increased capacity in the EMS application to capture information new devices, particularly distributed generation;
- Prevent network outages, which would impact regulatory availability requirements;
- Provide a more robust network security environment, which allows National Grid to continue meeting the North American Electric Reliability Corporation Critical Infrastructure Protection (NERC CIP) requirements; and
- Mitigate risks associated to unsupported hardware and software affecting National Grid's ability to effectively monitor, operate, and control the electric bulk power supply systems.

The FERC-approved Cost Allocation Methodology utilized to allocate National Grid USA Service Company, Inc. costs associated with this investment is based on the number of Remote Terminal Units within each operating company service territory, as depicted in the table below:

Description		SAP Co./ Segment	Company Description	FY 2018 RTUs	FY 2018 Percentage
	U-186	5210E	Niagara Mohawk Power Corp. (Electric Distribution)	305.5	25.33%
Basis Data for RTU	U-186	5210T	Niagara Mohawk Power Corp. (Transmission)	392.5	32.54%
allocation	U-186	5310E	Massachusetts Electric Company	225.0	18.66%
	U-186	5310T	Massachusetts Electric Company (Transmission)	43.5	3.61%
	U-186	5320E	Nantucket Electric Company	-	0.00%
	U-186	5360E	The Narragansett Electric		5.64%

Prepared by or under the supervision of: John Gilbert, Daniel DeMauro, and Mukund Ravipaty

The Narragansett Electric Company d/b/a National Grid RIPUC Docket No. 4770 Responses to Division's Third Set of Data Requests Issued December 21, 2017

		Company	68.0	
		The Narragansett Electric		
U-186	5360T	Company (Transmission)	45.0	3.73%
		New England Power Company		
U-186	5410T	(Transmission)	126.5	10.49%
		Totals	1,206.0	100.00%

Prepared by or under the supervision of: John Gilbert, Daniel DeMauro, and Mukund Ravipaty
Division 3-39

Request:

Referring to Schedule ISP-1, and the project identified as "Regulatory Mandates" on page 2 of 23, the description states: "This investment is for the identified regulatory mandated projects that scheduled to be completed during the Rate year. The following have been identified as mandated projects of:

- INVP 4400 Annual HR & Payroll Mandatory Service Pack Upgrade (HRSP) FY18
- INVP 4421 New Arrearage Forgiveness Plan
- INVP 4411AB Distributed Generation Portal
- INVP 4411C New Electric Connections
- INVP 4411D New Gas Connections
- INVP 4124 Auto Remote Net Meter
- INVP 4479 US Control-Gas Electronic Bulletin Board (EBB) Upgrade"

For each of these "mandated projects," please explain how each relates to regulatory mandates or other requirements in each of the National Grid jurisdictions across New York and each of the New England states, in addition to Rhode Island. Please identify the method and reasoning for the allocation of the total cost of this project to Rhode Island.

Response:

Please see Attachment DIV 3-39 for the FERC-approved allocation method and benefiting companies for each investment. Projects descriptions and jurisdictional requirements for each project identified as a regulatory mandate are provided below.

INVP 4400 Annual HR & Payroll Mandatory Service Pack Upgrade (HRSP) – FY2018

This project implements mandatory annual changes requested by federal and state agencies, such as the Internal Revenue Service (IRS) and various state departments of finance, as well as different municipalities that must be applied to the SAP core solution to properly reflect employee wages, employee and company withholdings, and legal requirements and to comply with federal and state regulatory reporting. To address these mandatory annual changes, SAP releases an annual support pack to update the following:

- Tax changes;
- Payroll modifications;
- Legal and regulatory reporting changes;
- Considerations required to produce year-end employee wage statements (W2s);

- Tax table changes for correctly processing payroll and required earnings withholdings;
- Revised tax withholding tables;
- New annual maximum withholding requirements; and
- All associated legal and regulatory compliance or reporting considerations for employee and company labor governmental reporting.

INVP 4421 - New Arrearage Forgiveness Plan

On June 24, 2016, amendments to R.I. Gen. Laws § 39-2-1 were signed into law, which amended the Henry Shelton Act and put into effect a revised debt forgiveness program for Rhode Island electric and gas low income customers who are eligible for the Low Income Home Energy Assistance Program (LIHEAP). The amended law replaced the Arrearage Forgiveness Program (AFP) that was put in place when the Henry Shelton Act was originally passed in 2011. The new program, the Arrearage Management Program (AMP), commenced on September 1, 2016 and amended the eligibility guidelines for customers enrolling into the AMP. The new program also detailed the requirements for remaining in the AMP once enrolled.

To comply with Rhode Island state law, this project will implement an automation process for the eligible residential Rhode Island electric and gas low income customers.

INVP 4411AB – Distributed Generation Portal

Distributed generation (DG) customer integration into the National Grid electric network is a fast growing area of National Grid's business that is regulated and mandated across all National Grid electric service territories. Each state has its own interconnection tariff, which outlines the process, forms, cost, timelines, penalties, and tracking and reporting requirements for administering the end-to-end DG interconnection process. In New York, the New York Public Service Commission requires that all electric distribution companies create and manage an online portal for DG application submissions.¹ The Massachusetts Department of Public Utilities has implemented a penalty-based enforcement mechanism with penalties up to \$1.5 million per year, which requires verifiable tracking of application process time dependencies for DG applications.

This project will deliver on providing the self-service portal and system of record for DG in New York. The project will also provide a base workflow engine that can be further enhanced to provide functionality necessary for DG in New England, new electric connection in all National Grid electric service territories, and new gas connections in all National Grid gas service territories.

INVP 4411C New Electric Connections

¹ See New York State Standardized Interconnection Requirements and Application Process For New Distributed Generators 5 MW or Less Connected in Parallel with Utility Distribution Systems, Section I(D), Page 16 (August 2017).

Prepared by or under the supervision of: John Gilbert, Daniel DeMauro, and Mukund Ravipaty

This project will build upon INVP 4411AB described above, which will deliver an online portal and workflow management for DG in New York and New England. This system will provide real-time information to trade allies and customers regarding the status of their new electric connections in Rhode Island, Massachusetts, and New York in much the same way so they can see the progress of DG. It will include additional back-end system integration to streamline manual processes.

INVP 4411D New Gas Connections

This project will build upon INVP 4411AB, which will deliver an online portal and workflow management for DG in New York and New England. This project will enhance the New Service workflow and integration to include:

- New Gas Connections for Rhode Island, Massachusetts, and New York to include Simple, Complex, Upgrades, and Disconnect/Reconnect; and
- Integration to the gas customer and work management systems for automation of current manual processes.

INVP 4124 Auto Remote Net Meter

National Grid will move to fully automate the remote net metering billing process. The billing function is currently performed manually by Accounts Processing. As the volume of remote net metering customers increases, this effort will eliminate the risk of human error in performing complex and repetitive calculations, assignments, tracking, rebilling activities, and reduce Sarbanes Oxley (SOX) compliance risks. Please see the following regulatory requirements:

Rhode Island R.I. Gen. Laws Chapter 39-26.4.

<u>Massachusetts</u> 220 CMR 18.00: M.G.L. c. 164, §§ 138 through 140; St. 2014, c. 251, §§ 5 and 6.

New York

New York Public Service Commission: Case 02E - 1622, Case 11E - 0321, Case 14E - 0151, Case 14E - 0422, Case 15E - 0082.

INVP 4479 US Control-Gas Electronic Bulletin Board (EBB) Upgrade

The current legacy gas Electronic Bulletin Board (EBB) relies on outdated hardware and aged reporting software (MicroStrategy). The software messaging function has bandwidth issues during heavy trading periods, which exposes National Grid to operational and potential financial risks. The legacy EBB software that was designed internally more than 15 years ago is limited in function and neither supports the continually evolving gas trading environments nor changing

regulatory demands. Therefore, this project is needed to support National Grid's gas transmission and distribution systems in New England and New York.

Listed Mandated Projects per Division 3-39

INVID	Project Name	Allocator	In Service Date	Project total
4124	INVP4124-Automate Remote Net Metering	C-198	11/30/2017	2,041,744
4400	INVP 4400 HR & Payroll Mand Svc Pck	G-020	8/14/2017	1,265,000
4411AB	INVP 4411AB Distributed Generation Portal	C-198	11/30/2017	4,128,486
4411C	INVP 4411C New Electric Connections	C-198	4/30/2018	343,000
4411D	INVP 4411D New Gas Connections	C-210	10/31/2018	860,000
4421	INVP4421 - New Arrearage Forgiveness Plan	G-316	2/1/2018	447,000
4479	INVP 4479 US Control-Gas Electronic Bulletin Board (EBB) Upgrade	G-210	5/1/2018	3,000,000
				12,085,230

	Alloc	ators utilized for N	landated Proje	<u>ects</u>				
G-020 (Allocat	tion to all KS and NG Companies based on 3-Point Allocator)							
SAP Alloc. Code	Company Description	SAP Co. Code	Co. Code w/Segment	3 Pt. Allocation %	Net Margin	Net	Plant	Net O&M
G-020	National Grid USA Parent	5020	5020R	0.09%	\$ -	\$		\$ 10,678,534
G-020	KeySpan Energy Corp.	5040	5040R	0.01%	\$ -	\$	-	\$ 669,841
G-020	Niagara Mohawk Power Corp Electric Distr.	5210	5210E	15.72%	\$ 1,198,921,609	\$ 4,2	64,491,304	\$ 619,066,340
G-020	Niagara Mohawk Power Corp Gas	5210	5210G	4.75%	\$ 346,680,591	\$ 1,4	91,438,437	\$ 165,095,195
G-020	Niagara Mohawk Power Corp Transmission	5210	5210T	5.59%	\$ 385,690,791	\$ 2,4	15,788,723	\$ 106,731,443
G-020	KeySpan Energy Delivery New York	5220	5220G	12.38%	\$ 993,070,386	\$ 3,6	76,541,909	\$ 416,418,656
G-020	KeySpan Energy Delivery Long Island	5230	5230G	8.51%	\$ 668,892,495	\$ 2,9	81,821,126	\$ 225,375,331
G-020	Massachusetts Electric Company	5310	5310E	20.02%	\$ 1,598,840,493	\$ 2,6	80,685,854	\$ 1,159,865,088
G-020	Massachusetts Electric Company - Transmission	5310	5310T	0.17%	\$ 17,339,390	\$	52,007,344	\$ 4,203,096
G-020	Nantucket Electric Company	5320	5320E	0.27%	\$ 22,878,224	\$	68,758,022	\$ 10,060,149
G-020	Boston Gas Company	5330	5330G	9.03%	\$ 716,665,901	\$ 2,4	06,613,994	\$ 347,617,727
G-020	Colonial Gas Company	5340	5340G	2.04%	\$ 161,327,519	\$ 5	81,444,275	\$ 73,390,098
G-020	Narragansett Electric Company	5360	5360E	6.60%	\$ 574,052,546	\$ 9	26,658,890	\$ 353,600,201
G-020	Narragansett Gas Company	5360	5360G	2.85%	\$ 231,782,063	\$ 7	61,289,647	\$ 106,868,890
G-020	Narragansett Electric Company - Transmission	5360	5360T	1.77%	\$ 133,930,510	\$ 8	62,645,421	\$ 13,013,773
G-020	New England Power Company - Transmission	5410	5410T	5.00%	\$ 378,086,156	\$ 2,2	21,166,435	\$ 69,879,050
G-020	NE Hydro - Trans Electric Co.	5411	5411F	0.17%	\$ 16,753,717	\$	31,800,443	\$ 7,178,838
G-020	New England Hydro - Trans Corp.	5412	5412F	0.11%	\$ 11,910,006	\$	4,272,818	\$ 6,000,534
G-020	New England Electric Trans Corp	5413	5413F	0.01%	\$ 1,374,412	\$	0	\$ 204,770
G-020	NG LNG LP Regulated Entity	5420	5420G	0.17%	\$ 8,230,443	\$	82,150,480	\$ 3,828,666
G-020	KeySpan Generation LLC (PSA)	5430	5430P	4.04%	\$ 464,650,405	\$ 5	94,113,557	\$ 156,428,992
G-020	KeySpan Glenwood Energy Center	5431	5431P	0.13%	\$ 11,845,255	\$	38,062,111	\$ 4,152,842
G-020	KeySpan Port Jefferson Energy Center	5432	5432P	0.15%	\$ 13,342,875	\$	45,737,978	\$ 4,298,071
G-020	Keyspan Energy Trading Services	5820	5820R	0.00%	\$-	\$	308,494	\$ 158,770
G-020	Transgas Inc	5825	5825N	0.08%	\$ 3,982,586	\$	7,837,743	\$ 6,208,446
G-020	KeySpan Energy Development Corporation	5840	5840N	0.18%	\$-	\$	74,017,254	\$ 10,567,625
G-020	KeySpan Services Inc.	5850	5850N	0.16%	\$ 14,478,322	\$	6,613,711	\$ 11,009,061
		Total		100.00%	7,974,726,692	26,2	76,265,968	3,892,570,026
G-210 (All G	as Retail companies based on 3-Point Allocator)							
SAP Alloc. Code	Company Description	SAP Co. Code	SAP Co./Seg	3 Pt. Allocation %	Net Margin	Net	Plant	Net O&M
G-210	Niagara Mohawk Power Corp Gas	5210	5210G	12.01%	\$ 346,680,591	\$ 1,4	91,438,437	\$ 165,095,195
G-210	KeySpan Energy Delivery New York	5220	5220G	31.31%	\$ 993,070,386	\$ 3,6	76,541,909	\$ 416,418,656

	Total			100.00%	\$	3,118,418,954	\$	11,899,149,387	\$	1,334,765,896
G-210	Narragansett Gas Company	5360	5360G	7.28%	\$	231,782,063	\$	761,289,647	\$	106,868,890
G-210	Colonial Gas Company	5340	5340G	5.19%	\$	161,327,519	\$	581,444,275	\$	73,390,098
G-210	Boston Gas Company	5330	5330G	23.08%	\$	716,665,901	\$	2,406,613,994	\$	347,617,727
G-210	KeySpan Energy Delivery Long Island	5230	5230G	21.13%	\$	668,892,495	\$	2,981,821,126	\$	225,375,331
0 210	Reyopan Energy Delivery New Tork	0220	02200	01.0170	φ	555,010,566	Ψ	0,070,041,000	€	410,410,000

G-316 (Narragansett Electric and Narragansett Gas based on 3-Point Allocator)

SAP Alloc.		SAP Co.	Co. Code	3 Pt. Allocation			
Code	Company Description	Code	w/Segment	%	Net Margin	Net Plant	Net O&M
G-316	Narragansett Electric Company	5360	5360E	67.64%	\$ 574,052,546	\$ 926,658,890	\$ 353,600,201
G-316	Narragansett Gas Company	5360	5360G	32.36%	\$ 231,782,063	\$ 761,289,647	\$ 106,868,890
	Tota			100.00%	\$ 805,834,609	\$ 1,687,948,537	\$ 460,469,091

C-198 (Alloca	-198 (Allocation to all Electric Distribution companies based on number of customers)									
SAP Alloc.		SAP Co.	Co. Code		Number of					
Code	Company Description	Code	w/Segment	%	Customers					
C-198	Niagara Mohawk Power Corp Electric Distr.	5210	5210E	47.68%	1,718,053					
C-198	Massachusetts Electric Company	5310	5310E	37.72%	1,358,869					
C-198	Nantucket Electric Company	5320	5320E	0.38%	13,704					
C-198	Narragansett Electric Company	5360	5360E	14.22%	512,318					
	Totals		Totals	100.00%	3,602,944					

C-210 (Allocation to all Gas Retail companies based on number of customers)

SAP Alloc.		SAP Co.	Co. Code		Number of
Code	Company Description	Code	w/Segment	%	Customers
C-210	Niagara Mohawk Power Corp Gas	5210	5210G	16.93%	639,493
C-210	KeySpan Energy Delivery New York	5220	5220G	34.83%	1,315,562
C-210	KeySpan Energy Delivery Long Island	5230	5230G	16.13%	609,071
C-210	Boston Gas Company	5330	5330G	19.15%	723,122
C-210	Colonial Gas Company	5340	5340G	5.59%	211,077
C-210	Narragansett Gas Company	5360	5360G	7.37%	278,403
	Totals		Totals	100%	3.776.728

Division 3-40

Request:

Referring to Schedule ISP-1, and the project identified as Physical Security Replacements, the description states: "This is annual capital replacement program for Physical Security. Physical Security is responsible for protecting National Grid's personnel and assets, and incorporates a security system as part of the overall security plan. To fulfill this responsibility, it is necessary to ensure that all security related equipment and assets in New England are in good condition. This project replaces assets that are at or near end of life and/or assets that are no longer under vendor warranty."

- a. Please identify each of the assets being replaced, where they are located, and the purposes each serves.
- b. Please explain why the expiration of a vendor warranty should be a main reason for commencing the project at this time.
- c. Please also explain what is meant by the statement that the assets "are at or near end of life."
- d. Of the assets identified in (a) above, please indicate which assets are "at end of life," which assets are "near end of life," and which assets have had vendor warranties expire (and the date the applicable warranty expired).

Response:

- a. The types of assets being replaced include camera systems, intrusion detection systems, security panels, and gates/fences at National Grid's LNG plants, substations, and operating yards. These systems are utilized for the protection of company personnel, assets, and the general public. Without these systems, National Grid cannot detect an intrusion or review videos to see what is occurring on National Grid's premises.
- b. If National Grid's security equipment is no longer supported by the manufacturer and fails, National Grid would be at risk because it could lose intrusion detection and video capability, which would eliminate National Grid's ability to detect and ensure response to security events at critical gas and electric facilities. A failure of such security equipment not only leaves the site vulnerable but requires emergency changes and replacement, which bring risks associated with availability of the equipment, technical support to perform installation, and an optimal controlled testing environment and timeframe.

- c. "End-of-life" is a term used to describe when a product is at the end of its useful life (from the vendor's point of view), and a vendor stops maintenance support, the manufacturing of replacement parts, marketing, or selling the product.
- d. The fence detection (intrusion) systems at some facilities are end-of-life. Also, the analog video infrastructure that supplies the control rooms with Closed Circuit Television (CCTV) video are end-of-life. There are also 139 video recorders enterprise-wide that are running on Server 2008/2008 R2, which is approaching end-of-life. Gate operators have begun to malfunction and need to be replaced as a main access point to the facilities. The intrusion detection systems and video platforms were installed in the 2002 to 2005 timeframe and are at or nearing end-of-life. These intrusion detection systems are no longer covered by vendor warranties. Since the intrusion detection systems were installed in the 2000 to 2005 timeframe, there have been video recorder upgrades due to the normal life cycle of the server. Those servers were installed between 2010 and 2012, and those warranties have also expired. Parts are no longer available to repair some of the existing systems, which decreases National Grid's ability to maintain the integrity of the systems. This has a direct impact on National Grid's role in protecting company personnel, assets, and the general public. The Verint Video Management platform, which manages National Grid's field deployed video systems, must be upgraded. This upgrade will take place in two phases. Phase 1, which will be completed in 2019, will address all of National Grid's critical facilities video systems. Phase 2, which will be completed in 2020, will address all of National Grid's non-critical facilities video systems. Project scope includes replacement of aging master and sub master servers, software upgrades, and network infrastructure upgrades. The system is end of life from a software standpoint. Microsoft no longer releases patches for vulnerabilities, and the security software manufacturers (like Verint) no longer release new versions of software that are compatible with end-of-life operating systems. If National Grid does not upgrade its software on a regular basis, it will have to use older Operating Systems for new installations because of compatibility.

Division 3-41

Request:

Referring to Schedule ISP-1, and the project identified as INVP 4395 US Mobile Device Refresh, the description states: "This policy-driven project will implement 750 mobile devices previously purchased as part of INVP 4671 – Mobile device refresh FY17 project. In addition, the project will purchase 200 new mobile devices and mounting accessories to continue the effort of eliminating old devices from the field. A majority of mobile devices used in the field are more than 5 years old and these devices impact day to day productivity. These old devices break down frequently and can't be easily repaired due to unavailability of parts and accessories (in some cases manufacturers have stopped supporting the devices). The replacement of old mobile devices with latest tough books will allow field technicians to have the reliable equipment and data required to perform their work in a safe and efficient manner."

- a. Please identify the method and reasoning for the allocation of the total cost of this project to Rhode Island.
- b. How many of the 750 mobile devices previously purchased are used in Rhode Island?
- c. Please explain the cost incurred and quantify the cost of "implementing" a mobile device that has already been purchased.
- d. How many of the 200 new mobile devices being purchased will be used in Rhode Island?
- e. Please provide a count of the total number of mobile devices used by field technicians in Rhode Island and the age of each of those devices.
- f. Please provide an itemized breakdown of the costs of this project, distinguishing between the purchase price of the new phones, the cost of implementing phones already purchased, and any other costs reflected in the estimate. Please also indicate which costs are being capitalized to rental expense and those that will be expensed during the year incurred.

Response:

a. As referenced in Schedule ISP-1, Page 4 (Bates Page 27 of Book 7), the total estimated cost of INVP 4395 Mobile Device Refresh is \$4,492,944. The FERC-approved G-020 Cost Allocation Method used to allocate National Grid USA Service Company, Inc. (the Service Company) costs associated with the investment is based on the 3-Point Formula (Net Plant, Net Margin, Net O&M), as depicted in Attachment DIV 3-32. The total allocated amounts are depicted in Schedule ISP-1 as follows: \$118,276 in the Rate Year, \$108,959 in Data Year 1, and \$102,557 in Data Year 2. On Schedule ISP-1, Page 11 (Bates Page 34 of Book 7), the allocated amount of the investment to Narragansett Electric is separately broken out, and on Schedule ISP-1, Page 19 (Bates Page 42 of Book 7) the allocated amount of the investment to Narragansett Gas is separately broken out.

- b. There are approximately 235 devices used in Rhode Island that will be installed out of the pool of the 750 devices that were previously purchased on INVP 4671 Mobile Device Refresh Fiscal Year 2017 and the 200 being purchased on INVP 4395 US Mobile Device Refresh. Mobile devices are mainly ruggedized computers Panasonic Toughbooks and iTronix devices used in the field to access work management applications.
- c. The installation cost of hardware (*e.g.*, device, dock, modem, and antenna) that was purchased on the previous information services (IS) project INVP 4671 – Mobile Device Refresh Fiscal Year 2017 includes all required license purchases, the establishment of a mobile lab and storage area, and the labor to correct image issues, perform the installations, conduct onsite visits, and manage the overall project. The Mobile deployment team includes a Project Manager, Solutioning Lead, Deployment Manager, Deployment Analyst, Mobile Application Architect, Application Engineer, and Mwork mobile software Specialist. A mobile lab had to be created and storage areas established. This team had to correct some flaws in the Mwork image that was generated. Numerous field visits to Providence and Lincoln, Rhode Island were conducted to meet with CMS Gas and Electric, and trouble worker personnel. Below is a chart of the latest high-level estimate, including risk margin and contingencies:

The operation and maintenance expenses were for requirement-gathering, and the forecasted operation and maintenance expenses were for training and closure.

	Spent (tl	hrough N	lovem	ber 2017)	For	ecasted			
	CAPEX		OPE	X	CA	PEX	OPE	X	
Hardware/	\$	900	\$	-	\$	2,075	\$	-	
Software									
Labor	\$	950	\$	15	\$	750	\$	45	
Other	\$	30			\$	90			
	\$	1,880	\$	15	\$	2,915	\$	45	\$

- d. Please see the response to part b. above.
- e. Please see the response to part b. above. A large portion of National Grid truck-mounted mobile devices (*i.e.* Panasonic tough books and iTronix) in the US are more than five years old.
- f. National Grid is not installing any phones as a part of this investment. Mobile devices are mainly ruggedized computers Panasonic Toughbooks and iTronix devices and associated hardware used in the field to access work management applications. The table provided in response to part c. above reflects the costs that will be incurred on INVP 4395 US Mobile Device Refresh. Upon completion of the project, the capital

expenditure costs will be amortized over the estimated service life of the assets and will be allocated to all benefitting National Grid operating companies in the form of rent expense. The operation and maintenance costs reflected in the table above will be expensed in the year during which such costs are incurred.

Division 3-42

Request:

Referring to Schedule ISP-1, and the project identified as INVP 4489 Active Directory Improvements, the description states: "Active Directory (AD) is a key service that supports core authentication for all National Grid computers and servers logging onto the corporate network in both the United States (US) and United Kingdom (UK). Therefore, AD provides access to all Information Systems (IS). The scope of this initiative is to implement a refreshed global AD infrastructure and support services. The new AD environment will unify all global applications that use the AD service. It is critical that National Grid can ensure that the AD service is reliable and supports core authentication requirements to all current and proposed applications."

- a. Please identify the method and reasoning for the allocation of the total cost of this project to Rhode Island.
- b. Please explain how Rhode Island ratepayers benefit from a refreshed "global AD infrastructure."
- c. Are any of the costs being allocated to shareholders? If yes, please quantify. If not, please explain why not.
- d. Are any of the costs being allocated to any National Grid entities in the UK? If yes, please quantify. If not, please explain why not.

Response:

- a. 11.2 percent of the US portion of the project costs is being allocated to Rhode Island. The total costs shown in Schedule ISP-1 (Bates Pages 24-46 of Book 7) represent the US portion of the project, and the amounts shown in the Rate Year, Data Year 1, and Data Year 2 columns represent the allocated amounts to Rhode Island for each of those years.
- b. The US and UK currently have separate Active Directory (AD) infrastructures that are used to authenticate user access (including Rhode Island users) to the corporate network and information technology (IT) services. The infrastructure in both regions has experienced reliability and security issues; therefore, this project is being undertaken to refresh the AD infrastructure. Through the project, National Grid intends to (with technical validation) consolidate the two regions into a single global infrastructure. In addition to ensuring that Rhode Island users can reliably and securely access IT systems and services, there are potential cost savings through: simplification of management because, currently, National Grid pays a premium for maintaining two AD infrastructures, and improved integration as future projects will only need to build authentication to a single platform thereby reducing their system development efforts.

Once realized, these benefits will be passed back to Rhode Island customers in future rate proceedings.

- c. No, these costs are not being allocated to shareholders. The project is being undertaken to benefit the US and UK business functions, which ultimately deliver services to their customers in their respective regions. Therefore, the US portion of the costs will be capitalized on the books of National Grid USA Service Company, Inc.'s and allocated to the benefiting companies (including Rhode Island) in the form of a rental charge.
- d. The overall project costs were split between the US and UK based on headcount with US receiving 67 percent of the costs and the UK receiving 33 percent. In turn, each region raised a separate sanction paper that included their portion of the costs and the respective sanctioning committees in each region approved the project. As noted in the response to part a. above, the total amount included in Schedule ISP-1 represents only the US portion (67 percent) of the overall project, which is then allocated based on the G-020 allocator with Rhode Island receiving 11.2 percent of the US portion.

Division 3-43

Request:

Referring to Schedule ISP-1, and the project identified as INVP 4707 Business Innovation Projects 1, the description states: "The Business Innovation project provides a funding base and governance structure that allows the Information Services (IS) organization to improve the IS experience for our employees and customers who will experience improved reliability, use ability, speed and efficiency across all functions. The program will also reduce the risk of system failure which has customer, brand and cost implications."

- a. Please identify the method and reasoning for the allocation of the total cost of this project to Rhode Island.
- b. Please explain how this project will improve the IS experience for customers.
- c. Please describe the nature of the "system failure" referenced in the last sentence of the description.
- d. Please explain what the "brand" implications will be for risk of system failure.
- e. Please explain how the project provides a governance structure for the IS organization.
- f. Please explain what the "funding base" means, and how these funds will be utilized.
- g. Please provide an itemized breakdown of the costs of this project.

Response:

- a. The Business Innovation projects are included in Schedule ISP-2 as one of the components of the Technology Modernization program. Please see the Company's response to Division 3-32 for an explanation of the method and reasoning for the allocation of a portion of project cost to Rhode Island.
- b. The impacts of the Business Innovation projects on the customer involve a number of areas, including:
 - Increase business and enterprise service performance and availability;
 - Support Jurisdictional and business function initiatives; and
 - Enable Customer Experience Transformation (CET).

Increased bandwidth and resilience - Delivery of software defined Wide Area Network technology will allow information services (IS) to deliver high bandwidth business class

service through low cost commodity broadband internet services. Software-defined wide area networking adds a control layer on top of network infrastructure, enabling centralized management of critical network functions, reduce the need for costly equipment, reduce provisioning times, and allow for better management of traffic across a network. In combination with cloud-based security tools, this technology will support high-speed Internet web browsing and use of high bandwidth cloud services even from the smallest locations. The tangible benefits that the user will experience are faster PC start up times, fast file transfers, more responsive applications, and access to bandwidth intensive Internet and cloud based services like, YouTube, WebEx, and Office 365.

Access anywhere from any device - Delivery of pervasive Wireless Networks with the capacity to support a multitude of devices will be key to supporting a flexible and mobile field worker or customer agent. Everyday, more wireless-only devices are coming to market that can allow National Grid to deliver services in a more effective and efficient manner (*e.g.*, iPads, specialized tablets, sensors, equipment controllers). The implementation of secure wireless networks that support this environment will be critical to improved efficiencies the business will be challenged to achieve.

Unified Communications - As National Grid moves to a more mobile world with people working away from the traditional office, it will be critical to have communications systems in place that ensure clear, consistent, and more personal communications between all parties. This will be achieved through use of a consistent set of easy to use communication tools that provide voice, video, and text communications between parties both within and outside the company. In addition, these tools will take advantage of the capabilities of the new device being used to relay real-time information in the form of pictures, videos, and telemetry to staff and systems that can process the information and provide informed feedback to the remote staff.

Virtual Desktop - If National Grid does not augment the current service, the business functional areas cannot grow because planned new development would be physically constrained by existing offerings. In addition, the current architecture is not a sustainable service and presents a single point of failure and high risk from internal attacks. The functional business areas would experience longer development times when existing resources begin to fail or current development tools need refresh.

Cloud - The business may lose competitive advantages because it will be limited to existing infrastructure options that lack current-state capabilities, are costly, and take a long time to provision relative to hyper scale offerings. With greater adoption of cloud capabilities, National Grid will be able to take advantage of economies of scale. Developer productivity will be constrained in the current environment; agile project approaches will simply not work. IS will be silently encouraging shadow

information technology start ups via lack of an internal offering and current speed to deliver, which has compliance and other risks.

Applications - Employees and customers will be able to use applications with more functionality in a more intuitive manner through multiple devices. The Jurisdictions and business functions will be able to utilize more reliable and resilient applications and leverage their full capability application upgrades will enable Customer Experience Technology to provide customers with more options to interact with the Company. Existing applications would be rationalized and decommissioned as deemed appropriate.

- c. To maximize benefits at a reasonable cost to customers and maintain reliable service, technology modernization investments such as Business Innovation will replace applications, equipment, and infrastructure that are no longer supported by vendors, are no longer covered by manufacture warranties, and no longer have available replacement parts.
- d. National Grid prides itself on providing reliable service to customers, particularly during severe weather events when customer contact and engagement is critical for restoration during outages. The "brand" implications for risk of system failure, such as the loss of our Customer Contact Centers caused by telephony or interactive voice response (IVR) equipment failure, would have serious negative impacts on customers and likely result in sanctions from regulators and governmental agencies. These critical investments are meant to provide assurance that such risks are mitigated.
- e. Business Innovation projects will follow the standard IS project sanctioning and governance review process. (Please see the Company's response to Division 3-26). The amounts budgeted for new projects are typically conceptual grade estimates that are refined as the project proceeds through its lifecycle. Once the IS Investment Plan is approved, the individual IS projects follow a two-step governance process whereby project costs are sanctioned at both the beginning of the Requirements and Design (R&D) and Development and Implementation stages of a project. As a project progresses through these stages, the level of effort and costs to deliver the solution is refined; this may result in differences from the budgeted amount. The two-step IS Governance process was designed such that project costs could be reviewed at these key points in the lifecycle by the sanctioning committees as described in the response to Division 3-26.
- f. The Business Innovation projects represent a multi-year investment program that will sanction multiple projects through the established funding base for each fiscal year. This funding base will be utilized to prioritize and sanction through the above referenced governance process the most critical projects required to mitigate operation risk and enable National Grid to deliver services in a more effective and efficient manner while

providing customers with the ability to engage with the Company in a manner that they have come to expect in the broader marketplace.

g. Please see the table below for a high-level itemized breakdown of the estimated costs of this project. The cost estimates will be further refined as each individual project under the program goes through the IS Project sanction and governance review.

Business Innovation Project E	<u>stimates</u>				
<u>Project</u>	Cost Components	FY18 CAPEX	FY19 CAPEX	FY20 CAPEX	FY21 CAPEX
Application Rationalization	Hardware and Software	2,113,613	1,160,967	2,680,360	1,498,000
	Labor			690,112	2,808,968
Robotics	Systems Integration	800,000			
	Software Licensing	210,000			
	Internal Labor	245,000			
	System Integration and Additional Licensin	786,290	1,500,000	1,600,000	
Data Visualization	Labor		550,194	874,667	874,667
	Software		474,139		
	Infrastructure		113,339		
Data Analytica	Consulting Costs		1 204 710	2 201 222	2 201 222
Data Analytics			1,384,710	2,201,333	2,201,333
	Software		2,153,964		
	Infrastructure		113,623		
	Total	3,368,613	6,737,226	7,946,472	8,982,968

Division 3-44

Request:

Referring to Schedule ISP-1, and the project identified as INVP 4706 1327 Interfaces - 523 FTS, 340 RDX, 245 MQSI, 253 JCAPS, 44 PM4D, 7 VB, the description contains, in part, the following statement: "In the event of failure National Grid IS will be unable to meet the agreed Service Level Agreements (SLAs) for many key applications once the middleware infrastructure goes out of support. The majority of these applications currently have Gold or Platinum SLA's."

- a. Please identify the method and reasoning for the allocation of the total cost of this project to Rhode Island.
- b. Please describe and explain the nature of the referenced Service Level Agreements, who are the parties to the agreement, and what the contractual consequences will be for an "event of failure."
- c. Please explain the significance of Gold and Platinum SLAs.
- d. Please provide copies of the referenced SLAs.

Response:

- a. Rhode Island is receiving 11.2 percent of the total costs. The total costs field was included on Schedule ISP-1 (Bates Pages 24-46 of Book 7) for presentation purposes only. The actual allocated amounts to Rhode Island are shown in the Rate Year, Data Year 1, and Data Year 2 columns for each of those years.
- b. National Grid information services (IS) maintains Service Level Agreements (SLAs) between itself and the National Grid business units, which identify the mutually agreed upon service parameters for many key applications. The referenced project, INVP 4706 1327 Interfaces, will upgrade the middleware infrastructure on several of these key applications. The middleware is the core infrastructure utilized to operate the interfaces on each of the key applications; thus, a failure to an interface could lead to an Application SLA not being met. There are no contractual consequences per se, but a failure would have a business impact to operations because National Grid personnel rely on these systems to deliver services to customers and external stakeholders. Regarding the 1327 interfaces, please see Attachment DIV 3-44-1. The affected SLAs are shown along with the source and target application that pertain to each interface, the number of interfaces, and the middleware component that is going out of support.
- c. The referenced Gold and Platinum SLAs are contractual agreements between National Grid IS and the IS Partners (*i.e.* IBM and Wipro), who provide application maintenance and support for these key applications. Each application in the IS portfolio is assigned a band level (*i.e.* Gold and Silver are the highest) that is based on the criticality and

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business impact of the application and are used to set the expectation with National Grid's IS partners regarding their response to application incidents.

d. Please see Attachment DIV 3-44-2 for an example of the Storms Application SLA. Each of the SLAs noted in Attachment DIV 3-44-1 contains the same type of standard information; therefore, the Company has provided one example with this response. There are 35 SLAs (out of 91 total) directly affected by this investment. The Company can provide the additional SLAs if necessary.

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SLA - Business	Source	Target	Count	Technology
AVLS, iScheduler	AVLS Database	iScheduler	2	JCAPS
Cascade	CASCADE	CASCADE	1	JCAPS
Cascade, Storms	CASCADE	STORMS	12	JCAPS
	CEW	CDR	3	JCAPS
CIAP	CIAP	JCAPS Application Server	14	JCAPS
CIAP	CIAP Database	SFDC	2	JCAPS
	Cloud	JCAPS	1	JCAPS
	СРР	CDR	3	JCAPS
CRIS	CRIS	Fiserve	2	JCAPS
CRIS, GridForce	CRIS	GridForce	2	JCAPS
CRIS, GTIS	CRIS	GTIS	6	JCAPS
CSS	CSS	CDR	4	JCAPS
CSS	CSS	Experian	2	JCAPS
CSS, Gridforce	CSS	Gridforce	1	JCAPS
CRIS, GTIS	CSS	GTIS	1	JCAPS
CSS	CSS	IEE	1	JCAPS
CSS, Scheduler	CSS	iScheduler	10	JCAPS
CSS	CSS	JCAPS	3	JCAPS
CSS, MWORK	CSS	MWORK	8	JCAPS
CSS, Storms	CSS	Storms	2	JCAPS
	Datafeeds	Data feeds	2	JCAPS
CRIS	Fiserve	CRIS	1	JCAPS
	Generic Component	NG Internal	2	JCAPS
GIS, Cascade	GIS	CASCADE	6	JCAPS
GIS	GIS	GIS	2	JCAPS
GridForce	GridForce	CAE	1	JCAPS
GridForce, CRIS	GridForce	CRIS	1	JCAPS
GridForce, CSS	GridForce	CSS	2	JCAPS
GridForce	GridForce	GCR	1	JCAPS

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SLA - Business	Source	Target	Count	Technology
GridForce, InDemand	GridForce	InDemand	6	JCAPS
GridForce, Maximo	GridForce	Maximo	2	JCAPS
GridForce, SAP	GridForce	SAP	1	JCAPS
GridForce, SPIPE	GridForce	SPIPE	1	JCAPS
GTIS	GTIS	GTIS	10	JCAPS
GTIS	GTIS	NG Internal	14	JCAPS
GTIS, SCADA	GTIS	SCADA	1	JCAPS
InDemand, GridForce	InDemand	GridForce	5	JCAPS
InDemand, ISO	InDemand	ISO	1	JCAPS
iScheduler	iScheduler	iScheduler	1	JCAPS
iScheduler, CSS	iScheduler	CSS	8	JCAPS
iScheduler, FFE (Mwork)	iScheduler	FFE (Mwork)	2	JCAPS
iScheduler	iScheduler	JCAPS	3	JCAPS
iScheduler, Mwork	iScheduler	MWORK	2	JCAPS
iScheduler, Storms	iScheduler	Storms	1	JCAPS
ISO, InDemand	ISO	InDemand	1	JCAPS
	JCAPS Common	JCAPS Common	2	JCAPS
	JCAPS Common	NG Internal	4	JCAPS
CSS	JCAPS	CSS	2	JCAPS
	JCAPS	Fiserve	2	JCAPS
	JCAPS	Global Connect	4	JCAPS
	JCAPS	JCAPS	3	JCAPS
	JCAPS	JCAPS CSF DB	1	JCAPS
	JCAPS	NOAA	2	JCAPS
OMS	JCAPS	OMS	7	JCAPS
	JCAPS	USRW	2	JCAPS
GTIS	M2M(Meter 2 Meter)	GTIS	5	JCAPS
	Managesoft	NG Internal	1	JCAPS
Maximo, Gridforce	Maximo	GridForce	1	JCAPS

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SLA - Business	Source	Target	Count	Technology
Maximo	Maximo	PPM	1	JCAPS
Mwork, CSS	MWORK	CSS	8	JCAPS
Mwork, iScheduler	MWORK	iScheduler	7	JCAPS
Mwork	MWORK	JCAPS	1	JCAPS
Mwork	MWORK	JCAPS DB	4	JCAPS
Mwork	MWORK	NG Internal	2	JCAPS
Mwork, Storms	MWORK	Storms	5	JCAPS
GTIS	NG Internal	GTIS	1	JCAPS
	NG Internal	NG Internal	18	JCAPS
	NOAA	DB	1	JCAPS
	NSD	CDR	1	JCAPS
OMS	OMS	JCAPS	5	JCAPS
Maximo	PPM	Maximo	3	JCAPS
	PPM	NG Internal	1	JCAPS
SAP	SAP	Global Rewards	4	JCAPS
SAP HR	SAP HR	NG Internal	1	JCAPS
SAP HR	SAP HR	Tower Watson	4	JCAPS
SAP SCM	SAP SCM	NG Internal	1	JCAPS
SAP, GridForce	SAP	GridForce	1	JCAPS
SCADA, GTIS	SCADA	GTIS	3	JCAPS
	SEP	CDR	4	JCAPS
Storms, Cascade	STORMS	CASCADE	14	JCAPS
Storms, CSS	Storms	CSS	2	JCAPS
Storms, GridForce	STORMS	GridForce	1	JCAPS
Storms, iScheduler	STORMS	iScheduler	1	JCAPS
Storms	STORMS	JCAPS	2	JCAPS
Storms, MWORK	STORMS	MWORK	3	JCAPS
CSS	TFCC	CSS	3	JCAPS
CSS	Acxiom	CSS	1	FTS

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SLA - Business	Source	Target	Count	Technology
SAP	ARCA	USF1085P (SAP)	6	FTS
SAP - ECC	Bank Of Newyork	SAP - ECC	1	FTS
CSS	Ceiva/CDR	CSS	1	FTS
CRIS	Con Edison	CRIS	15	FTS
CSS	Concorde	CSS	6	FTS
CRIS	CRIS	AEA	7	FTS
CRIS	CRIS	c0000003@ftp2.na.ngrid.net	1	FTS
CRIS	CRIS	c0000007@ftp2.na.ngrid.net	1	FTS
CRIS	CRIS	c0000010@ftp2.na.ngrid.net	1	FTS
CRIS	CRIS	Checkfree	4	FTS
CRIS	CRIS	Con Edison	5	FTS
CRIS	CRIS	СРА	3	FTS
CRIS	CRIS	CSG	25	FTS
CRIS	CRIS	custcol@ftp.keyspanenergy.com	25	FTS
CRIS	CRIS	EBD	7	FTS
CRIS	CRIS	EFI	27	FTS
CRIS	CRIS	Energy Guide	1	FTS
CRIS	CRIS	ESG	15	FTS
CRIS	CRIS	Experian	2	FTS
CRIS	CRIS	Fiserv	3	FTS
CRIS	CRIS	ftp_ked@ftp.energyservicesgroup.net	4	FTS
CRIS	CRIS	ftpdownstate@sa-replevin-manager-001.com	1	FTS
CRIS	CRIS	g0000003@ftp2.na.ngrid.net	2	FTS
CRIS	CRIS	GXSWTME	3	FTS
CRIS	CRIS	JP Morgan Chase	3	FTS
CRIS	CRIS	keke2@208.235.248.3	1	FTS
CRIS	CRIS	KeyEngy@72.45.145.194	3	FTS
CRIS	CRIS	Keyspan	13	FTS
CRIS	CRIS	Keyspan2@142.192.200.25	3	FTS

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SLA - Business	Source	Target	Count	Technology
CRIS	CRIS	Lipa	1	FTS
CRIS	CRIS	lipkeylig@ftp.payomatic.com	1	FTS
CRIS	CRIS	Mellon	1	FTS
CRIS	CRIS	Mercantile	1	FTS
CRIS	CRIS	mkbill@ftp.keyspanenergy.com	18	FTS
CRIS	CRIS	mkbill@ftp2.na.ngrid.net	1	FTS
CRIS	CRIS	myMailbox@CityOfBostonFTPs	1	FTS
CRIS	CRIS	ngrid@ftp.penncredit.com	1	FTS
CRIS	CRIS	NYC HRA	1	FTS
CRIS	CRIS	penncredit	3	FTS
CRIS	CRIS	Princeton	1	FTS
CRIS	CRIS	RISE	18	FTS
CRIS	CRIS	streetevents	1	FTS
CRIS	CRIS	Transcentra	7	FTS
CRIS	CRIS	USR	1	FTS
CRIS	CRIS	vfckyp@ftp.visionfinancialcorp.com	1	FTS
CRIS	CRIS	wachovia	1	FTS
CRIS	CRIS	westinteractive	5	FTS
SAP	CSG	USF1085P (SAP)	14	FTS
CSS	CSS	Barnett	2	FTS
CSS	CSS	Business/SimpleEnergy	1	FTS
CSS	CSS	Concorde	7	FTS
CSS	CSS	Cybergrants	1	FTS
CSS	CSS	ESG	10	FTS
CSS	CSS	Experian	4	FTS
CSS	CSS	JP Morgan Chase	4	FTS
CSS	CSS	M2M	1	FTS
CSS	CSS	Navigation/CDR	1	FTS
CSS	CSS	NYPA	2	FTS

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SLA - Business	Source	Target	Count	Technology
CSS	CSS	O-Power	1	FTS
CSS	CSS	Pitney Bowes	2	FTS
CSS	CSS	Questline	1	FTS
CSS	CSS	RRDonnelley	2	FTS
CSS	CSS	SimpleEnergy/CDR	2	FTS
CSS, Smartgrid	CSS	Smartgrid	4	FTS
CSS	CSS	Smartgrid/CDR/Navigation	1	FTS
CSS	CSS	Smartgrid/Ceiva	1	FTS
CSS	CSS	Smartgrid/GNM	1	FTS
CSS	CSS	Smartgrid/Itron	2	FTS
CSS	CSS	Smartgrid/Simpleenergy	1	FTS
CSS	CSS	Smartgrid/SimpleEnergy/CDR	1	FTS
CSS	CSS	Striata	2	FTS
SAP	EFI	USF1085P (SAP)	20	FTS
CSS	ESG	CSS	10	FTS
CRIS	Experian	CRIS	6	FTS
CSS	Experian	CSS	8	FTS
CSS	g0000003@ftp2.na.ngrid.net	CSS	2	FTS
	g0000003@ftp2.na.ngrid.net	LIPA	1	FTS
CSS	GreatEastern	CSS	1	FTS
CSS	HSBC	CSS	1	FTS
SAP-ECC	HSBC	SAP_ECC	1	FTS
SAP-ECC	HSBC	SAP-ECC	1	FTS
	IQOR	USF1085P	1	FTS
CRIS	JP Morgan Chase	CRIS	4	FTS
CSS	JP Morgan Chase	CSS	2	FTS
CRIS	keke1@208.235.248.3	CRIS	1	FTS
CSS	LIPA	CSS	1	FTS
CSS	lipauser@12.105.22.172	CSS	1	FTS

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SLA - Business	Source	Target	Count	Technology
CSS	lsbill@ftp.keyspanenergy.com	CSS	2	FTS
CRIS	M2M	CRIS	7	FTS
CRIS	Mercantile	CRIS	2	FTS
CSS	Navigation/CDR	CSS	3	FTS
CSS	NYPA	CSS	2	FTS
SAP-ECC	SAP - ECC	ADP	1	FTS
SAP-ECC	SAP - ECC	Bank Of Newyork	2	FTS
SAP-ECC	SAP - ECC	Barnett	1	FTS
SAP-ECC	SAP - ECC	HPSM7	3	FTS
SAP-ECC	SAP - ECC	Octanner	1	FTS
SAP-ECC	SAP - ECC	Pro Unlimited	2	FTS
SAP-ECC	SAP - ECC	SuccessFactor	2	FTS
SAP-ECC	SAP - ECC	Tangoe	1	FTS
SAP-ECC	SAP - ECC	Tower Watson	4	FTS
SAP-ECC	SAP - ECC	USI	1	FTS
SAP-ECC	SAP - ECC	Vanguard	1	FTS
SAP-ECC	SAP ECC	Sedgwick	1	FTS
CSS	Smartgrid/Ceiva	CSS	1	FTS
CSS	Smartgrid/Simpleenergy	CSS	1	FTS
Smartgrid, CSS	Smartgrid	CSS	12	FTS
CSS	Striata	CSS	4	FTS
SAP-ECC	Tangoe	SAP - ECC	1	FTS
SAP-ECC	Tower Watson	SAP - ECC	6	FTS
SAP	USF1085P (SAP)	Banshee	20	FTS
SAP	USF1085P (SAP)	IQOR	1	FTS
	v0000005@ftp2.na.ngrid.net	GreatEastern	1	FTS
SAP-ECC	Vanguard	SAP-ECC	1	FTS
CRIS	Western Union	CRIS	4	FTS
GTIS	WSI	GTIS	4	FTS

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SLA - Business	Source	Target	Cou	nt	Technology
Storms	ACIS	STORMS		2	PM4D
Computapole, Storms	Computapole	STORMS		4	PM4D
CSS	CSS	CIS		2	PM4D
CSS	CSS	GasPricing		2	PM4D
CSS, SAP	CSS	SAP		3	PM4D
CSS, Storms	CSS	STORMS		4	PM4D
GIS, FFE	GIS	FFE (Mwork)		1	PM4D
GIS, IDS	GIS	IDS		1	PM4D
	MGT	PS GL		1	PM4D
ТОА	Primavera	ТОА		2	PM4D
SAP, Storms	SAP	Storms		1	PM4D
Storms, SAP	Storms	SAP		1	PM4D
Storms	STORMS (app58v)	OLDS		1	PM4D
Storms	STORMS	ACIS		3	PM4D
Storms	STORMS	BusinessObjects		1	PM4D
Storms, CSS	STORMS	CSS		3	PM4D
Storms	STORMS	JPP		1	PM4D
Storms, PowerPlan	STORMS	PowerPlan		1	PM4D
Storms, SAP	Storms	SAP		2	PM4D
ТОА	ТОА	Primavera		1	PM4D
Avaya, CRIS	Avaya Call Center	CRIS		16	MQSI
CRIS, Avaya	CRIS	Avaya		2	MQSI
CRIS, CWQ	CRIS	CWQ		13	MQSI
CRIS	CRIS	EDI		10	MQSI
CRIS	CRIS	JCAPS		6	MQSI
CRIS, MDSI	CRIS	MDSI		5	MQSI
CSS,CWQ	CSS	CWQ		3	MQSI
CSS, MDSI	CSS	MDSI		4	MQSI
Maximo	CueLogic	Maximo		2	MQSI

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SLA - Business	Source	Target	Count	Technology
CWQ, CRIS	CWQ	CRIS	2	MQSI
CWQ, CSS	CWQ	CSS	3	MQSI
CWQ, LMSLI	CWQ	LMSLI	1	MQSI
CWQ, LMSNY	CWQ	LMSNY	16	MQSI
CWQ, Maximo	CWQ	Maximo	5	MQSI
CWQ, MDSI	CWQ	MDSI	13	MQSI
	EBO	EDI	2	MQSI
CRIS	EDI	CRIS	2	MQSI
Maximo	GFDM	ΜΑΧΙΜΟ	2	MQSI
LMSLI, CWQ	LMSLI	CWQ	2	MQSI
LMSLI, Maximo	LMSLI	MAXIMO	2	MQSI
LMSLI, MDSI	LMSLI	MDSI	2	MQSI
LMSNY, CWQ	LMSNY	CWQ	4	MQSI
LMSNY, Maximo	LMSNY	ΜΑΧΙΜΟ	2	MQSI
LMSNY, MDSI	LMSNY	MDSI	1	MQSI
Maximo, CWQ	MAXIMO	cwq	2	MQSI
Maximo	MAXIMO	GFDM	1	MQSI
Maximo	MAXIMO	LION	1	MQSI
Maximo, LMSLI	MAXIMO	LMSLI	2	MQSI
Maximo, LMSNY	MAXIMO	LMSNY	3	MQSI
Maximo, MDSI	MAXIMO	MDSI	3	MQSI
Maximo	MAXIMO	PL&SCH	2	MQSI
CRIS	MDSI	CRIS	14	MQSI
CSS	MDSI	CSS	13	MQSI
MDSI, CWQ	MDSI	CWQ	17	MQSI
MDSI	MDSI	DISNY	1	MQSI
MDSI, LMSLI	MDSI	LMSLI	4	MQSI
MDSI, LMSNY	MDSI	LMSNY	3	MQSI
MDSI, Maximo	MDSI	ΜΑΧΙΜΟ	15	MQSI

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SLA - Business	Source	Target	Count	Technology
MDSI	MDSI	PAVING NY	1	MQSI
Permits, Maximo	Permits	ΜΑΧΙΜΟ	2	MQSI
Maximo	PL&SCH	ΜΑΧΙΜΟ	1	MQSI
CWQ	Sagent	CWQ	1	MQSI
Siebal, CRIS	Siebel KSE	CRIS	30	MQSI
SPIPE, CRIS	SPIPE	CRIS	1	MQSI
SPIPE, CWQ	SPIPE	CWQ	2	MQSI
SPIPE, Maximo	SPIPE	ΜΑΧΙΜΟ	1	MQSI
CSS	ACS	CSS	2	RDX
CSS	ALL	CSS	2	RDX
CSS	BOA	CSS	2	RDX
CSS	СВ	CSS	2	RDX
CIAP, CSS	CIAP	CSS	11	RDX
CSS	CIB	CSS	2	RDX
CSS	СРА	CSS	2	RDX
CSS	CRS	CSS	1	RDX
CSS	CSS	Agway	1	RDX
CSS	CSS	ВОА	1	RDX
CSS	CSS	CMS	1	RDX
CSS	CSS	Collections	1	RDX
CSS	CSS	ConEd/marlboro	1	RDX
CSS	CSS	CSG	1	RDX
CSS	CSS	DWH	3	RDX
CSS	CSS	EQI	2	RDX
CSS	CSS	ESG	10	RDX
CSS	CSS	Experian	1	RDX
CSS, GTIS	CSS	GTIS	4	RDX
CSS	CSS	HON (MassSave)	1	RDX
CSS	CSS	IQR	1	RDX

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SLA - Business	Source	Target	Count	Technology
CSS	CSS	JPM/Chase	2	RDX
CSS	CSS	MA CAP agencies	2	RDX
CSS	CSS	MeterInventory	1	RDX
CSS	CSS	NHEAP	1	RDX
CSS	CSS	NRG	2	RDX
CSS	CSS	ΝΥΡΑ	2	RDX
CSS	CSS	OBF	6	RDX
CSS	CSS	ODS/web	1	RDX
CSS	CSS	Opower	2	RDX
CSS	CSS	OSMOSE	2	RDX
CSS	CSS	Pitney	7	RDX
CSS	CSS	PositiveEnergy	1	RDX
CSS	CSS	Questline	1	RDX
CSS	CSS	RNY	2	RDX
CSS	CSS	RUI	1	RDX
CSS, Smartgrid	CSS	SmartGrid	3	RDX
CSS	CSS	Striata	1	RDX
CSS	CSS	WNY	2	RDX
CSS	Cybergrant	CSS	1	RDX
CSS	EQI	CSS	1	RDX
CSS	ESG	CSS	3	RDX
GTIS,CSS	GTIS	CSS	2	RDX
CSS	ICS	CSS	2	RDX
CSS	IQR	CSS	1	RDX
CSS	ITRON	CSS	1	RDX
CSS	JPM/Chase	CSS	2	RDX
CSS	M2M	CSS	1	RDX
CSS	MA CAP Agencies	CSS	1	RDX
	MRC	CSS	2	RDX

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SLA - Business	Source	Target	Count	Technology
CSS	NCO	CSS	3	RDX
CSS	NRA	CSS	2	RDX
CSS	NRG	CSS	1	RDX
CSS	NYState	CSS	1	RDX
CSS	OBF	CSS	3	RDX
CSS	OneStep	CSS	1	RDX
CSS	PCC	CSS	2	RDX
CSS	Pitney	CSS	1	RDX
CSS	Regulus	CSS	2	RDX
CSS	RILINEAP	CSS	78	RDX
CSS	RNY	CSS	1	RDX
CSS	RUI	CSS	2	RDX
CSS	SBS	CSS	2	RDX
CSS	SOL	CSS	2	RDX
CSS	TEM	CSS	1	RDX
CSS	WNY	CSS	1	RDX
CSS	WSI	CSS	1	RDX
CSS	WU	CSS	2	RDX
SAP-HR, AMAG	SAP HR	HIXAMAG2 (AMAG)	1	VBSCRIPT
SAP-HR	SAP HR	NYHCBAPP28V	1	VBSCRIPT
SAP-HR	SAP HR	NYHCBAPP218v	1	VBSCRIPT
SAP-HR	SAP HR	Nyhcbapp03v	1	VBSCRIPT

Nationalgrid SERVICE LEVEL AGREEMENT SERVICE SUMMARY Information Services Troux ID: Storms: 1112 Storms Month/Year: February, 2018

This Service Level Agreement (SLA) is between National Grid Information Services (IS) and the National Grid business, and covers the It remains valid until superseded by a revised SLA mutually endorsed by the stakeholders.

It outlines all of the parameters of the named service as they are mutually understood by the primary stakeholders.

It does not supersede current processes and procedures unless explicitly stated herein.

Approvals		Supporting signatures	<u></u>
Role	Name	Date	Signature
Business System Owner	Gary Spicer, Director, EBS		
	Business Process Support		
IS Service Owner	US Operations		
	US: Al Porpora		
IS Customer Service	Francis Di Leonardo - Director, IS Customer		
Manager	Service Management - Operations		

Service Details	Supplementary details
System Name	Storms
Service Description	STORMS (Severn Trent Operational Resource Management System) is a work management system that includes multiple management tools to initiate, design, estimate, assign and schedule multiple work crews. It also has the capability to complete and close construction and non-construction requests and provides multiple reporting tools. The STORMS application defines work management as an enterprise-wide business process, managing each new job from initiation to completion. From the initial request through to final closing, work is handled within the five major subsystems: Work requesting, design and job estimate, work scheduling, reporting and job progress and closing.
Scope of Agreement	Provide 24/7/365 support of Storms application. This SLA will support all functionality, daily operation and "break fix hosting services". It will also include server back up services and server storage along with data security.

 Business Importance
 (Note this information is to determine general service requirements not Service Continuity requirements)

 The business importance should be assessed by estimating the tangible and intangible losses from losing the system

 Service Criticality:
 Operationally Critical (OTHER)

 Service Criticality:
 Operationally Critical (OTHER)

Systems that support the management of the physical network infrastructure and/or emergency response that if not available for an extended period will impact upon the safe and reliable operation of National Grid

Safety Impact:	Yes	Details of Safety Impact:	Customer emergency orders for both gas and electric are scheduled using the Storms Oracle Database		
Tangible Loss:	\$5K - \$50K per 2 hr outage	Intangible Loss:	High		
Description / Reason	The Tangible Loss range noted above is with regard to Storms and is dependent upon the time of day that an outage occurs and its associated impact on the ability to schedule work crews. In the event of a total system loss, a manual process would be implemented as needed by the business to replace the STORMS WR process; however if this situation persisted for an extended period of time, i.e., more than 48 hrs, National Grid would also be at risk of suffering the following intangible losses: reputation, safety and customer goodwill.				

Service Hours and Support Periods					
Service Hours are the periods during which the system is available for use. The system might be available but not fully supported by IS during every period (e.g. unsupported outside of normal office hours), as indicated by the "Supported Period" field. Any incidents occurring outside of the Supported Periods typically will not be addressed until the next Supported Period, or limited to a best endeavors only.					
State whether UK or US Hours	Service Hours	# of Users (for availability calculation) See Service Details for	Supported Period (Y / N)		

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SERVICE LEVEL AGREEMENT

The next scheduled review is:

Information Services

SERVICE SUMMARY

Troux ID: Storms: 1112		;	Storms	Month/Year:	February, 2018
US				users by location	
State whather UK or US Hours	Sonvior	Houro		Number of Users	s Supported
State whether UK or US Hours	Service	nours		(for availability calc.) Period
US	From (Time)	To (Time)		Storms	(Y / N)
Weekdays (Low Vol)	12:00 AM	5:00 AM		10	Yes
Weekdays (Low Vol)	5:00 AM	6:30 AM		25	Yes
Weekdays (Low Vol)	6:30 AM	7:30 AM		100	Yes
Weekdays (High Vol)	7:30 AM	8:30 AM		400	Yes
Weekdays (peak hours)	8:30 AM	3:30 PM		600	Yes
Weekdays (High Vol)	3:30 PM	4:30 PM		300	Yes
Weekdays (Low Vol)	4:30 PM	6:00 PM		150	Yes
Weekdays (Low Vol)	6:00 PM	12:00 AM		50	Yes
W/	10.00 414	7.20 414		10	Vee
weekends - Sat/Sun/Hol*	12:00 AM	7:30 AM		10	res
Weekends - Sat/Sun/Hol*	7:30 AM	6:00 PM		25	Yes
Weekends - Sat/Sun/Hol*	6:00 PM	12:00 AM		10	Yes
Storms Batch Server	see a	lbove		50% of users specifie above for single instance outage; otherwise 100% for mu instance outage	d Itti-
Citrix Server (10)	see a	bove		5% of users specified above for single instance outage; otherwise 100% for mu instance outage	l Iti-
CSS	see a	bove		75% of users specifie in above outage perio	d d
Database Servers (STORMS/iSched)	see a	lbove		100% of users specifie in above outage perio	ed d
GISSmallworld 4.2 UNY and NE Electric	see a	ibove		40% of users specifie in above outage perio	d d
JCAPS	see a	bove		10% of users specifie in above outage perio if creating an order to g to Mwork	0 d d
MWork	see a	bove		10% of users specifie in above outage perio when creating an order for Mwork	d d ar
Network (entire impact - data center connection)	see a	above		100% of users specifie in above outage perio	ed d
Network (local impact)	see a	lbove		TBD when such an outage occurs	
PM4D	see a	lbove		75% of users specifie in above outage perio	d d
PowerPlant	see a	ibove		70% of users specifie in above outage perio	d d

nationalgrid SERVICE LEVEL AGREEMENT **Information Services** SERVICE SUMMARY The next scheduled review is: Troux ID: Storms: 1112 **Storms** Month/Year: February, 2018 70% of users specified SAP/PI see above in above outage period 100% of users specified Storage see above in above outage period In the event that a BCP is initiated, the user impact will need to be assessed according to the situation. The duration of the incident is Other service independent of the BCP cancellation; it is calculated based upon iScheduler availability considerations:

Service Performance Targets

The service performance targets against which IS performance will be measured and reported. Service availability is calculated using client seats (user weighted) calculation for Service Performance will only be measured during the **Supported Periods**. Any incidents outside the Supported Periods will be excluded for performance measurements and

	Availability Target %	Maximum time to recover (Downtime)	Ro (max failure:	eliability s per mth/qtr/year)	Other performance considerations:
Supported Periods	99.25%	Severity Level 1 = 4 hours Severity Level 2 = 8 hours	3	month	
Un-Supported Periods	N/A	N/A	N/A		•

Service Cost Allocation					
The business manager responsible for	reviewing the IS costs are appropriate re	ative to the business benefits of the service.			
Endorsing Business Manager (Role / Job Title)	Mary Lawless - Acting Front Office Support Lead Business Process Support	Cost Allocation (Business Area / Line of Business)	NMPC Electric Dist - 36.73% NMPC Gas - 10.24% Massachusetts Electric = 34.71% Nantucket Electric = 0.54% Narragansett Electric = 12.69% Narragansett Gas = 5.09%		

Performance Reports & Service Reviews Service performance report					
Please note that Incident Rep	Please note that Incident Reports will be provided by IS for Complete and Major losses of service.				
	Frequency:	e.g. monthly / on exception basis			
		Mary Lawless, Acting Front Office Support Lead Analyst, Business Process Support			
		Rick Sheer - Business Relationship Manager, Operations			
		Fran Di Leonardo, Director, Customer Service Management, operations			
Service Performance		Debbie Dhaliwal, Senior Service Delivery Manager			
Reports	Circulated to:				
This agreement is subject to review as	specified below, or a	t a minimum every 12 months from the date of approval or following a major change.			
	Frequency:	On exception basis			
	Attendees	Mary Lawless, Front Office Support Lead Analyst, Business Process Support			
	(Titles/Role):				
Service Review Meetings		Rick Sheer - Business Relationship Manager, Operations			
		Fran Di Leonardo, Director, Customer Service Management, operations			

Information Services

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SERVICE LEVEL AGREEMENT

SERVICE DETAILS

STORMS

Service Information	
Main Locations of Users:	Legacy National Grid territory, but is used everywhere (Upstate NY, MA Electric, Rhode Island, and Nantucket)
Number or percentage of users/location:	All office and barn locations at National Grid utiize Storms appl.
Main Locations of SERVICE:	Newark/Norwich
Highest Incident Level Allowed	P1

Related Services:	
Affecting service	STORMS user availability is impacted by the following applications/infrastructure components' availability: Application servers Citrix servers CSS Database servers (STORMS/iScheduler) GIS JCAPS MWork Network PM4D PowerPlant SAP/Pi
F - - - Affected by service - - - - - - - - - - - - - - - - - - -	Failure of STORMS will impact the following applications: PowerPlant will be interrupted for estimates and as-builts; MWork will also be interrupted Joint Pole Tracking System SAP ACIS GIS Computapole Gridforce Cascade CSS

Position / Role	Name	Title	Tel. No. 🕿*	Escalation level
Key Business Client	Mary Lawless	Acting Front Office Support Lead, Business Process Support	315-428-5623	1
Customer Service Analyst	Melody Speier	Lead Analyst	315-428-6946	1
Business System Owner	GarySpicer	Director, EBS Business Process Support	315-428-6435	2
Customer Service Manager	Fran Di Leonardo	Director, IS Customer Service Management - Operations	516-545-4159	2
Senior Business Contact	Doneen Hobbs	VP -US Shared Services	516-545-5004	3
US CIO	Anuraag Bhargava	US CIO	781-907-2850	3

*The Enterprise Services (Hosting) and the Solution Delivery Supplier metal tier bandings are the key to calculating end-to-end service availability.

national grid	SERVICE LEV	EL AGREEMENT	Information Services
	SERVIC ST	E DETAILS ORMS	
Tower Service Provider and method of calculation.	*Enterprise Services (hosting)	ES metal tier is based on availability of the hosting service. Hosting service includes all sub-components within the scope of the Services, such as Computing, Storage and relevant underlying Infrastructure and data centre environments / facilities. Availability excludes non service hours and scheduled maintenance. Tower Target Service Level (ES SLA reference # ESLA1004): ES Platinum - 99.96% ES Gold - 99.70% ES Silver - 99.53% ES Bronze - 96.55% NHCBP78A iScheduler/STORMS Database server Production (NOR) - Silver NGUSXNANWH020 iScheduler/STORMS Citrix server Production (NOR) bronze NGUSXNANWH021 iScheduler/STORMS Citrix server Production (NOR) bronze NGUSXNANWH022 iScheduler/STORMS Citrix server Production (NOR) bronze NGUSXNANWH023 iScheduler/STORMS Citrix server Production (NOR) bronze NGUSXNANWH024 iScheduler/STORMS Citrix server Production (NOR) bronze NGUSXNANWH025 iScheduler/STORMS Citrix server Production (NOR) bronze NGUSXNANWH024 iScheduler/STORMS Citrix server Production (NOR) bronze NGUSXNANWH026 iScheduler/STORMS Citrix server Production (NOR) bronze NGUSXNANWH029 iScheduler/STORMS Citrix server Production (NOR) bronze NGUSXNANWH029 STORMS Batch server Production (NOR) bronze NGUSXNANWH029 STORMS Batch server Production (NOR) Silver NHCBP82A PM4D(VIA JCAPS) Application server Production (NOR) bronze NHCBP82A PM4D(VIA JCAPS) Database server Production (NOR) bronze	ES Silver
	*Solution Delivery	Solution Delivery uses a combination of application criticality, service window and number of users to determine the metal tier	SD Platinum
	nterprise Services (user platforn	Managed desktop service	ES Bronze
	Add Tower Service Provider, if Applicable		

IS Service Continuity Measures					
Business Service Continuity plans agreed and in place	Yes	Business Service Continuity Plan Number/Title:	GAS-01 Gas - Customer Meter Services(CMS) BPS-01 Business Process Support EDO-NY-ELEC Maintenance & Construction - NY Electric Ops		
		IS Service Continuity DR Tier:	2	RTO <= 24 hours; RPO = 15 minutes	
IS Service Continuity / DR plans agreed and in place	Yes	IS Service Continuity Plan Number/Title:	STORMS_1112.000_v0.2_20170103 as filed Sharepoint Site	d in the IT Service Continuity	
Service Limitations during an incident recovery period	During an incident recovery period paper process. Elective service re placed on hold until the system is f	, a partial IS service is not provided. In the quests would likely be placed on hold. A ully recovered.	is situation the focus would be to handle eme ny in-process requests would be brought to a	rgency work via a manual point where they could be	
Service Dependencies	See Disaster Recovery documentation				
Data Restoration Point & Maximum Data	Recovery Time Objective (RTO) - 24 hours				
Loss	Recovery Point Objective (RPO) -	15 minutes			
Agreed DR/BCP Test Schedule	A DR Test is performed annually o	n a Tier 2 application. The next schedule	ed test should be done as part of the Storms u	pgrade project in 2016.	

Planned Outages			
IS will make contact at least 5 working days before the p	planned outage to agree the details	Outage From	Outage To
	All Citrix boxes are rebooted independently on a daily basis during the overnight shift to minimize business disruption.	3:00 AM	5:00 AM
Maintenance Requirements	STORMS - monthly maintenance.	12:00:00 -AM	6:00:00 AM
	Bi-weekly batch server restart	12:00 AM	6:00:00 AM
	Storms - daylight savings change (Fall - 90 mins);	12:45 AM	01:15 AM
	Stormsr - daylight savings change (Spring - 30 mins);	01:45 AM	03:15 AM
Generic Outages	Specific business requests for backups, enhancements or upgrades.	TBD - as negotiated with business on	TBD - as negotiated with
		weekend only	business on weekend only

Capacity Considerations

national grid	SERVICE LEVE	EL AGREEMENT		Information Services
	SERVICE	E DETAILS		
	STO	DRMS		
Expected Service Life of System (in years)	 Existing system is beyond end of life Program. In addition, it has been ag The database is unsupported and and the database is also shared with The application is dependent upon Server OS is unsupported The integration/middleware layer in Due to the many aged components, 	for many software/hardware component reed to perform a project in FY2017 to u does not have a hot-failover or replication I scheduler a single database server. s an unsupported version of JCAPs the services at risk to maintain the note	nts and under review for replacement within th upgrade the Storms service to supportable ler n. d Serivce Level until the upgrade and/or repla	ne Gas Enablement vels. acement is implemented.
Lifetime Maintenance Requirements (e.g.	An agreement was reached with CG	I to extend the iScheduler/Storms main estment to stabilize and upgrade the an	tenance agreement through September 2016	. Progress continues with
Agreed Maximum Growth within next 12 m	onths:			
Users Transaction volumos	No expected growth			
Data storage (inc reports & MI)	50 gig			
Network Traffic	No expected growth			
Estimated Use of Service Desk per Month	In Hours	Out of Hours	Total	
(calls)	10	2	12	
Security Considerations Beyond NG	None			
Policy: The above information indicates that an ext	tensive review or investment may b	e required during:		
Archive Arrangements				
Data which will be Archived	Orders closed more than 5 years ag	0		
Data Retention Period	Indefinite			
Supporting Agreements	Details of supporting documents incl	uding Operational Level Agreements (C	DLA's)	
Document Title	(Link to) Document Location		
CGI Maintenance Agreement				
Supporting Signatures	Details of supporting signatures with	in IS and client (business) organizations	5.	1
Name	Role / Job Title	proved by Service Strategy team as	Date	Signature
UK: Nigel Taylor	well as by others listed below	proved by Service Strategy learn as	N/A	
US: Debbie Dhaliwal (informed)	Business Direct Service Owner appr	oval is within the Service Summary	I approve	
UK: Jim Colby (Informed)	tab, regional head is to be "informed	" only.	Albert Porpora	
			01/05/2017	1
UK: Shakeel Bashir	CNI Service Owner		1/4/2017	l will approve of the SLA Phil Lavallee
US: Eric Austin (Informed)	Customer (End User) Support Servio	ce Owner	1/5/2017	Approved
US: Joseph Johnson (Approval)	Help Desk Services/Incident Manage	ement		Thank you,
UK: Robert Kay (informed)				Joseph Johnson
Global: Michael McGarry (Informed)	Service Management Center		1/19/2017	SMC - Conditional Approval
Globally: Tracey Fyfe (Approval)	IS Service Continuity/Availability Ma	nagement		Tracey Fyfe
Globally:	Infrastructure Service Owner		1/19/2017	approved
US: Paul Circolone (Approval)	Network Services			
Globally: Paul Circolone(Approval)	Computing Storage Data Center Ser	vices (CSDC)		Paul Circolone
Globally: Andy Bacon (informed)	User Platform Service Owner		1/5/2017	approve
Globally: Harold Pinsker (Approval)	Client Services (CS)		1/3/2017	Pinsker, Harold R.
Globally: Dean Nicholls(Approval)	Print Services (as necessary)			<harold.pinsker@nationalgr< td=""></harold.pinsker@nationalgr<>
Clabally, Systlena Lyk -	Integration Convict-		1/10/0047	id.com>
Giobaliy: Svetiana Lyba	Integration Services		1/19/2017	Approved Svetlana Lyba
US: Jeff Dailey, Aman Aneia.	Business Relationship Management		N/A	
Rick Sheer (informed)				
UK: Kate Jones, Mike Gale,				
Critis nugries (informed)				

Document Amendment History:
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SERVICE LEVEL AGREEMENT

Information Services

Incident Classification

Storms

This sheet should be updated with the incident response times for this system, by reference to either the generic response times or specific ('non-standard') arrangements established for this system as appropriate.

Business Impact Classif	ication				
The criteria that will be used the assess how much the service is affected during an incident. These classifications define the resolution time for each incident, and drive the incident management processes and					
Incident Severity Level	Generic Definition	Specific criteria to be used for this system			
P1	 A complete loss of an operationally critical or business critical system/service. Operationally critical systems or services include CNI systems, systems that are directly linked to or support CNI systems, and those systems that support the management of the physical network infrastructure and/or emergency response that if not available for an extended period will impact upon the safe and reliable operation of National Grid. A connectivity outage to a critical site (for example Henry Clay Blvd, Metrotech, Syracuse SOC, Warwick, the Strand) or multiple sites. An infrastructure failure impacting multiple critical applications or services. Any incident escalated to this level by National Grid. 	 -Verizon (Network) communications unavailable in Upstate NY or NE, or the database server located at CSC Data Center is unavailable, taking the entire application down. -Database server is down or not responsive 			
P2	 A partial loss of an operationally critical or business critical system/service. A complete loss of a business core system/service. A network outage impacting a non-critical operational site/s. A significant loss of network connectivity (telephony or data) to a critical site (for example Henry Clay Blvd, Metrotech, Syracuse, Warwick, Strand). Any incident escalated to this level by National Grid. 	-At this level there is a partial loss of the STORMS application due to a problem with one of its infrastructure components which is causing a larger volume of users not to have access to the application e.g. > 20 to 25 users. -Any interface to or from Storms, such as Powerplant, SAP, GIS, CSS, JCAPS and Mwork is not functioning -Batch server: NYHCBAPP29V is not functioning or jobs are not running on the batch server			
P3	 A partial loss of a business core system/service. A complete loss of a business efficiency system/service. A failure to a network segment within a company location. Batch jobs for an operationally critical or business critical system which requires immediate attention to ensure the system/service is not further impacted or becomes unavailable as a result. Any incident escalated to this level by National Grid. 	-At this level the STORMS application is available, however there may be a small community of users i.e. < 20 to 25, that are experiencing client workstation issues and therefore unable to access the application -At this level, it might also be the case that a single STORMS function or interface is not working, e.g. a single report is not working			
P4	 A partial loss of a business efficiency system/service. A "How to" question by a client. A request initiated by a client. Minor loss of infrastructure (e.g. one of a number of networked printers) Password resets are normally resolved at first call. A minor loss of infrastructure impacting a single user (e.g. a single desktop related incident or one of a number of networked printers). Batch job failures for Business Core or Efficiency systems which may require expedited attention to ensure the system/service is not further impacted or becomes unavailable as a result. 	-At this level, the STORMS application is fully available and no new functional issues have been identified, but rather there is a request for information or admin type services. -Individual client unable to log into desktop application.			

Incident Response Time and Resolution Targets					
Incident Classification	Response Target	Resolution Target			
P1	<15 mins	<4 hours			
P2	<30 mins	<8 hours			
P3	<3 hours	<12 hours - 3 days*			
P4	<6 hours	<24 hours - 5 days*			

Time to fix (respond plus resolve) is measured as elapsed time during the on-line service hours as defined for each service. * depending on supplier (ex. Verizon Service Level Targets for P3 and P4 incidents are 3 Business Days and 5 Business Days respectively)

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Service Description	back to Service Summary	
Business Impact	back to Service Summary	
Service Hours and Support Periods	back to Service Summary	
Service Performance Targets	back to Service Summary	
Cost Allocation	back to Service Summary	
Service Details & Related Services	back to Service Details	
IS Incident Management & Service Continuity	back to Service Details	
Planned Outages	back to Service Details	
Capacity and Archiving Considerations	back to Service Details	
Supporting Agreements	back to Service Details	

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Additional Information	back to Service Details	

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Topology Diagram	back to Service Summary	
Storms ischeduler.vsd Storms ischeduler1.png		

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SERVICE LEVEL AGREEMENT D R A F T Service Performance Report Storms

As At:

Month / Year

Please note that Incident Reports must be provided for Complete and Major losses of service.

Current Month Availability Achieved						
	Target	Actual	Target	Actual	Mean Time To	
	Availability	Availability	Reliability	Reliability	Recover	
	(%)	(%)	(No. failures)	(No. Failures)	(MTTR)	Notes
This Service Period						

Availability History - Previous Months

Based on MTBF and MTTR for the period	Target Availability	Actual Availability (this month)	Actual Availability (12 month rolling average)	Target Reliability	Actual Reliability (this month)	Actual Reliability (12 month rolling average)
Current Month						
Month -1						
Month -2						
Month -3						
etc						

Details of Service I	ncidents (This Month)	Details of all high-impact incidents and as	sociated downtime p	er month.
Date & Time:	Reference:	Priority:		
Target Maximum	Actual	Performance		
downtime (minutes):	Duration:	Indicator:		

Incident Summary:			
Root Cause:			
Actions:			
Date & Time:	Reference:	Priority:	
Target Maximum	Actual	Performance	
downtime:	Duration:	Indicator:	
Incident Summary:			
Root Cause:			
Actions:			
Date & Time:	Reference:	Priority:	

Target Maximum	Actual	Performance	
downtime:	Duration:	Indicator:	
Incident Summary:			
Root Cause:			
Actions:			

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SERVICE LEVEL AGREEMENT D R A F T Service Performance Report Storms

As At: Month / Year

Other Performance Indicators						
Criteria:	Target	Actual	Indicator	Notes		
Num. Open Root Cause						
Analysis (RCA) Reports						
Number low impact						
incidents						
Num application						
changes						
Other						
Special Reporting F	Requirements					

Service Owner

Select from drop-down list	IS Service Owner
UK Shared Services and Corporate	UK: Chris Ashe
UK ESO, GSO and Non-Reg Business	UK: Gabriel Diaz
UK Gas Distribution	UK: Steve Hether
UK ETO and GTO (interim)	UK: Paul Miller
US Customer	US: James Lozito
US Shared Services	US: James Lozito
US Network Strategy	US: Kevin Tanne
US Operations	US: Al Porpora
US USFP	US: Vaughn Lars

Critical	
Select from drop-down list	System Criticality Definition
	Systems that would impact upon the safe and reliable operation
Operationally Critical (CNI)	of the National Grid's Transmission & Distribution (E or G) if not available
Operationally Critical (OC CNI)	Systems that are directly linked to and support CNI system(s)
	Systems that support the management of the physical network infrastructure and/or emergency response that if not available for an extended period will impact upon the safe and reliable
Operationally Critical (OTHER)	operation of National Grid
	Systems that support critical business process(es) and if not available will result in a financial or
Business Critical	reputational damage or license impact upon National Grid
	Systems that support day to day business process(es) and are not critical to the safe and
	reliable operation of National Grid LOBs. They could impact National Grid LOBs ability to
	complete day to day activities and cause major internal productivity loss if not available, but
Business Core	would not directly cause financial or reputational damage
	Systems that are not Operational Critical, Business Critical, or
Business Efficiency	Business Core. They could cause minor internal productivity loss if not available

Gabriel Diaz Steve Hetherington Paul Miller James Lozito James Lozito Kevin Tanner Al Porpora Vaughn Larsen

These are standard definitions used for incident management. Please do not amend.

ES Tier

Select from drop down list
ES Platinum
ES Gold
ES Silver
ES Bronze
N/A

Sol Del Tier

Select from drop down list
SD Platinum
SD Gold
SD Silver
SD Bronze
N/A

YESNO

Yes No

RAG R A G

HIGHMEDLOW

High Medium Low

Location

UK US

TIER

Select from drop-down list	RTO and RPO targets
	RTO <= 15 minutes;
0	RPO = Near 0
	RTO <= 8 hours;
1	RPO = Near 0
	RTO <= 24 hours;
2	RPO = 15 minutes
	RTO <= 48 hours;
3	RPO = 15 minutes
	RTO <= 5 days;
4	RPO = 24 hours
	RTO <= 1 month;
5	RPO = Last Backup
	RTO = On Request;
6	RPO = Last Backup

Time Period

Select Time Period Month Quarter Year

Document Information

Original Author:	
This version by:	Victoria Berezin
Number of this version:	2.3
Date of this version:	16 Mar 2012

Template Amendment History:

Version	Date	Remarks
		Draft 1: Mike Gale - base structure
		structure and split system
	16-Jun-08	Review: Alan Watson - converted into SDP template
4	26 Jun 09	Alon Watson new SDB templete
11	4-Aug-08	Alan Watson - UK P1 change + Minor Formatting
1.2	23-Jan-09	Alan Watson - Consistent font size and colour, DR Teir
	0.11	numbering, Service Criticality
1.3	2-Mar-10	CR136 - add Version control; CR289 - protect Data Control sheet
1.4	8-Mar-10	Victoria Berezin - Minor changes to the definitions of
15	16-Apr-10	System Criticality
1.0	16-Mar-12	Victoria Berezin - updated Service Summary tab:
		line 24 - added fields "Safety Impact" and " Details of
		cell A34 - the word Public deleted.
		Service Details tab:
		(Position/Role) updated to reflect organizational
		changes
		Tower Service Providers" added
		line 68 - section "Supporing Signature" (Name and
		Service Details tab:
		Added RPO and RTO targets for DR tiers
		Consolidated US and UK Incident classification tab into
		1 Global Incident Classification tab. Updated Response
		in Service Providers Schedule 3
1.7	31-Jul-13	Victoria Berezin "Service Details" tab :
		orgchrt
		Updated "Incident Management Contact Details"
		line 22-23 added 3 days and 5 days
		line 26 added reference to line 22-23
10	20 Jul 14	Vietoria Porozia : "Soprino Dotaila" tab :
1.0	25-501-14	Updated supporting signature section to reflect current
		org changes : Lina Gladstein was removed from SMI
		approver for SMI
1.9	15-Jul-15	Service Summary:Added Comment for Next Service
		Service Summary:Added Troux id in cell A4
		IS Service Manager changed to IS Customer Service
		Header in Cell 30F changed to refer to users/location in
		Service Details
		line 8 added number or percentage of users per
		location
		line 9 - Added comment
		allowed based on application banding
		calculate availability
		line 29 added manage desktop services.
		Change supporting signatures section to reflect current
		org changes "Global Incident tab" added line 26 for example of
		service level targets. Added root cause analysis targets
		in line 30-35. Added "Toplogy Diagram" tab to include component
		diagram
		Changed "Service Performance Report" tab to note Draft in title
2	10-Aug-15	Service Summary:
	g .u	Line 4 - Unprotected Troux ID, so can type in field: Line
		4 - Made month/year a title with an input field: Line 46 - Modified title to say "max failures per month/gtr/vear".
		Prior the title said max failures per year, while the
		comment said month/qtr/year. Added a selection box so timeframe for reliability can be explicitly stated.
		Service Details:
		Line 30 - increased row width so can see RTO/RPO display
		Line 74 - corrected comment to state that regional
		service owner head to be "informed" only All worksheets - ensured comments were visible
	17-Aug-15	Replace Bill Kearns with Marc Hurwitz
2.1		

22	14-Jan-16	Replaced Jimmy Lozito with Kevin Tanner as Network Strategy services owner Replaced John Stephenson (infrastructure Services) with Andy Bacon Replaced Derek Price - Global Network Services approver with Paul Circolone - however as US only
2.3	24-Feb-16	Replaced Victoria Berezin (Help Desk) approval with Joseph Johnson for the US - per Eric Austins request. Replaced Eric Austin as informed for SMC with Michae McCarry - global SMC owner - as informed - per Rob Kaye.
		insert new entries above this row

Request:

Referring to the testimony of Bhargava, DeMauro, and Rapivaty (p. 17, lines 18-19), please explain why 64 full-time equivalent employees are needed now, but were not needed over the past few years? Please explain the time period over which the 64 employees will be hired. Will the hiring of these 64 employees result in lower cost to the company from third party partner/vendors? If so, please quantify.

Response:

The 64 full time equivalent positions that are being added are incremental roles to strengthen National Grid's cyber capabilities, deliver the expanded information services (IS) capital plan, and support the re-tendering and oversight of third party contracts. The cyber security positions are in response to an increase in cyber threats, which has required National Grid to increase its capabilities in detecting and preventing cyber threats. As noted in the joint pre-filed direct testimony of Company Witnesses Anuraag Bhargava, Daniel J. DeMauro, and Mukund Ravipaty referenced in the request, National Grid is adding several types of National Grid USA Service Company, Inc. full time equivalent positions, including: Cyber Security Operations Center personnel who represent the first line of defense for identifying and responding to cyber threats to National Grid's critical network infrastructure and corporate networks; risk and business information security operations analysts, who work closely with functional teams across National Grid to identify risk and establish appropriate controls to safeguard National Grid assets; and project managers responsible for the implementation of security toolsets that address emerging threats.

National Grid is adding program delivery positions because of an increase in business demand for new technology and to support the delivery of large capital programs, such as the Technology Modernization initiative. As noted in the testimony referenced in this request, these positions include program managers, solution architects, and business analysts. The remaining positions are a combination of commercial management and administration roles to address the retendering of external partner contracts that are set to expire over the next two years and provide improved oversight surrounding the delivery of the expanded IS portfolio of systems and services.

Please see the table below for the current status of the on-boarding of the 64 positions. The positions have been budgeted for in the current fiscal year budget; however, it is likely that some of the positions will not be on-boarded until early in Fiscal Year 2019 because of the competitive job market for certain positions, such as the cyber security roles.

The Narragansett Electric Company d/b/a National Grid RIPUC Docket No. 4770 Responses to Division's Third Set of Data Requests Issued December 21, 2017

	Incremental	Hired As of		
	Planned FTE's	12/31/2017	To Be Hired	Estimated Hiring Completion
Cyber Security	28	8	20	Half by 3/31/2018, remainder by 6/30/2018
Program Delivery	25	16	9	Completed by 3/31/2018
Commercial Supplier Management	4	1	3	Completed by 3/31/2018
Administration	7	4	3	Completed by 3/31/2018
Total	64	29	35	

The positions are entirely incremental because National Grid does not anticipate any lowering of costs in the near term. National Grid expects that, over time, vendor and partner costs will be lower as project management personnel gain more knowledge with National Grid systems and the re-tendering of partner contracts start to commence. However, at this point, National Grid is unable to quantify savings with any level of certainty, and these benefits are not likely to be realized until after the conclusion of this rate case proceeding.

Request:

Referring to the testimony of Little, p. 65-66,

- a. Please confirm whether the \$1.5 million was Narragansett Electric's allocated share of a larger cost incurred by National Grid USA Service Company, or whether the amount of \$1.5 million represented costs for "development of the business case, assessment of processes and applications, and high-level design" charged only to Narragansett Electric.
- b. In either case applicable from (a) above, please provide an itemization of all the costs comprising the \$1.5 million that was removed from the cost of service or, if \$1.5 million was an allocation of costs, the itemization of the total cost from which the allocation was derived.
- c. If the \$1.5 million was an allocation of costs, please indicate the amount allocated to each of the other jurisdictions and indicate whether cost recovery is being allowed in those jurisdictions for these past non-recurring costs.

Response:

- a. The \$1.5 million was Narragansett Electric's allocated share of a total \$20.5 million in Gas Business Enablement operating expesses incurred by National Grid USA Service Company, Inc. (the Service Company) during the test year ended June 30, 2017 (the Test Year).
- b. Please refer to Attachment DIV 3-46, Page 2 for an itemization of the costs comprising the \$1.5 million of Gas Business Enablement operating costs allocated to the Company during the Test Year.
- c. Please refer to Attachment DIV 3-46, Page 2 for the total \$20.5 million in Gas Business Enablement operating costs incurred at the Service Company by cost type and the amounts that were allocated to each of the other jurisdictions by operating company.

In New York (Niagara Mohawk Power Corporation), cost recovery of pre-rate year operating expenses was not proposed in the ongoing rate cases (17-E-0238 and 17-G-0239); estimated incremental operating spend in the rate year was proposed, and the company is awaiting a final commission order. In Massachusetts, Boston Gas Company and Colonial Gas Company have requested recovery of a levelized amount of total incremental Gas Business Enablement operating expenses incurred from inception of the project, in their ongoing rate case (D.P.U. 17-170). The downstate New York gas and Massachusetts electric operating companies have yet to request any recovery of the Gas

Business Enablement Program costs as there are currently no base rate proceedings for these companies before their respective regulators.

THE NARRAGANSETT ELECTRIC COMPANY d/b/a NATIONAL GRID RIPUC Docket No. 4770 Attachment DIV 3-46 Page 1 of 2

Receiving Company - Text Narragansett Electric Co

Sum of OPEX - Amount		Fiscal Year / Period - F	iscal Year / Period									
		006/2017	007/2017	008/2017	009/2017	010/2017	011/2017	012/2017	001/2018	002/2018	003/2018	Grand Total
L02 Cost Type	Originating Company - Text	September-17	October-17	November-17	December-17	January-17	February-17	March-17	April-18	May-18	June-18	
Consultants	NGUSA Service Company	\$63,222	\$75,640	\$102,437	\$131,332	\$65,799	\$365,165	\$256,707	\$42,368	\$97,565	\$147,348	\$1,347,583
Consultants Total		\$63,222	\$75,640	\$102,437	\$131,332	\$65,799	\$365,165	\$256,707	\$42,368	\$97,565	\$147,348	\$1,347,583
Contractors	NGUSA Service Company		\$136		\$2,077	\$35,114	\$5,707	\$4,338	\$2,329	\$4,261	\$3,577	\$57,539
Contractors Total			\$136		\$2,077	\$35,114	\$5,707	\$4,338	\$2,329	\$4,261	\$3,577	\$57,539
Employee Expenses	NGUSA Service Company		\$1,493	\$2,560	\$2,246	\$3,197	\$28,086	\$9,585	\$4,205	\$3,344	\$3,879	\$58,596
Employee Expenses Total	l		\$1,493	\$2,560	\$2,246	\$3,197	\$28,086	\$9,585	\$4,205	\$3,344	\$3,879	\$58,596
Materials	NGUSA Service Company		\$395	\$260	\$152	\$634	\$5,999	\$1,011	\$414	\$492	\$74	\$9,430
Materials Total			\$395	\$260	\$152	\$634	\$5,999	\$1,011	\$414	\$492	\$74	\$9,430
Other Expenses	Boston Gas Company					\$1						\$1
	Massachusetts Electric Co									\$0		\$0
	NGUSA Service Company		\$5	\$125	\$1,130	\$1,533	\$9,485	\$1,262	\$884	\$23,230	\$996	\$38,652
	Niagara Mohawk Power Corp					\$11	-\$11		\$0			\$0
Other Expenses Total			\$5	\$125	\$1,130	\$1,545	\$9,475	\$1,262	\$884	\$23,230	\$996	\$38,653
Transportation	NGUSA Service Company				\$2		\$116	\$2	\$2	\$1		\$123
Transportation Total					\$2		\$116	\$2	\$2	\$1		\$123
Grand Total		\$63,222	\$77,669	\$105,382	\$136,939	\$106,289	\$414,548	\$272,906	\$50,202	\$128,893	\$155,874	\$1,511,924

THE NARRAGANSETT ELECTRIC COMPANY
d/b/a NATIONAL GRID
RIPUC Docket No. 4770
Attachment DIV 3-46
Page 2 of 2

1,458.55 \$ 3.26 \$ 688,244.43 \$

38,322.97 \$ 1.71

1,794,193.63 \$

2,303,816.42 \$

20,530,869.75

206.74

2,119.19 \$ 4.06 \$

195.00 \$

4,156,187.23 \$ 3,701,034.24 \$

Report:	4500
Start:	7/1/2016
End:	6/30/2017

Transportation

\$

Grand Total

Sum of OPEX - Amount	Column Labels 004/2017		005/2017	006/2017	007/2017	008/2017	009/2017	010/2017	011/2017	012/2017	001/2018	002/2018	003/2018 G	rand Total
Row Labels	000,2017	Jul-2017	Aug-2017	Sep-2017	Oct-2017	Nov-2017	Dec-2017	Jan-2017	Feb-2017	Mar-2017	Apr-2018	May-2018	Jun-2018	
Boston Gas Company				\$ 198,710.28	\$ 244,116.42	\$ 331,220.29	\$ 430,406.81	\$ 334,072.45	\$ 1,302,944.92	\$ 857,758.51	\$ 159,155.67	\$ 408,633.67	\$ 494,170.39 \$	4,761,189.41
Consultants				\$ 198,710.28	\$ 237,739.94	\$ 321,964.42	\$ 412,783.39	\$ 206,808.54	\$ 1,147,732.15	\$ 806,843.73	\$ 134,321.06	\$ 309,312.52	\$ 467,140.43 \$	4,243,356.45
Contractors					\$ 425.98		\$ 6,528.81	\$ 110,365.74	\$ 17,935.99	\$ 13,635.53	\$ 7,383.02	\$ 13,510.06	\$ 11,341.44 \$	181,126.59
Employee Expenses					\$ 4,693.51	\$ 8,046.63	\$ 7,060.41	\$ 10,047.60	\$ 88,277.23	\$ 30,125.56	\$ 13,330.72	\$ 10,602.46	\$ 12,297.38 \$	184,481.49
Materials					\$ 1,241.25	\$ 815.70	\$ 476.83	\$ 1,993.59	\$ 18,855.12	\$ 3,178.58	\$ 1,311.66	\$ 1,558.86	\$ 233.13 \$	29,664.71
Other Expenses					\$ 15.74	\$ 393.55	\$ 3,552.31	\$ 4,856.98	\$ 29,779.35	\$ 3,967.52	\$ 2,802.94	\$ 73,646.48	\$ 3,158.01 \$	122,172.87
Transportation							\$ 5.06		\$ 365.07	\$ 7.59	\$ 6.27	\$ 3.29	5	387.29
Brooklyn Union Gas-KEDNY				\$ 256,813.20	\$ 315,496.10	\$ 428,069.16	\$ 556,257.83	\$ 431,755.29	\$ 1,683,926.23	\$ 1,108,567.25	\$ 215,908.32	\$ 554,346.62	\$ 670,384.53 \$	6,221,524.55
Consultants				\$ 256,813.20	\$ 307,255.14	\$ 416,106.87	\$ 533,481.32	\$ 267,279.39	\$ 1,483,329.23	\$ 1,042,764.97	\$ 182,218.04	\$ 419,608.96	\$ 633,716.08 \$	5,542,573.19
Contractors					\$ 550.54		\$ 8,437.83	\$ 142,636.71	\$ 23,180.48	\$ 17,622.57	\$ 10,015.71	\$ 18,327.56	\$ 15,385.64 \$	236,157.03
Employee Expenses					\$ 6,065.89	\$ 10,399.46	\$ 9,124.88	\$ 12,985.52	\$ 114,089.51	\$ 38,934.27	\$ 18,084.27	\$ 14,383.14	\$ 16,682.45 \$	240,749.40
Materials					\$ 1,604.19	\$ 1,054.21	\$ 616.26	\$ 2,576.51	\$ 24,368.35	\$ 4,108.00	\$ 1,779.38	\$ 2,114.73	\$ 316.26 \$	38,537.89
Other Expenses					\$ 20.34	\$ 508.62	\$ 4,591.00	\$ 6,277.16	\$ 38,486.84	\$ 5,127.62	\$ 3,802.43	\$ 99,907.76	\$ 4,284.11 \$	163,005.89
Transportation							\$ 6.54		\$ 471.82	\$ 9.82	\$ 8.51	\$ 4.46	5	501.15
Colonial Gas Company				\$ 44,451.72	\$ 54,609.13	\$ 74,094.36	\$ 96,282.50	\$ 74,732.39	\$ 291,470.29	\$ 191,881.57	\$ 35,789.34	\$ 91,889.46	\$ 111,124.11 \$	1,066,324.87
Consultants				\$ 44,451.72	\$ 53,182.70	\$ 72,023.81	\$ 92,340.12	\$ 46,263.31	\$ 256,749.01	\$ 180,491.88	\$ 30,204.78	\$ 69,555.11	\$ 105,045.88 \$	950,308.32
Contractors					\$ 95.29		\$ 1,460.50	\$ 24,688.94	\$ 4,012.30	\$ 3,050.28	\$ 1,660.22	\$ 3,038.01	\$ 2,550.35 \$	40,555.91
Employee Expenses					\$ 1,049.94	\$ 1,800.04	\$ 1,579.42	\$ 2,247.66	\$ 19,747.72	\$ 6,739.12	\$ 2,997.68	\$ 2,384.17	\$ 2,765.31 \$	41,311.07
Materials					\$ 277.67	\$ 182.47	\$ 106.67	\$ 445.97	\$ 4,217.91	\$ 711.05	\$ 294.95	\$ 350.54	\$ 52.42 \$	6,639.66
Other Expenses					\$ 3.52	\$ 88.04	\$ 794.66	\$ 1,086.51	\$ 6,661.68	\$ 887.54	\$ 630.30	\$ 16,560.88	\$ 710.14 \$	27,423.26
Transportation							\$ 1.13		\$ 81.67	\$ 1.70	\$ 1.41	\$ 0.74	\$	86.65
KS Gas East Corp-KEDLI				\$ 183,864.60	\$ 225,878.44	\$ 306,474.77	\$ 398,251.04	\$ 309,113.84	\$ 1,205,601.67	\$ 793,675.22	\$ 145,708.81	\$ 374,108.72	\$ 452,418.56 \$	4,395,095.68
Consultants				\$ 183,864.60	\$ 219,978.35	\$ 297,910.40	\$ 381,944.27	\$ 191,357.83	\$ 1,061,984.88	\$ 746,564.29	\$ 122,972.44	\$ 283,179.09	\$ 427,672.33 \$	3,917,428.48
Contractors					\$ 394.16		\$ 6,041.04	\$ 102,120.30	\$ 16,595.99	\$ 12,616.82	\$ 6,759.24	\$ 12,368.61	\$ 10,383.22 \$	167,279.38
Employee Expenses					\$ 4,342.85	\$ 7,445.46	\$ 6,532.93	\$ 9,296.94	\$ 81,682.03	\$ 27,874.87	\$ 12,204.43	\$ 9,706.67	\$ 11,258.39 \$	170,344.57
Materials					\$ 1,148.52	\$ 754.76	\$ 441.21	\$ 1,844.65	\$ 17,446.45	\$ 2,941.11	\$ 1,200.84	\$ 1,427.16	\$ 213.43 \$	27,418.11
Other Expenses					\$ 14.57	\$ 364.15	\$ 3,286.91	\$ 4,494.11	\$ 27,554.53	\$ 3,671.10	\$ 2,566.12	\$ 67,424.18	\$ 2,891.19 \$	112,266.87
Transportation							\$ 4.68		\$ 337.80	\$ 7.03	\$ 5.74	\$ 3.01	ş	358.26
Narragansett Electric Co				\$ 63,222.12	\$ 77,668.64	\$ 105,381.81	\$ 136,939.22	\$ 106,289.26	\$ 414,547.95	\$ 272,906.42	\$ 50,201.62	\$ 128,893.11	\$ 155,873.50 \$	1,511,923.66
Consultants				\$ 63,222.12	\$ 75,639.89	\$ 102,436.94	\$ 131,332.11	\$ 65,798.68	\$ 365,165.10	\$ 256,707.26	\$ 42,368.17	\$ 97,564.78	\$ 147,347.59 \$	1,347,582.63
Contractors					\$ 135.53		\$ 2,077.22	\$ 35,114.22	\$ 5,706.56	\$ 4,338.31	\$ 2,328.79	\$ 4,261.41	\$ 3,577.37 \$	57,539.40
Employee Expenses					\$ 1,493.30	\$ 2,560.13	\$ 2,246.36	\$ 3,196.77	\$ 28,086.49	\$ 9,584.82	\$ 4,204.84	\$ 3,344.28	\$ 3,878.90 \$	58,595.87
Materials					\$ 394.92	\$ 259.52	\$ 151.71	\$ 634.28	\$ 5,998.99	\$ 1,011.30	\$ 413.73	\$ 491.70	\$ 73.54 \$	9,429.70
Other Expenses					\$ 5.01	\$ 125.21	\$ 1,130.21	\$ 1,545.31	\$ 9,474.67	\$ 1,262.31	\$ 884.12	\$ 23,229.91	\$ 996.11 \$	38,652.86
Transportation						* *******	\$ 1.61	* ***	\$ 116.15	\$ 2.42	\$ 1.98	\$ 1.04	* <i>***</i> *****	123.20
National Grid USA Parent	\$ 2	5,633.57	\$ 146,435.91	\$ 654,872.21	\$ 293,251.74	\$ 106,842.44	\$ 3,055.85	\$ 51,349.96	\$ (1,438,252.08)	\$ 18,086.57	\$ (1,338.21)	\$ 23,683.81	\$ 162,696.86 \$	46,318.63
Consultants			\$ 10,070.94	\$ 5/5,833.37	\$ 138,715.40	\$ 51,227.20	¢ 105.02	\$ 12,3/2./3	\$ (9//,4/4.02)	¢ 2.046.00	e 1.057.c0	e 14.424.01	\$ 100.00 f	(189,254.38)
Contractors	e 1	0.217.05	5 6,410.00	\$ 1,/59./2	\$ 964.89	\$ 15,747.59	\$ 105.82	\$ 10,612.15	\$ 9,207.48	\$ 3,946.22	\$ 1,057.60	\$ 14,436.01	5 100.98 3	64,548.46
Employee Expenses	\$ 1 ¢	9,317.85	5 18,109.22	\$ 60,588.80	\$ 138,352.73	\$ 39,033.31	\$ 2,950.03	\$ 27,655.24	\$ (318,264.57) © (70,212.00)	\$ 7,259.71		\$ 3,854.62	\$ 12,421.45 \$	11,876.37
Materials	\$	2,9/1.15	5 52,050.64	\$ 6,687.04	\$ 8,260.86	¢ 202.47	e.	¢ 711.04	\$ (70,213.99)	¢ 6000.64	e (2.205.01)	e 5 202 10	\$ 150 174 45 6	(244.30)
Other Expenses	\$	3,182.60	\$ 58,902.70	\$ 9,772.65	\$ 6,686.24	\$ 223.47	s -	\$ /11.84	\$ (79,939.48)	\$ 0,880.04	\$ (2,395.81)	\$ 5,393.18	\$ 150,174.45 \$	159,592.48
Transportation	\$	161.97	\$ 892.41	\$ 230.63	\$ 2/1.62	\$ 10.87	* 220 005 ac	¢ 150.420.52	\$ (1,567.50)	¢ 450.150.40	¢ 03.010.00	¢ 010 (00 00 0	¢ 057.140.47 é	(0.00)
Nagara Monawk Power Corp				₱ 106,138.08	a 130,391.08	T 10,910.29 S 171.072.41	229,895.26	a 1/8,459.73	ö 95,948.25 612.042.71	→ 458,158.69 ↓ → 420,062,22 ↓ → ↓ →	32,818.88 60.905.94		257,148.46 \$ 0 242.082.04	2,528,492.95
Consultants				\$ 106,138.08	5 120,985.18 6 227.52	\$ 1/1,9/2.41	5 220,481.98 6 2.497.26	5 110,465.64 6 59.050.10	5 013,043.71 6 0.590.24	5 450,965.55 6 7.282.21	5 09,895.84 6 2,841.86	5 100,955.08 C	5 243,083.04 3 6 5 001.69 6	2,255,982.29
Contractors Employee Engeneer					3 227.53 8 2.506.06	¢ 4 207 08	5 5,487.20 6 2,771.21	5 58,950.19 6 5.266.77	5 9,580.24 6 47.151.04	5 /,285.21 6 16.001.11	5 5,841.80 6 6 026 82	5 /,030.15 C	5 5,901.68 3	96,302.12
Matarials					a 2,300.90	a 4,297.98	φ 3,771.21 \$ 257.60	a 3,300.//	s 47,151.94 s 10.071.17	\$ 10,091.11 \$ 1,607.70	0,930.83 6 692.54	a 3,317.14 3	ې ۱۵۱۵۲ و. ۱۵۱۵۱ و	96,039.00
And Andrew Andre					o 002.99	φ 455.09 \$ 210.21	a 204.09 6 1.007.41	s 1,004.84	s 10,0/1.1/	a 1,09/./9 s 2,110.10	o 062.34 e 1.459.55	011.18 011.18	9 121.31 3 9 1642.21 9	13,002.22
Other Expenses					a 6.41	φ 210.21	φ 1,097.41	φ 2,394.28	φ 10,900.19	φ 2,119.19	a 1,436.55	a 30,322.97 3	φ 1,045.51 3	04,100.52

1,897.41 \$

2.70

1,485,752.92 \$

25,633.57 \$ 146,435.91 \$ 1,508,072.21 \$ 1,341,411.54 \$ 1,528,999.13 \$ 1,851,088.52 \$

Request:

Referring to the testimony of Little, pp. 107-108, please explain (i) why allowing the Company to recover \$1.5 million of one-time operating (non-capital) costs already incurred prior to the filing of this rate case (without prior regulatory approval) would not constitute retroactive ratemaking, (ii) why the deferral would benefit Rhode Island ratepayers and, (iii) why this cost should not simply be treated as a one-time expense incurred in that year that is not eligible for recovery.

Response:

As discussed in the Company's responses to Division 3-62 and Division 3-63, 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. As further discussed in the Company's response to Division 3-58, the \$1.5 million of incremental costs incurred in the test year are not eligible to be capitalized pursuant to generally accepted accounting principles, but these costs are no less critical to the success of the Gas Business Enablement Program than capitalized costs of the program, or costs incurred after the test year. 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 or whether the costs were incurred during the test year or after it.

The Company has requested that the Public Utilities Commission (PUC) approve the creation of a regulatory asset for the deferral of Gas Business Enablement Program costs that are not eligible to be capitalized per the accounting rules, including the \$1.5 million of test year program costs. Approval by the PUC to defer the \$1.5 million of test year costs does not and cannot constitute retroactive ratemaking. Retroactive ratemaking occurs where retrospective rate recovery is allowed in contradiction of an approved rate tariff. The Company's currently effective rate tariffs are recovering, among other items, *normally recurring* operating expenses, as determined in the Company's last rate case. The cost that the Company is seeking to defer is differentiated by the fact that it is a *non-recurring*, material expense incurred in the test year and not anticipated or accounted for in current base distribution rates. Therefore, in this case, the Company is not seeking retroactive recovery of operating expenses already included in rates. Instead, the Company is seeking permission to defer all Gas Business Enablement Program costs that are not eligible for capitalization for recovery through rates on an amortized basis, which is entirely consistent with typical ratemaking practice.

It should also be noted that there are several examples of costs that are incurred first and requested for recovery in a subsequent rate proceeding. For example, costs that are capitalized in the normal course of business are frequently incurred prior to the actual request for recovery through rates.¹ Another example is the financing of new debt or the costs of retiring existing debt. An example of a cost of a special program in which costs were incurred first and subsequently approved by the PUC to be recovered from customers was the cost of a 2003 voluntary early retirement program that were approved to be recovered over the subsequent 10 years in Docket No. 3617. None of these examples are considered to be retroactive ratemaking. Therefore, the \$1.5 million of Gas Business Enablement non-capitalized costs incurred during the test year are no different than the types of costs that are incurred first and later approved to be recovered from customers in rates.

¹ Prior to the establishment of the Infrastructure, Safety, and Reliability (ISR) program effective April 1, 2011, the vast majority of the Company's utility plant in service was incurred before it was approved by the PUC to be included in the Company's rate base.

Request:

Referring to the testimony of Johnston & Connolly, p. 10 (lines 4-5), please explain what impact and relevancy, if any, the "different timelines for rate cases and rate-recovery mechanisms in each jurisdiction" had on the timing and sequencing of the phases for the Gas Enablement Program.

Response:

The roadmap and timing of the Gas Business Enablement Program were developed based on the following three principles: (1) reducing operational risk and increasing the Company's ability to serve customers safely and reliably by replacing aging existing systems as soon as reasonably practical; (2) reducing implementation risk to ongoing operations by implementing capabilities in manageable segments; and (3) implementing functionality with the greatest value within the quickest timeframe to bring benefits to customers at the earliest timeframe possible. After satisfying the first two principles, National Grid looked for opportunities to accelerate value-adding capabilities in the roadmap where possible.

The reference to rate-case timing and rate-recovery mechanisms is intended only to explain that National Grid is pursuing cost recovery in each state jurisdiction on a path that coincides with the jurisdictional procedures for cost recovery. Given that these procedures differ between Rhode Island, New York, and Massachusetts, National Grid expects that cost recovery will differ accordingly.

Request:

Referring to the testimony of Johnston & Connolly, p. 10 (lines 15-19) stating: "Implementation of the systems within the Gas Business Enablement Program on an integrated basis in all three jurisdictions to establish the three major capabilities will cost customers less than implementing the same systems one at a time by jurisdiction because it will avoid costs that would arise with work completed on different timelines, with potentially different vendors." Please explain how beginning solely in Rhode Island is consistent with the statement that the systems will cost less if implemented on an integrated basis. Please explain how this sequence will result in lower implementation costs to Rhode Island. Please quantify the savings to Rhode Island from sequencing the project in this manner.

Response:

The cost efficiencies that National Grid has identified in relation to the implementation of the Gas Business Enablement Program are two-fold. First, cost efficiencies will arise due to the decision to implement an integrated, enterprise solution rather than constructing standalone systems in each jurisdiction. The enterprise solution allows for economy of costs in relation to the design, build, and testing of a single system across all three jurisdictions in which National Grid has gas and electric distribution operations. More specifically, development of the enterprise solution on an integrated basis allows for reduced overall cost because National Grid achieves economies of scale by entering into single contracts with system integrators and software vendors that serve all three jurisdictions, rather than separate contracts for each jurisdiction. This integrated approach to program implementation is designed to provide significant efficiency improvements and customer benefits that otherwise would cost substantially more (and potentially be cost-prohibitive) if implemented in a single jurisdiction such as Rhode Island.

Second, there are cost efficiencies to be gained by implementing the enterprise solution on a phased basis rather than all at one time. Based on lessons learned from past projects, project cost control will be aided by undertaking carefully choreographed efforts to complete implementation in each state with a singular focus. To accomplish this in a single phase (rather than a sequential phase), National Grid would need to establish and utilize separate teams in each jurisdiction involving multiple project partners, rather than a single set of project partners that would be able to focus on implementation in each state and assure continuity and quality control across the enterprise. This approach would add both cost and risk to the implementation effort.

National Grid's experience is that implementation risk can be lowered by a phased approach by starting with the least complex component of the overall project. Implementation of the solution on a smaller-scale basis before implementing it in the other two jurisdictions will allow National

Grid to make sure that Rhode Island implementation is completed effectively and expeditiously to *avoid* costs that could be necessitated by an overly broad implementation effort that diverts resources in too many directions at once or requires a much larger-scale of project implementation resources.

As discussed in the pre-filed direct testimony of Company Witnesses Anthony H. Johnston and Christopher J. Connolly, the Rhode Island jurisdiction is well-suited to be the first jurisdiction in which to start implementation because of the jurisdictional characteristics, such as its smaller geography and manageable size; the Company's relatively high reliance on paper processes; and the dual operation of both gas and electric businesses. Customers will benefit from National Grid's singular focus on Rhode Island, which will increase the likelihood of a successful deployment in Rhode Island, thereby mitigating the risk of subsequent expensive stabilization and recovery activities for Rhode Island customers.

In that regard, it is important to note that costs of the entire project are being allocated to the operating companies that will receive benefits from the project using cost causal allocation codes. Please see the Company's response to Division 3-61 and Attachment DIV 3-61 for a description of how the costs of the project will be allocated and an analysis showing how the \$478.3 million of projected Gas Business Enablement investment will be charged to each jurisdiction. Therefore, the cost to Rhode Island customers of this project would not be different if Rhode Island was the first jurisdiction to deploy Gas Business Enablement or the last. National Grid's main, driving objective is to keep total project costs as low as possible. The phased implementation approach is critical to this effort.

Lastly, starting implementation in Rhode Island is beneficial to Rhode Island customers because it will allow those customers to begin experiencing the benefits sooner than the other jurisdictions. Although there are no quantifiable cost savings that are directly attributable to the particular sequencing of the phased implementation, National Grid has performed a high level analysis of the incremental costs of creating and implementing independent solutions for each jurisdiction showing that total enterprise program delivery costs would increase by approximately 50 percent (please see the Company's response to Division 3-64).

Request:

Referring to the testimony of Johnston & Connolly, pp. 35-36, when the first phase of the Gas Business Enablement Program is implemented in Rhode Island, does the Company expect to gain knowledge and experience with the new initiative that will help National Grid implement more efficiently in Massachusetts and New York at the later dates? If so, please explain. If not, explain why not.

Response:

Please see the Company's response to DIV 3-49 for a discussion of the cost efficiencies inherent in the implementation plan that National Grid has developed.

In terms of implementation knowledge and experience, the lessons National Grid will learn from the various stages and phases of the implementation of the Gas Business Enablement Program will be reciprocal and mutually beneficial across all three jurisdictions. National Grid will learn from the Rhode Island implementation and apply what it learns as to deployment efforts in the other jurisdictions. In turn, as National Grid expands the implementation and deploys functionality and broader capabilities in Massachusetts and New York, it will leverage what it learns in those states to improve the operation in Rhode Island.

It is important to note that the sequencing of the phased implementation by jurisdiction will not have a negative impact on the cost to customers in Rhode Island. Total project costs will be allocated to the operating companies receiving benefits from the project using cost-causation allocation codes. Please see the Company's response to Division 3-61 and Attachment DIV 3-61 for a description of how the costs of the project will be allocated and an analysis showing how the \$478.3 million of projected GBE investment will be charged to each jurisdiction. The cost to Rhode Island customers of this project would not be different if it were the first jurisdiction to deploy GBE or the last jurisdiction to deploy it.

Request:

Referring to the testimony of Johnston & Connolly, pp. 24-31, regarding the "well-defined management structure" and Schedule GBE-3, please explain why there has been no representation of any officers or high-level operations personnel from Rhode Island involved in the Gas Business Enablement Government Framework of the project. Please explain how the interests of Rhode Island customers has been and will be protected in this management structure.

Response:

There has been, and will continue to be, significant involvement in, and oversight of, the Gas Business Enablement Program by Rhode Island personnel, to ensure that the needs of Rhode Island customers, and the employees who serve those customers, are met. Rhode Island directors, managers, supervisors, and front line employees have been actively involved in all aspects of the business design workshops to gather the business requirements for the new solution.

The Vice President for Rhode Island Field Operations and the Vice President for Rhode Island Customer Meter Services both sit on the Gas Business Enablement Design Authority, the key decision-making authority for the design of the solution and implementation plan for the program.

The President of the Rhode Island jurisdiction sits on the Senior Executive Sanctioning Committee, which is responsible for ongoing sanction of the program.

Request:

Referring to the testimony of Johnston & Connolly, p. 25, the testimony references a "rigorous procurement process to identify third party partners,"

- a. Please describe the process used to decide who to hire as third-party partners for the project and how much would be paid for the services.
- b. If there were competitive bidding processes, please describe the processes and summarize the outcomes. If there was no competitive bidding process, please explain why not.
- c. Please provide an estimate of how much of the multi-year Gas Business Enablement program costs will be charges from these third-party partners.

Response:

a. National Grid conducted separate competitive bidding processes to assess the technical competencies and commercial proposals of the potential vendors to duly select the best value partners to support National Grid in the two distinct phases of the Gas Business Enablement Program:

The first phase was the Strategic Assessment Phase. This phase included a high level strategic assessment to determine the Gas Business Enablement solution, the required initiatives, plan a deliverable roadmap, and build the business case. In this phase, National Grid sought two partners: (1) a Strategic Assessment Partner to complete the assessment, and (2) a Business Assurance partner to provide independent oversight of the assessment to provide National Grid with additional assurance that the business design/roadmap developed for Gas Business Enablement program is "fit-for-purpose", and meets the Company's requirements for business functionality, deliverability (including risk management), and that it was estimated reasonably.

The second phase was the Delivery Phase. This phase included the detailed design and implementation work. The five-year roadmap that resulted from the Strategic Assessment phase was used as the scope for the procurement event for the second phase. In this phase, National Grid sought: (1) one or more delivery partners to support the direct implementation of the program, and (2) a Value Assurance partner to provide an independent Quality Assurance role during implementation to provide assurance on the on-going implementation of the program.

b. Strategic Assessment Phase

National Grid conducted Competitive Request for Proposal (RFP) processes to select the Strategic Assessment partner and Business Assurance partner for this first phase of program activities. This process included written vendor submissions, vendor presentations with feedback, and final proposals. National Grid issued the Strategic Assessment RFP to ten vendors; seven vendors met the minimum technical threshold required. After the first stage evaluation, National Grid selected four vendors to enter the final round of the RFP process (vendor presentation, final proposal submission). Accenture was selected as the Strategic Assessment partner to assist the Company with developing the high-level program design, roadmap, and business case. In support of these efforts, Accenture's provision of service included consulting on the current state/gap analysis, future state technical design, implementation approach, change analysis/strategy, risk analysis, and initial work packet of services required for the future program system integrator role. The Business Assurance RFP was issued to ten vendors, and six vendors met the minimum technical threshold. Upon final evaluation, PriceWaterhouseCooper was selected as the Business Assurance partner. PriceWaterhouseCooper's role included reviewing and analyzing business/technology and project design alignment; market and best practices; design flexibility and process; implementation strategy; integration plan; design process; and risk analysis. This phase of the Program was completed in March 2017.

Delivery Phase

The contracts in the Delivery phase were going to be significantly larger and longer than for the Strategic Assessment phase. Consequently, National Grid contracted external procurement advice from AT Kearney and external legal advice from Covingtons to help secure the best value for National Grid and its customers. National Grid elected to conduct a competitive sourcing strategy known as an agile sourcing process to select delivery partners for the Program. The key benefits of this agile sourcing strategy included allowing the National Grid team to spend more time with the most promising potential vendors to ensure they understood National Grid's requirements, enabling National Grid to improve its solution based on ideas and feedback from the different vendors, and decreasing the overall time from initiation of the Request for Information (RFI) to contracting and mobilization of the partners. The agile sourcing process consisted of a pre-defined four-step stage gate process to evaluate and down-select vendors with inclusion and alignment with strategic Company business stakeholders. A total of 21 vendors were invited to submit proposals via the agile sourcing RFI process. It also positioned the Program to make an informed decision on selected partners through the collaborative approach of joint solutioning to enhance understanding of scope, deliverables and assessing culture of partnership to reduce the risk of delivery of the Program. Through this competitive agile sourcing process, National Grid was able to select the strongest partners, secure fixed-price commercial arrangements within the

original estimates and include risk sharing arrangements aligned to successful delivery of the program.

Following completion of the agile sourcing process, National Grid selected two System Integrator delivery partners. This reduced the risk to National Grid by bringing in multiple industry leading partners to support the program and having their scope aligned to the strengths they demonstrated through the process. PriceWaterhouseCooper was selected in a system integrator role with responsibility for delivery of the Maximo work and asset management software application, ESRI GIS software application and key enabling functions including Technology, Change and Portfolio Management. Accenture was selected in a system integrator role with responsibility for delivery of the Salesforce customer contact center, scheduling, dispatch and field mobile software applications. Kotter International was selected to be responsible for Change Leadership support for the Program working closely with the system integrators to prepare the business for delivery of the Gas Business Enablement solution. Furthermore, an additional competitive RFP process was conducted to determine an industry leading partner to provide Value Assurance services during the Program timeline. PA Consulting was selected for the Value Assurance partner role to provide independent Quality Assurance services to National Grid. This phase of the Program began in July, 2017.

c. Estimated costs for third-party partners for Program Delivery Phase

National Grid - Gas Business Enablement Program Forecast: Systems Integrators (Accenture, PwC, Kotter, PA Consulting) – Fiscal Years 2018-2023

SI	Fiscal Years 2018-2023
Accenture	\$56.31
PwC	\$196.78
PA Consulting	\$3.01
Kotter	\$9.99
Total	\$266.10

All values in \$US Millions