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Tags & Notes

nationalgrid

Investment Request Summary - IS US

FISCAL YEAR 2018

INV ID: 4564

Project Name: **US SAP: Enhancement Pack 9 Upgrade**

Program:

Sponsor: Doneen Hobbs

Title: VP US Shared Services

Relationship Manager: Joel Semel

Title: Relationship Manager

Prog Delivery Manager: Samir Parikh

Title: Director, Portfolio SAP Enterprise

Paper Author: Ella Weisbord

Title: Business Consultant

IS Roadmap Category: Enterprise SAP

Business Area: **US F,SS&C**

Portfolio: **Other**

☐ In-Flight Project?

Invest Classification: Medium

Category: Policy Driven

Primary Policy Driver: Reliability

Region: **US**

☐ Growth Playbook Project?
☐ Shaping Our Future Project?
☐ Energy Efficiency Project?

Project Description: The context for the project with background information

The SAP Enhancement pack upgrade is an investment to provide for the upgrade of the core SAP application every two years (biennially) excluding the upgrade work associated with the annual HR service pack which is accounted for under a separate mandatory annual investment. The project would apply the latest agreed SAP service packs for ECC, SRM, PI, Portal, BPC and SolMan 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. The investment would only include the upgrade packs (non HR) which are supplied by the SAP and would exclude any discretionary enhancements as part of this upgrade or any upgrades associated with ancillary USFP systems (ex. PowerPlan, uPerform, OpenText, SABRIX). The investment would also not account for any upgrade work which may be required on the BI/BW SAP platform. This biennial patching/upgrade strategy is to ensure that National Grid applies the latest service packs every two year in order to ensure proper system operation and application maintenance support.

Project Rationale: Highlight business challenge, capability or process the project addresses

Periodic upgrades and solution updates to maintain currency and supportability

Project Scope: Explain what is in scope and what is not in scope for the project

Included in scope:

- Upgrade core SAP application . The project would apply the latest agreed SAP service packs for ECC, SRM, PI, Portal, BPC and SolMan 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

- Automated Testing and Autometed Performance Testing (including LoadRunner licenses)

Excluded from scope: upgrade work associated with annual HR Service pack

Project Dependencies: Identify any core program or project dependencies, please include INVP numbers if known

INVP4348 - US SAP Infrastructure Landscape

In addition, the unknown impact from Enterprise Wide Program:

- Shaping The Future (Supply Chain Transformation Program)

- Gas Enablement

- HR Simplification Program

Basic Project Assumptions:

RTB cost is based on assumption that additional functionality can be added and would require Application Maintenance support

Indicative Project Costs by Fiscal Year

(\$M)	Prior Years	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Total
CapEx		3.493	5.328							8.821
OpEx		2.427	0.592							3.019
Impact on RTB				0.178	0.178	0.178				0.534

Indicative Project Costs by Delivery Phase

(\$M)	Start-up	R & D	D & I	Closure	Total
CapEx		2.901	5.920		8.821

OpEx	1.184	1.243		.592	3.019
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Project Benefits - Type I only

(\$M)	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Total
Type I - CapEx									0.000
Type I - OpEx									0.000
Revenue Generation									0.000

Key Business Benefits:

Describe benefits, both financial and non-financial, and when those benefits will be delivered. Provide a clear & concise business case stating the investment drivers -why do we need to do something and why now? Explain any Regulatory considerations and how this initiative aligns with the US Business Strategy. More reliable procurement, vendor management, inventory management, general ledger, financial reporting, system monitoring, and interface integration,, closing and business reporting processes. More stable and reliable core SAP solution, reduced OSS messages and associated OSS note patches, opportunity for the elimination of custom code included in upgrade pack and faster SAP vendor resolution times for production problems and situations.

Investment Prioritization

Benefits	Impact	Weight	Score	Cost	Impact	Weight	Score
OpEx Annual Savings		10.3%	0	OpEx Cost	3.019	-24.4%	-2.196
CapEx Annual Savings		5.1%	0	CapEx Cost	8.821	-11.2%	-1
Revenue Generation (annual)		6.2%	0	RTB Efficiency	14.125	% -22.5%	-2.025
Financial Control	Low	6.2%	0.08	Union Labor Relations	does not apply	-9.8%	0
Soft Financial Benefits	Medium	3.8%	0.114	Dependencies	does not apply	-10.6%	0
Regulatory Impact	Medium	11.2%	0.336	Elapse Time Duration	Medium	-6.6%	-0.198
Process & Personal Safety	Low	19.4%	0.194	Change Management Effort	does not apply	-14.9%	0
Reliability	High	10.9%	0.981				
Customer & Community Responsiveness	does not apply	5.3%	0				
Employee Satisfaction	High	4.6%	0.414				
Mitigates a Corporate Risk Risk of not Doing	High= 40 or more	8.9%	0.801				
Jurisdictional Engagement	High	8.2%	1				
		Benefit Score:	3.64			Cost Score:	-5.43
		Overall Priority Score:	-1.787				

Investment Risk and Complexity

Project Risk Score:	42	Risk Score Description: Based on Risk Scoring GuidekineL Financial Impact Score: 6 (\$10-40M) / Likelihood of Failure: 7 (Likelihood score (50% chance within 2 years)
Project Complexity Score::	26	Project Complexity Score Description: Project Cost: 6 (>=\$5), Project Duration 1, Project Delivery 6, Process Impact 6, External impact 4, Dependencies 2, Innovation: 1

Key Risks Description:

Provide detail on project risks & mitigation strategy:

IS Project Dependencies

if you don't see a project in the drop-down please contact the Planning & Performance team.

Benefiting Operating Companies:

Check all that apply

IS Projects:

4564 - US SAP: Enhancement Pack 9 Upgrade

1. Has a Upstream

dependency on IS Project;

4348 - US SAP Application Asset Health

Select All Companies

Select All Gas

Select All

Clear All Companies

Select All Electric

Select All

Gen

2. Has a dependency on IS Project;

3. Has a dependency on IS Project;

4. Has a dependency on IS Project;

5. Has a dependency on IS Project;

6 Has a dependency on IS Project;

☒ National Grid USA Parent
 ☒ KeySpan Energy Development Corporation
 ☒ KeySpan Services Inc.
 ☒ KeySpan Energy Corp
 ☒ KeySpan Energy Delivery New York
 ☒ KeySpan Energy Delivery Long Island
 ☒ KeySpan Generation LLC (PSA)
 ☒ KeySpan Glenwood Energy Center
 ☒ KeySpan Port Jefferson Energy Center
 ☒ KeySpan Energy Trading Svc LLC
 ☒ Niagara Mohawk Power Corp- Electric Distribution
 ☒ Niagara Mohawk Power Corp - Gas
 ☒ Niagara Mohawk Power Corp - Transmission
 ☒ Massachusetts Electric Company
 ☒ Massachusetts Electric Company - Transmission
 ☒ Nantucket Electric Company
 ☒ Boston Gas Company
 ☒ Colonial Gas Company
 ☒ Narragansett Gas Company
 ☒ Narragansett Electric Company
 ☒ Narragansett Electric Company - Transmission
 ☒ New England Power Company - Transmission
 ☒ New England Hydro - Trans Corp
 ☒ New England Electric Trans Corp
 ☒ NG LNG LP Regulated Entity

Business Initiative Dependencies

IS Projects: 4564 - US SAP: Enhancement Pack 9 Upgrade

1. Has a dependency on Biz Initiative;

2. Has a dependency on Biz Initiative;

3. Has a dependency on Biz Initiative;

4. Has a dependency on Biz Initiative;

Project Relationships

☐ Minor Works
 Project Relationship: Standalone Project

Related Projects:

Enabling IS Capabilities check all that apply

☐ Enterprise Content Management (ECM)
 ☐ Enterprise Mobility
 ☐ Comprehensive Integration Services (CIS)
 ☐ Reporting and Analytics
 ☐ Hybrid Cloud
 ☐ Networks
 ☐ Next Gen Workplace

Key Milestone Dates: Select the 1st, 15th or last day of the month

Begin

Start-up

April, 2017

Begin

Requirements & Deign

Begin

Development & Implementation

Begin

User Acceptance Testing

Go live

March, 2019

Project Completion

Project Closure

Business Resource Estimates: # of Full Time Equivalents

Start-up

0

Requirements & Deign

0

Develop & Implement

0

Business Resources UAT

0

Go live Readiness

0

Post Go live Support

0

Resourcing Strategy:

Attached Supporting Documents

Recommendation Sign-off

Role	Name	Title	Date
Business Project Sponsor	Doneen Hobbs	VP US Shared Services	
Business Relationship Manager	Joel Semel	IS Business Relationship Manager	
IS Program Delivery Manager	Samir Parikh	IS Program Delivery Manager	

US Sanction Paper

Title:	US Mobile Device – FY18	Sanction Paper #:	USSC-17-198
Project #:	INVP 4395	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	April 12, 2017
Author:	Rashmi Kadam	Sponsor:	John Bruckner, SVP Operations, and Engineering
Utility Service:	IS	Project Manager:	Sally Seltzer

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of INVP 4395 in the amount \$5.156M with a tolerance of +/- 10% for the purposes of Full Project Implementation.

This sanction amount is \$5.156M broken down into:

\$4.915M Capex
\$0.241M Opex
\$0.000M Removal

1.2 Project Summary

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.

Mobile devices are mainly ruggedized computers – Panasonic Toughbooks and iTronix devices used in the field to access work management applications. 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.

US Sanction Paper

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
4395	Project Type	Mobile Device Refresh - FY18	5.156
Total			5.156

1.4 Associated Projects

Project Number	Project Title	Estimate Amount (\$M)
4671	Mobile Device Refresh - FY17	4.657
Total		4.657

1.5 Prior Sanctioning History

N/A

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
Apr 2018	Closure

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	<p>This project is a policy-driven initiative in support of compliance with National Grid's Reliability and Safety</p> <ol style="list-style-type: none"> 1. Increase availability of working mobile devices in the field 2. Access to applications to perform work efficiently – to maintain productivity 3. Access to process and policy documents resulting in safer work execution 4. Higher employee satisfaction



US Sanction Paper

1.8 Asset Management Risk Score

Asset Management Risk Score: 45

Primary Risk Score Driver: (Policy Driven Projects Only)

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

1.9 Complexity Level

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

Complexity Score: 22

1.10 Process Hazard Assessment

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

☐ Yes ☒ No

1.11 Business Plan

Business Plan Name & Period	The project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY18-22	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input checked="" type="radio"/> Under <input type="radio"/> NA	\$0.594M Under

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

N/A

US Sanction Paper

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
CapEx	0.000	4.915	0.000	0.000	0.000	0.000	0.000	4.915
OpEx	0.000	0.241	0.000	0.000	0.000	0.000	0.000	0.241
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	5.156	0.000	0.000	0.000	0.000	0.000	5.156

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	Mar 2017
Full Sanction	Apr 2017
Begin Requirements and Design	Apr 2017
Begin Development and Implementation	Apr 2017
Project Complete	Mar 2018
Project Closure Sanction	Apr 2018

1.15 Resources, Operations and Procurement

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



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Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green

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

N/A

1.17 Climate Change

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

1.18 List References

N/A

US Sanction Paper

2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on April 12, 2017

- (a) APPROVED this paper and the investment of \$5.156M and a tolerance of +/-10%.
- (b) APPROVED the RTB impact of \$0.107M (per annum) for 5 years
- (c) NOTED that Sally Seltzer has the approved financial delegation.

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

Christopher Kelly
Senior Vice President, Electric Process & Engineering
US Sanctioning Committee Co – Chair Person

US Sanction Paper

3 Sanction Paper Detail

Title:	Mobile Device Refresh – FY 18	Sanction Paper #:	
Project #:	INVP 4395	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	April 12, 2017
Author:	Rashmi Kadam	Sponsor:	John Bruckner, SVP Operations, and Engineering
Utility Service:	IS	Project Manager:	Sally Seltzer

3.1 Background

A large portion of National Grid truck-mounted mobile devices (i.e. Panasonic tough books and iTronix) in the US are more than 5 years old. The challenges that mobile crews face while using these old devices are related to:

*** Replacement Parts and Spare Devices Not Available**

The devices fail frequently due to age and the normal wear and tear of operating in a harsh environment. Additionally, the hardware vendor General Dynamics (previously called iTronix) has stopped manufacturing most widely used a mobile device at National Grid. Therefore, parts are not available to fix failed devices, leading to the devices being fully replaced when broken.

*** Underpowered Devices**

Newer versions of some of the applications (such as ArcFM Viewer) need more processing power and disk space than what is available on the existing devices. Therefore, these types of applications do not work well on the old devices.

*** Slow Network Hardware**

Wireless networks have doubled in speed approximately every two years over the last 7-10 years. The devices currently in the field are unable to take advantage of these improved speeds since they only use the old Verizon air/Wi-Fi cards that were installed 7 years ago.

*** Obsolete Operating System**

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Over 800 of these ruggedized devices still run on the discontinued Windows XP operating system, which is no longer supported by Microsoft. Therefore, Microsoft is no longer issuing security patches, bug fixes, etc. for the operating system used on these devices. This situation places National Grid and these devices at increased risk of exposure to viruses and security intrusions.

***Applications Not Upgradable**

The next versions of the applications that need to be run on these mobile devices are not available for Windows XP. It is imperative that Windows 7 devices are deployed to the field.

In summary, current US mobile technology challenges the ability of the company to manage mobile workflow. Key issues are:

- Shortage of usable mobile devices
- No spare parts to perform minor repairs
- Limited pool of working spare devices to swap out for non-functional ones
- Slow devices with poor network connectivity, due to older hardware
- Inefficient work environment

At this time, mobile workers in US Gas Operations are at a critical stage in terms of the number of usable devices. To address this need, this project will purchase 200 new mobile devices. Additionally, the project will deploy 750 mobile devices secured as part of Technology Improvement Program initiative – INVP 4671.

3.2 Drivers

The key drivers for this investment are:

- The truck-mounted ruggedized mobile devices will ensure that field technicians have the equipment and set of applications required to perform work in a safe and efficient manner.
- Reduce broken devices downtime by deploying newer devices

3.3 Project Description

This investment is to implement 750 field devices and purchase additional 200 mobile devices and related mounting accessories.

3.4 Benefits Summary

The following are the key benefits of implementing this project:

- **Efficiency / Productivity**

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Increased reliability and/or efficiencies gained by the availability of newer, faster, and more reliable devices

- **More Field Devices**

There will be more available usable mobile devices, due to:

- Purchase of additional units
- Creation of a pool of additional devices
- Replenishment of part of the spare pool with older usable devices

- **Speed / Connectivity**

Faster devices with better connectivity through the use of the latest modem technology

- **Facilitate Compliance**

Comply with regulatory requirements by:

- Obtaining mobile devices with the latest National Grid Standards & Policies available to the crews
- Providing ability to perform and report work in a timely fashion

Comply with National Grid Information Services (IS) Policies by:

- Ensuring that devices are compliant with Digital Risk & Security (DR&S) policies
- Manual tracking of assets

3.5 Business and Customer Issues

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

3.6 Alternatives

Alternative 1: Do Nothing

Rejected - This is not a viable option, since most of the field devices have a high failure rate, and operating without doing anything is a potential risk to providing safe and efficient field services.

Alternative 2: Defer

Rejected - This option is not recommended due to the inefficiencies currently being experienced by the field workers. The current state of the field devices or lack of available field devices does not allow a recommendation to continue operating as-is.

3.7 Safety, Environmental and Project Planning Issues

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

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3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	There is a risk that CSC does not have resources to provision the Devices at the pace that National Grid desires for this project	3	2	5	6	15	Mitigate	To have frequent status update meetings with the vendor to stay updated on their progress	The schedule is impacted and the Business does not receive the benefit of a replacement device as soon as we would like. Could endure additional cost by the third party vendor.	The project team would attempt to bring in additional resources to supplement where CSC could not provide adequate coverage.
2	There is a risk that the installing vendor does not meet the schedule required	1	1	3	1	3	Mitigate	We will work with the vendor to create a very achievable schedule with some buffer to account for any delays.	If the delay exceeds the additional time allocated then the overall schedule would be impacted.	The project team would work with the vendor to mitigate the delay with additional resources.
3	There is a chance that the Business does not make the vehicles and keys available when required for the installers according to the schedule.	2	2	2	4	4	Mitigate	To have frequent communication with the Business to keep them informed of the schedule.	The schedule could be impacted and the Business does not receive the benefit of a replacement device as soon as we would like. Could endure additional cost by the third party vendor.	The project team would escalate to the Business upper management as soon as any issues are detected to keep delays to a minimum.

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

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

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

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3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

					Current Planning Horizon						
Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total
					2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
4395	Mobile Device Refresh - FY18	+/- 10%	CapEx	0.000	4.915	0.000	0.000	0.000	0.000	0.000	4.915
			OpEx	0.000	0.241	0.000	0.000	0.000	0.000	0.241	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	0.000	5.156	0.000	0.000	0.000	0.000	5.156	
Total Project Sanction			CapEx	0.000	4.915	0.000	0.000	0.000	0.000	0.000	4.915
			OpEx	0.000	0.241	0.000	0.000	0.000	0.000	0.000	0.241
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	5.156	0.000	0.000	0.000	0.000	5.156	

3.11.2 Project Budget Summary Table

	Prior Yrs	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
\$M	(Actual)	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
CapEx	0.000	5.000	0.000	0.000	0.000	0.000	0.000	5.000
OpEx	0.000	0.750	0.000	0.000	0.000	0.000	0.000	0.750
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	5.750	0.000	0.000	0.000	0.000	0.000	5.750

Variance (Business Plan-Project Estimate)

	Prior Yrs	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
\$M	(Actual)	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
CapEx	0.000	0.085	0.000	0.000	0.000	0.000	0.000	0.085
OpEx	0.000	0.509	0.000	0.000	0.000	0.000	0.000	0.509
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.594	0.000	0.000	0.000	0.000	0.000	0.594

3.11.3 Cost Assumptions

This estimate was developed in 2017 using the Standard IS Estimating Methodology. The accuracy level of estimate for each project is identified in Table 3.11.1.

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3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

N/A

3.11.4.2 NPV Assumptions and Calculations

N/A

3.11.5 Additional Impacts

N/A

3.12 Statements of Support

3.12.1 Supporters

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

Role	Individual's Name
Business Executive Sponsor	John Bruckner
IS Head of Program Delivery Management (PDM)	Deb Rollins
IS Business Relationship Manager	Richard Sheer
IS Program Delivery Manager	Sally Seltzer
IS Finance Management	Chip Benson
IS Regulatory	Daniel DeMauro
IS Digital Risk & Security (DR&S)	Elaine Wilson
IS Service Delivery	Brian Detota
IS Enterprise Architecture	Svetlana Lyba

US Sanction Paper

3.12.2 Reviewers

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

Function	Individual	Area
Regulatory	Zschokke, Peter	All
Jurisdictional Delegate(s)	Harbaugh, Mark	Electric - NY
	Anand, Sonny	Electric - NE
	Hill, Terron	FERC
	Brown, Laurie	Gas - NY
	Currie, John	Gas - NE
Procurement	Curran, Art	All

4 Appendices

4.1 Sanction Request Breakdown by Project

N/A

4.2 Other Appendices

4.2.1 Project Cost Breakdown

Project Cost Breakdown			
Cost Category	sub-category	\$ (millions)	Name of Firm(s) providing
Personnel	NG Resources	0.517	
	SDC Time & Materials	0.345	
	SDC Fixed-Price	-	
	All other personnel	0.193	
	TOTAL Personnel Costs	1.055	
Hardware	Purchase	2.300	
	Lease	-	
Software		-	
Risk Margin		0.430	
Other		1.371	
TOTAL Costs		5.156	

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4.2.2 Benefiting Operating Companies

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp - Electric	Electric Distribution	NY
Niagara Mohawk Power Corp – Gas	Gas Distribution	NY
Massachusetts Electric Company	Electric Distribution	MA
Nantucket Electric Company	Electric Distribution	MA
Narragansett Gas Company	Gas Distribution	RI
Narragansett Electric Company	Electric Distribution	RI
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
Boston Gas Company	Gas Distribution	MA
Colonial Gas Company	Gas Distribution	MA

4.2.3 IS Ongoing Operational Costs (RTB)

Summary Analysis of RTB Costs							
All figures in \$ millions	Yr. 1 17/18	Yr. 2 18/19	Yr. 3 19/20	Yr. 4 20/21	Yr. 5 21/22	Yr. 6+	Total
Forecast of RTB Impact							
RTB if Status Quo Continues	-	-	-	-	-	-	-
RTB if Project is Implemented	0.085	0.107	0.107	0.107	0.222		0.628
Net change in RTB	0.085	0.107	0.107	0.107	0.222		0.628
RTB Variance Analysis (if Project is Implemented)							
Net Δ RTB funded by Plan(s)	-	-	-	-	-	-	-
Variance to Plan	0.085	0.107	0.107	0.107	0.222	-	0.628
Total RTB Costs - by Cost Type (if Project is Implemented)							
App.Sup. - SDC 1	-	-	-	-	-	-	-
App.Sup. - SDC 2	0.070	0.092	0.092	0.092	0.192		0.540
App.Sup. - other	-	-	-	-	-		-
SW maintenance	0.015	0.015	0.015	0.015	0.030		0.088
SaaS	-	-	-	-	-		-
HW support	-	-	-	-	-		-
Other: IS	-	-	-	-	(0.000)		(0.000)
All IS-related RTB (sub-Total)	0.085	0.107	0.107	0.107	0.222		0.628
Business Support (sub-Total)	-	-	-	-	-		-
Total RTB Costs	0.085	0.107	0.107	0.107	0.222		0.628

Note: U.S. Policy dictates that RTB Variance = forecasted Net Δ RTB - Net Δ RTB funded by Investme



Planning & Performance Management ▶ FY19 - Investment Request Summaries - IRSs: Virtualized Branches



I Like It



Tags & Notes

nationalgrid

Investment Request Summary - IS US

FISCAL YEAR 2019

INV ID:	4843	Project Name:	Virtualized Branches																																																		
Program:	Enterprise Services		IRS Status: ACTIVE																																																		
Sponsor:	Gilbert, John		Title: Global Head IS Service Delivery, Global IS																																																		
Relationship Manager:	Brian Detota		Title: IS Relationship Manager, Global IS																																																		
Progr Delivery Director:	Helen Smith		Title: Head of Programme Delivery																																																		
Paper Author:			Title:																																																		
			Business Area:	IS - Infrastructure		Portfolio: IS for IS																																															
<input type="checkbox"/> In-Flight Project?	Invest Classification:	Medium	Category:	Policy Driven		Primary Policy Driver:	Reliability	Region: US																																													
Strategic Program:	End to End Process (Primary):		Business Priority:		IS Focus Area:		Application Strategy:																																														
Tech Modernization			High		Future Proof Our Business		Enhance																																														
	End to End Process (Secondary):																																																				
<p>Project Description: The context for the project with background information 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.</p> <p>Project Rationale: Highlight business challenge, capability or process the project addresses The configuration and management of a wide area network is technically challenging and labor intensive. The migration to an SD-WAN which provides a technology where the control functions are separated from the data transport function simplifies these tasks and reduces support costs.</p> <p>The separation of the control and data transport functions enables the use of more cost effective hardware (eg generic compute devices) that can provide a virtual network function rather than having to purchase expensive proprietary hardware.</p> <p>SD-WAN provides dynamic routing capabilities that allow the network to identify the quality of the available network paths in real time and route application traffic in the most cost effective manner that meets required services levels.</p> <p>Project Scope: Explain what is in scope and what is not in scope for the project <u>In Scope:</u> The implementation of SD-WAN capability at National Grid business locations Enabling direct internet access at WAN locations <u>Out of Scope:</u> Local Area Network Services</p> <p>Project Dependencies: Identify any core program or project dependencies, please include INVP numbers if known This is dependent on INVP 4387 SD-WAN Core, automation, orchestration tools and pilot sites.</p> <p>Basic Project Assumptions: Without this project, National Grid will be unable to take advantage of the capabilities and benefits offered by software defined networking such as integrated policy management, application based routing, and use of the Internet for network transport.</p> <p>Staged rollout across national grid sites</p>																																																					
Indicative Project Costs by Fiscal Year <table border="1"> <thead> <tr> <th>(\$M)</th> <th>Prior Years</th> <th>FY 2019</th> <th>FY 2020</th> <th>FY 2021</th> <th>FY 2022</th> <th>FY 2023</th> <th>FY 2024</th> <th>FY 2025</th> <th>FY 2026</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>CapEx</td> <td></td> <td>0.300</td> <td>2.700</td> <td>1.800</td> <td>0.000</td> <td>0.000</td> <td></td> <td></td> <td></td> <td>4.800</td> </tr> <tr> <td>OpEx</td> <td></td> <td>0.050</td> <td>0.300</td> <td>0.150</td> <td>0.000</td> <td>0.000</td> <td></td> <td></td> <td></td> <td>0.500</td> </tr> <tr> <td>Impact on RTB</td> <td></td> <td>0.000</td> <td>-0.250</td> <td>-0.750</td> <td>-1.540</td> <td>-1.540</td> <td></td> <td></td> <td></td> <td>-4.080</td> </tr> </tbody> </table>										(\$M)	Prior Years	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Total	CapEx		0.300	2.700	1.800	0.000	0.000				4.800	OpEx		0.050	0.300	0.150	0.000	0.000				0.500	Impact on RTB		0.000	-0.250	-0.750	-1.540	-1.540				-4.080
(\$M)	Prior Years	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Total																																											
CapEx		0.300	2.700	1.800	0.000	0.000				4.800																																											
OpEx		0.050	0.300	0.150	0.000	0.000				0.500																																											
Impact on RTB		0.000	-0.250	-0.750	-1.540	-1.540				-4.080																																											

Indicative Project Costs by Delivery Phase

(\$M)	Start-up	R & D	D & I	Closure	Total
CapEx		0.200	3.500		3.700
OpEx	0.010	0.010	0.075	.005	0.100

Project Benefits - Type I only

(\$M)	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Total
Type I - CapEx									0.000
Type I - OpEx									0.000
Revenue Generation									0.000

Key Business Benefits:

Describe benefits, both financial and non-financial, and when those benefits will be delivered. Provide a clear & concise business case stating the investment drivers – why do we need to do something and why now? Explain any Regulatory considerations and how this initiative aligns with the US Business Strategy.

Investment Prioritization

Benefits	Impact	Weight	Score	Cost	Impact	Weight	Score
OpEx Annual Savings		10.3%	0	OpEx Cost	0.500	-24.4%	-2.196
CapEx Annual Savings		5.1%	0	CapEx Cost	4.800	-11.2%	-1
Revenue Generation (annual)		6.2%	0	RTB Efficiency	0.000	% -22.5%	0
Financial Control	Medium	6.2%	0.186	Union/Labor Relations	Low	-9.8%	0
Soft Financial Benefits	Medium	3.8%	0.114	Dependencies	Medium	-10.6%	-0.318
Regulatory Impact	Low	11.2%	0.112	Elastice Time Duration	Medium	-6.6%	-0.198
Process & Personal Safety	Low	19.4%	0.194	Change Management Effort	Medium	-14.9%	-0.447
Reliability	Medium	10.9%	0.327				
Customer & Community Responsiveness	Medium	5.3%	0.159				
Employee Satisfaction	Medium	4.6%	0.138				
Mitigates a Corporate Risk / Risk of not Doing	Medium=16 to 39	8.9%	0.267				
Jurisdictional Engagement	High	8.2%	1				
			Benefit Score: 2.24				Cost Score: -4.27
			Overall Priority Score: -2.03				

Investment Risk and Complexity

Project Risk Score:	39	Risk Score Description: Risk impact = 5 and Risk likelihood = 5
Project Complexity Score::	22	Project Complexity Score Description:

Key Risks Description: Provide detail on project risks & mitigation strategy:

IS Project Dependencies if you don't see a project in the drop-down please contact the Planning & Performance team.**Benefiting Operating Companies:** Check all that apply**IS Projects: 4843 - Virtualized Branches**

1. Has a dependency on IS Project;
2. Has a dependency on IS Project;
3. Has a dependency on IS Project;
4. Has a dependency on IS Project;
5. Has a dependency on IS Project;
6. Has a dependency on IS Project;

☐ Select All Companies ☐ Clear All Companies☐ Select All Gas ☐ Select All Electric ☐ Select All Gen

- ☒ National Grid USA Parent
- ☒ KeySpan Energy Development Corporation
- ☒ KeySpan Services Inc.
- ☒ KeySpan Energy Corp
- ☒ KeySpan Energy Delivery New York
- ☒ KeySpan Energy Delivery Long Island
- ☒ KeySpan Generation LLC (PSA)
- ☒ KeySpan Glenwood Energy Center
- ☒ KeySpan Port Jefferson Energy Center
- ☒ KeySpan Energy Trading Svc LLC
- ☒ Niagara Mohawk Power Corp- Electric Distribution
- ☒ Niagara Mohawk Power Corp - Gas
- ☒ Niagara Mohawk Power Corp - Transmission
- ☒ Massachusetts Electric Company
- ☒ Massachusetts Electric Company - Transmission
- ☒ Nantucket Electric Company
- ☒ Boston Gas Company
- ☒ Colonial Gas Company
- ☒ Narragansett Gas Company
- ☒ Narragansett Electric Company
- ☒ Narragansett Electric Company - Transmission
- ☒ New England Power Company - Transmission
- ☒ New England Hydro - Trans Corp
- ☒ New England Electric Trans Corp
- ☐ NE Hydro Trans Electric Co
- ☒ NG LNG LP Regulated Entity

Business Initiative Dependencies**IS Projects: 4843 - Virtualized Branches**

1. Has a dependency on Biz Initiative,
2. Has a dependency on Biz Initiative,
3. Has a dependency on Biz Initiative,
4. Has a dependency on Biz Initiative,

Project Relationships☐ Minor Works Project Relationship:

Related Projects:

Enabling IS Capabilities check all that apply

- ☐ Enterprise Content Management (ECM)
- ☐ Comprehensive Integration Services (CIS)
- ☐ Hybrid Cloud
- ☐ Next Gen Workplace
- ☐ Enterprise Mobility
- ☐ Reporting and Analytics
- ☐ Networks

Key Milestone Dates: Select the 1st, 15th or last day of the month**Indicative Estimated Duration (Months):** 26


Begin Start-up	Begin Requirements & Deign	Begin Development & Implementation	Begin User Acceptance Testing	Go Live	Project Completion	Project Closure
January, 2019				February, 2021	March, 2021	

Business Resource Estimates: # of Full Time Equivalents

Start-up	Requirements & Deign	Develop & Implement	Business Resources UAT	Go Live Readiness	Post Go Live Support
0	0	0	0	0	0

Resourcing Strategy:

Attached Supporting Documents

Recommendation Sign-off			
Role	Name	Title	Date
Business Project Sponsor	Gilbert, John	Global Head IS Service Delivery, Global IS	
Business Relationship Manager	Brian Detota	IS Business Relationship Manager	
IS Program Delivery Manager	Helen Smith	IS Program Delivery Manager	
			

US Sanction Paper

Title:	Active Directory Improvements	Sanction Paper #:	USSC-17-300
Project #:	INVP 4489	Sanction Type:	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	September 13, 2017
Author:	Susan Stallard / Nicola Pennington	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	Dave McCune / Deborah Gears

1 Executive Summary

1.1 Sanctioning Summary

This paper requests partial sanction of INVP 4489 in the amount \$1.138M with a tolerance of +/- 10% for the purposes of Requirements and Design.

This sanction amount is \$1.138M broken down into:

\$0.565M Capex
\$0.573M Opex
\$0.000M Removal

NOTE the potential investment of \$5.781M with a tolerance of +/- 25%, contingent upon submittal and approval of a Project Sanction paper following completion of Discovery, Requirements and Design.

1.2 Project Summary

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

US Sanction Paper

1.3 Summary of Projects

Project Number	Project Title	Estimate Amount (\$M)
INVP 4489	Active Directory Improvements	5.781
Total		5.781

1.4 Associated Projects

N/A

1.5 Prior Sanctioning History

N/A

1.6 Next Planned Sanction Review

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

1.7 Category

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

US Sanction Paper

1.8 Asset Management Risk Score

Asset Management Risk Score: 49

Primary Risk Score Driver: (Policy Driven Projects Only)

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

1.9 Complexity Level

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

Complexity Score: 20

1.10 Process Hazard Assessment

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

☐ Yes ☒ No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY18 - 22	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	\$5.231M



US Sanction Paper

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

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

1.13 Current Planning Horizon

		Current Planning Horizon						
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total
\$M	Prior Yrs	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
CapEx	0.000	2.555	1.630	0.000	0.000	0.000	0.000	4.185
OpEx	0.000	1.596	0.000	0.000	0.000	0.000	0.000	1.596
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	4.151	1.630	0.000	0.000	0.000	0.000	5.781

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	May 2017
Partial Sanction	Sep 2017
Begin Requirements and Design	Aug 2017
Project Sanction	Jan 2018
Begin Development and Implementation	Jan 2018
Move to Production / Last Go Live	Dec 2018
Project Complete	Dec 2018
Sanction Closure	Apr 2019

1.15 Resources, Operations and Procurement

Resource Sourcing

US Sanction Paper

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

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

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

1.17 Climate Change

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

1.18 List References

N/A

US Sanction Paper

2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on September 13, 2017:

- (a) APPROVED the investment of \$1.138M and a tolerance of +/- 10% for the purposes of requirements and design.
- (b) NOTED the potential run-the-business (RTB) Impact TBD in project sanction.
- (c) NOTED the potential investment of \$5.781M and a tolerance of +/-25%, contingent upon submittal and approval of a Project Sanction paper following completion of requirements and design.
- (d) NOTED that Dave McCune has the approved financial delegation to undertake the activities stated in (a).

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

Christopher Kelly

Senior Vice President, Electric Process and Engineering

US Sanction Paper

3 Sanction Paper Detail

Title:	Active Directory Improvements	Sanction Paper #:	USSC-17-300
Project #:	INVP 4489	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	September 13, 2017
Author:	Susan Stallard / Nicola Pennigton	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	Dave McCune / Deborah Gears

3.1 Background

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

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

Project findings include:

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

3.2 Drivers

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

- Be reliable and supported;

US Sanction Paper

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

3.3 Project Description

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

The initial phase of this work will be a Requirements and Design phase, which will include:

- Document the current AD infrastructure (hardware, locations, applications, operating systems, and application ownership);
- Define the support model;
- Gather requirements for the support process to manage, maintain and govern the new service including interoperability with other services;
- Produce the recommendation as to whether to build new application and infrastructure or refit the current application and infrastructure; and
- Provide detailed costs and plan for next phase for Design, Development and Implementation.

3.4 Benefits Summary

The financial benefits of this project include:

- Decommissioning of the legacy AD environment with eventual savings in AD support costs.

The non-financial benefits of this project include:

- An accurate technical understanding of the current global AD environment, including detailed information on current applications using or depending on AD, to be delivered in the discovery phase;
- A global AD environment that fits with National Grid's current strategy to deliver global enterprise solutions;
- Prepares the environment for true Single Sign On with a unified global user group;
- Significantly reduces the risk of failure with the introduction of modern hardware and latest Operating System software;
- Consistent standards, governance and processes utilized in the management and administration of AD;
- Cloud ready environment for seamless Cloud application integration;
- Improved testing with the introduction of new global test environment; and

US Sanction Paper

- Improved identity access management through integration with Digital Risk & Security identity control services.

3.5 Business and Customer Issues

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

3.6 Alternatives

Alternative 1: Do Nothing / Defer

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

3.7 Safety, Environmental and Project Planning Issues

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

US Sanction Paper

3.8 Execution Risk Appraisal

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

US Sanction Paper

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

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

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

					Current Planning Horizon						
Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total
					2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
INVP 4489	Active Directory Improvements	+/- 25%	CapEx	0.000	2.555	1.630	0.000	0.000	0.000	0.000	4.185
			OpEx	0.000	1.596	0.000	0.000	0.000	0.000	1.596	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	0.000	4.151	1.630	0.000	0.000	0.000	5.781	
Total Project Sanction			CapEx	0.000	2.555	1.630	0.000	0.000	0.000	0.000	4.185
			OpEx	0.000	1.596	0.000	0.000	0.000	0.000	0.000	1.596
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	4.151	1.630	0.000	0.000	0.000	0.000	5.781

US Sanction Paper

3.11.2 Project Budget Summary Table

Project Costs per Business Plan

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
\$M								
CapEx	0.000	0.275	0.000	0.000	0.000	0.000	0.000	0.275
OpEx	0.000	0.275	0.000	0.000	0.000	0.000	0.000	0.275
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.550	0.000	0.000	0.000	0.000	0.000	0.550

Variance (Business Plan-Project Estimate)

	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
\$M								
CapEx	0.000	(2.280)	(1.630)	0.000	0.000	0.000	0.000	(3.910)
OpEx	0.000	(1.321)	0.000	0.000	0.000	0.000	0.000	(1.321)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	(3.601)	(1.630)	0.000	0.000	0.000	0.000	(5.231)

3.11.3 Cost Assumptions

This estimate was developed in 2017 using the standard IS estimating methodology. The accuracy level of estimate for each project is identified in table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

This is not a NPV project.

3.11.4.2 NPV Assumptions and Calculations

3.11.5 Additional Impacts

N/A

3.12 Statements of Support

US Sanction Paper

3.12.1 Supporters

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

Role	Individual
Business Executive Sponsor	John Gilbert
Head of PDM	Helen Smith
Relationship Manager	Bill Kearns
Program Delivery Director	Dave McCune
IS Finance Management	Chip Benson
IS Regulatory	Dan DeMauro
DR&S	Muks Ravipaty
Service Delivery	Brian Detota
Enterprise Architecture	Joe Clinchot

3.12.2 Reviewers

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

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

US Sanction Paper

4 Appendices

4.1 Sanction Request Breakdown by Project

\$M	INVP 4287	Total
CapEx	4.185	4.185
OpEx	1.596	1.596
Removal	0.000	0.000
Total	5.781	5.781

4.2 Other Appendices

4.2.1 Project Cost Breakdown

Project Cost Breakdown			
Cost Category	sub-category	\$ (millions)	Name of Firm(s) providing resources
Personnel	NG Resources	0.796	
	SDC Time & Materials	0.281	IBM, Wipro
	SDC Fixed-Price	-	
	All other personnel	1.600	Verizon, DXC, MicroSoft
	TOTAL Personnel Costs	2.678	
Hardware	Purchase	1.500	
	Lease	-	
Software		1.000	
Risk Margin		0.105	
Other		0.498	Shared Costs, AFUDC, other costs
TOTAL Costs		5.781	

US Sanction Paper

4.2.2 Benefitting Operating Companies

Benefitting Operating Companies:

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

US Sanction Paper

4.2.3 IS Ongoing Operational Costs (RTB)

This project IS on-going operations support costs will be determined as part of the Requirements & Design phase. These are known as Run the Business (RTB) costs.

Summary Analysis of RTB Costs							
All figures in \$ millions	Yr. 1 17/18	Yr. 2 18/19	Yr. 3 19/20	Yr. 4 20/21	Yr. 5 21/22	Yr. 6+	Total
Forecast of RTB Impact							
RTB if Status Quo Continues	-	-	-	-	-	-	-
RTB if Project is Implemented	-	-	-	-	-	-	-
Net change in RTB	-	-	-	-	-	-	-
RTB Variance Analysis (if Project is Implemented)							
Net Δ RTB funded by Plan(s)	-	-	-	-	-	-	-
Variance to Plan	-	-	-	-	-	-	-
Total RTB Costs - by Cost Type (if Project is Implemented)							
App.Sup. - SDC 1	-	-	-	-	-	-	-
App.Sup. - SDC 2	-	-	-	-	-	-	-
App.Sup. - other	-	-	-	-	-	-	-
SW maintenance	-	-	-	-	-	-	-
SaaS	-	-	-	-	-	-	-
HW support	-	-	-	-	-	-	-
Other: IS	-	-	-	-	-	-	-
All IS-related RTB (sub-Total)	-	-	-	-	-	-	-
Business Support (sub-Total)	-	-	-	-	-	-	-
Total RTB Costs	-	-	-	-	-	-	-

US Sanction Paper

Title:	US Office 365 ICE Replacement	Sanction Paper #:	USSC-17-154
Project #:	INVP 4491	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	April 12, 2017
Author:	Paul Cudby	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	Zakariyya Ahmedabadi

1 Executive Summary

1.1 **Sanctioning Summary**

This paper requests sanction of INVP 4491 in the amount \$4.291M with a tolerance of +/- 10% for the purposes of Full implementation

This sanction amount is \$4.291M broken down into:

\$3.316M Capex

\$0.974M Opex

\$0.000M Removal

1.2 **Project Summary**

This investment is required to replace the current Instant Messaging, Collaboration, and Email (ICE) services with a set of similar, or enhanced, services provided by Office 365. Office 365 will provide a more effective collaboration and email service (Microsoft Office 365) to meet the business demand for additional capabilities (eg: collaboration with external parties) and provide any enabling infrastructure technology necessary before the ICE service contract expires.

1.3 **Summary of Projects**

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
INVP 4491	Project Type	Office 365 US	4.291
Total			4.291

1.4 **Associated Projects**

N/A

1.5 **Prior Sanctioning History**

N/A

US Sanction Paper

1.6 Next Planned Sanction Review

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

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	The IS Leadership Team have signed off and approved the Global Strategy to implement Office 365 as the preferred solution to replace the current Instant Messaging, Collaboration and Email services

1.8 Asset Management Risk Score

Asset Management Risk Score: 34

Primary Risk Score Driver: (Policy Driven Projects Only)

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

1.9 Complexity Level

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

Complexity Score: 25

1.10 Process Hazard Assessment

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

☐ Yes
☒ No



US Sanction Paper

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY2018-22	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input type="radio"/> Under <input checked="" type="radio"/> NA	\$0.000M

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

N/A

1.13 Current Planning Horizon

		Current Planning Horizon						
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total
\$M	Prior Yrs	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
CapEx	0.000	3.316	0.000	0.000	0.000	0.000	0.000	3.316
OpEx	0.000	0.974	0.000	0.000	0.000	0.000	0.000	0.974
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	4.291	0.000	0.000	0.000	0.000	0.000	4.291

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	Jan 2017
Begin Requirements and Design	Apr 2017
Full Sanction	Apr 2017
Begin Development and Implementation	Aug 2017
Move to Production / Last Go Live	Mar 2018
Project Complete	Apr 2018
Project Closure Sanction	Jun 2018

US Sanction Paper

1.15 Resources, Operations and Procurement

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

1.16 Key Issues (include mitigation of Red or Amber Resources

1	Network Infrastructure - VStig upgrade needs to deliver required bandwidth capacity including the upgrade of existing Proxy servers
2	Microsoft Enterprise License Agreement need to be renewed in time to prevent delays to delivery timelines
3	Transformation of users from XP to Windows 7

1.17 Climate Change

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

1.18 List References

N/A

US Sanction Paper

2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on April 12, 2017:

- (a) APPROVED this paper and the investment of \$4.291M and a tolerance of +/-10%.
- (b) NOTED the RTB reduction of \$0.857M (per annum) for 5 years.
- (c) NOTED that Zakarry Ahmedabadi has the approved financial delegation.

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

Christopher Kelly
Senior Vice President, Electric Process & Engineering
US Sanctioning Committee Co – Chair Person

US Sanction Paper

3 Sanction Paper Detail

Title:	US Office 365 ICE Replacement	Sanction Paper #:	USSC-17-154
Project #:	INVP 4491	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	April 12, 2017
Author:	Paul Cudby	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	Zakariyya Ahmedabadi

3.1 *Background*

The way we work internally and interact with our external customers and partners is changing and is driving new requirements for improved collaboration, mobility and user experience.

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. A few of the issues are:

- High risk threats to the service from capacity pressure. On average, an additional 1.5TB to 2TBs of data are being added each month, resulting in us nearing our storage capacity and needing to implement new storage to cope with demand.
- These uplifts in storage as required result in additional effort risk and cost
- The EMC (N.B. this is the branded name of the storage) hardware storage supporting the current service is at end of operational life support from the manufacturer (Dell)
- ICE cannot integrate with Cloud services in an efficient manner. For example, Integrations with Salesforce, EFSS (Enterprise File Sync and Share), success factors, etc.

The existing ICE contract expired in October 2016. It has been extended for another 26 months with an early exit clause. The contract could be extended further if required, but the existing service does not deliver to the business the required capabilities listed below.

- Reliability of the service
- Demand for improved collaboration (including external collaboration)
- Greater mobile device capability
- Enhanced storage capability
- Promoting the “Anytime, Anywhere” working model

The current plan is to gradually move away from ICE by the end of December 2017.

US Sanction Paper

3.2 Drivers

The business drivers for this investment are:

- To ensure the ongoing reliable delivery of the service, as there are issues with the existing service in place
- To meet business demand for improved collaboration (including external collaboration requirements), mobile device capability and “Anytime, Anywhere” working model.

Whilst it is not the main reason for delivering this project, it should be noted that the successful completion and implementation will also deliver a reduction in RTB.

3.3 Project Description

This project will include two key areas of work :

1. Refresh the requirements / gap analysis against Office 365
2. Implementation of Office 365 and migrate users off ICE

This investment will deliver:

- Establish platform and foundation services, for example, ADFS (Active directory Federation Service) and co-existence with ICE
- Implementation of Office 365 capabilities including Exchange, SharePoint Online and Skype for Business (to replace MS Lync on an Instant Messaging basis) and other identified services.
- Migration of all US users and services

In Scope

Office 2010 assessment

- Office 2010 upgrade assessment in scope – Implementation of the upgrade is dependent on the outcome of the assessment

Collaboration and social

- Migrate UK SharePoint 2010 sites to SharePoint Online
- Provide ability for external collaboration with Partners and Suppliers
- Provide ability to access SharePoint sites on mobile devices
- Improved user experience using latest versions of office online

Email and Calendar

- Migrate US Mailboxes and Calendar
- Assessment of pst and archive files during detailed design phase and plan for migration
- Improve/enhance Webmail experience (Exchange Online)
- Increased mail box sizes

US Sanction Paper

- Provide ability to access emails on Mobile devices. (Windows Phones, iOS, and other Android devices)

External Instant Messaging

- Migrate As-Is features of Lync
- Provide ability to use new web version of Skype for Business instead of the current Lync thick client

Cloud storage

Ability to use One Drive– Private cloud storage that can be accessed from any where

Training and Adoption

Adoption requires much more than communication and training. A business change management approach will be run to ensure:

Awareness

- of the need for change
- of the nature of the change

Desire

- To support the change
- To Participate and engage

Knowledge

- On how to change
- On how to implement new skills and behaviours

Ability

- To implement the change
- To demonstrate performance

Reinforcement

- To sustain the change
- To build a culture and competence around change to business processes and use of office 365 capabilities

Operational Support and Monitoring

Delivery of a full support model of the Office 365 services and provide administrative controls, Monitoring and Reporting

Security and Mobile Data Management

Delivery of the capabilities in line with the National Grid DR&S security principles and industry best practice

N.B. The migration scope can be found in the [Appendices](#) section

US Sanction Paper

3.4 Benefits Summary

The project is expected to deliver the following benefits:

Saving in RTB:

- The successful completion and delivery of this project will result in a reduction in RTB

Reliable service provided:

- 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 licence 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 licences provide user friendly and common solution for archiving

New service will provide new capabilities:

- Mobility – Office 365 is designed to support mobility whether by smartphone, tablet or PC
- External collaboration – Office 365 is designed to support external collaboration across all services. This could be supporting instant messaging with our stakeholders, making data in SharePoint available to Joint Venture partners, or collaborating with partners
- Social 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)
- Power BI (Business Intelligence) – Opportunity for future savings by exploiting Power BI as a potential strategic reporting tool
- Future Desktop Office Upgrades – E3 licences come with Pro Plus, helping mitigate future upgrade costs of Office 2010
- Potential for future capabilities – Office 365 has many additional features which can be implemented to add further value as required

3.5 Business and Customer Issues

None identified at this stage

US Sanction Paper

3.6 Alternatives

Alternative 1: Do Nothing - Practically, there is no do nothing option, the current contract is due to expire at the end of 2018. The current service does not deliver required capabilities, and the infrastructure is set to fail due to capacity issues. DR&S need new functionality on the anti-virus defences entailing a move away from current technology. Rejected

Alternative 2: Replace ICE with Office 365 (All E1 licences) - This option does not align with all business needs and will at some point in near future require to upgrade to E3 licences. Despite the E1 licences being initially cheaper than E3 licences, E1 licence option would entail buying off the shelf solutions for Data Loss Prevention (DLP), Archiving, E-Discovery, etc. Future projects to upgrade Office would also be costlier with E1 option. Rejected

Alternative 3: Replace ICE with Cloud other than Office 365 - Comparable solutions from competitors are not a significant differentiator. However, user adoption and training, migration and magnitude of the change including co-existence will likely be more costly and complex, due to moving to a new technology stack. It will be time consuming and NG will incur high costs both due to maintenance of current aged infrastructure and due to lengthy prospective implementation. Rejected

3.7 Safety, Environmental and Project Planning Issues

None at this stage

US Sanction Paper

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	There is a risk of technical or cost limitations based on the discovery phase output of the following services: • Office 2010 upgrade to Office 2016/Pro-plus • All other public shared drives • Personal folders (if applicable) to Onedrive • Legacy Sharepoint migration (2007/03) • Access/Connectivity of any part of the business that is run from offshore	3	4	4	12	12	Mitigate	Risk margin allowance included within this sanction based on high level assumptions prior to output of discovery phase. Upon discovery assessment output proposal to be presented to Project Board. If cost or schedule impact of including these initiatives are considerable then a follow on phase to the project or re-sanction to cover funding will need to be considered.		
2	There is a risk that D&I phase might be more complex and/or there is a change in requirements causing project schedule slippage	3	2	2	6	6	Mitigate	Risk Margin to cover any additional engagement		
3	Active Directory infrastructure project changes – risk of rework and impact to end users	3	3	2	9	6	Mitigate	Close working between Active Directory and Office 365 projects to ensure a robust business change plan		
4	There is a potential risk that additional bandwidth is required as more Office 365 features/services are introduced	3	2	3	6	9	Mitigate	Network performance reports and validation of network design Staging and phasing the networking upgrade approach during discovery phase. Office 365 project will also be working closely with VStig upgrade plans/project.		
5	A risk that external dependencies could impact on overall migration timescales.	3	1	2	3	6	Accept	The full migration will have dependencies on various external projects and business critical period's/change freeze – e.g. bandwidth increase, BAU patching of clients, year/month end. These will be identified in at the start of the R&D phase and work with the business/projects to identify completion dates and incorporate into plan		
6	Business Maturity for handling the change.	3	1	1	3	3	Accept	Business Change and adoption management workshops will be run across the business		

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

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

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A



US Sanction Paper

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

					Current Planning Horizon						
Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total
INVP 4491	Office 365 US	Est Lvl (e.g. +/- 10%)	CapEx	0.000	3.316	0.000	0.000	0.000	0.000	0.000	3.316
			OpEx	0.000	0.974	0.000	0.000	0.000	0.000	0.974	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	0.000	4.291	0.000	0.000	0.000	0.000	0.000	4.291
Total Project Sanction			CapEx	0.000	3.316	0.000	0.000	0.000	0.000	0.000	3.316
			OpEx	0.000	0.974	0.000	0.000	0.000	0.000	0.000	0.974
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	4.291	0.000	0.000	0.000	0.000	0.000	4.291

3.11.2 Project Budget Summary Table

Project Costs per Business Plan

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
CapEx	0.000	3.316	0.000	0.000	0.000	0.000	0.000	3.316
OpEx	0.000	0.974	0.000	0.000	0.000	0.000	0.000	0.974
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	4.291	0.000	0.000	0.000	0.000	0.000	4.291

Variance (Business Plan-Project Estimate)

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

3.11.3 Cost Assumptions

- This estimate was developed in 2017 using the standard IS estimating methodology; the accuracy level of estimate is identified in table 3.11.1
- Office 365 implementation will complete before ICE contract expiry in Dec 2018. There will be cost implications if that doesn't happen. Cost implications are unknown at the moment.
- Commercial approach is that the suppliers and partners are engaged on fixed cost basis

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

N/A

US Sanction Paper

3.11.4.2 NPV Assumptions and Calculations

3.11.5 Additional Impacts

N/A

3.12 Statements of Support

3.12.1 Supporters

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

Role	Individual's Name
Business Executive Sponsor	John Gilbert
Head of PDM	Tom Cunningham
Relationship Manager	Graham Pool
Program Delivery Manager	Lee Denny
IS Finance Management	Chip Benson
IS Regulatory	Dan DeMauro
DR&S	Elaine Wilson
Service Delivery	Brian Detota
Enterprise Architecture	Joe Clinchot

3.12.2 Reviewers

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

Function	Individual	Area
Regulatory	Zschokke, Peter	All
Jurisdictional Delegate(s)	Harbaugh, Mark	Electric - NY
	Anand, Sonny	Electric - NE
	Hill, Terron	FERC
	Brown, Laurie	Gas - NY
	Currie, John	Gas - NE
Procurement	Curran, Art	All

US Sanction Paper

4 Appendices

4.1 Sanction Request Breakdown by Project

N/A

4.2 Other Appendices

4.2.1 Project Cost Breakdown

Project Cost Breakdown			
Cost Category	sub-category	\$ (millions)	Name of Firm(s) providing
Personnel	NG Resources	1.489	
	SDC Time & Materials	-	
	SDC Fixed-Price	-	
	All other personnel	-	
	TOTAL Personnel Costs	1.489	
Hardware	Purchase	-	
	Lease	-	
Software		0.129	
Risk Margin		0.488	
Other		2.186	
TOTAL Costs		4.291	

4.2.2 Benefitting Operating Companies

This project will benefit all the companies listed below.

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp.- Electric Distr.	Electric Distribution	NY
Massachusetts Electric Company	Electric Distribution	MA
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY
Boston Gas Company	Gas Distribution	MA
Narragansett Electric Company	Electric Distribution	RI
Niagara Mohawk Power Corp. - Transmission	Transmission	NY
Niagara Mohawk Power Corp. - Gas	Gas Distribution	NY
New England Power Company – Transmission	Transmission	MA, NH, RI, VT
KeySpan Generation LLC (PSA)	Generation	NY
Narragansett Gas Company	Gas Distribution	RI
Colonial Gas Company	Gas Distribution	MA



US Sanction Paper

Operating Company Name	Business Area	State
Narragansett Electric Company – Transmission	Transmission	RI
National Grid USA Parent	Parent	
Nantucket Electric Company	Electric Distribution	MA
NE Hydro - Trans Electric Co.	Inter Connector	MA, NH
New England Hydro Finance Company Inc.	Inter Connector	MA, NH
KeySpan Energy Development Corporation	Non-Regulated	NY
KeySpan Port Jefferson Energy Center	Generation	NY
New England Hydro - Trans Corp.	Inter Connector	MA, NH
KeySpan Services Inc.	Service Company	
KeySpan Glenwood Energy Center	Generation	NY
Massachusetts Electric Company – Transmission	Transmission	MA
NG LNG LP Regulated Entity	Gas Distribution	MA, NY, RI
Transgas Inc	Non-Regulated	NY
Keyspan Energy Trading Services	Other	NY
KeySpan Energy Corp.	Service Company	
New England Electric Trans Corp	Inter Connector	MA

US Sanction Paper

4.2.3 IS Ongoing Operational Costs

Summary Analysis of RTB Costs							
All figures in \$ millions	Yr. 1 17/18	Yr. 2 18/19	Yr. 3 19/20	Yr. 4 20/21	Yr. 5 21/22	Yr. 6+	Total
Forecast of RTB Impact							
RTB if Status Quo Continues	3.892	3.892	3.892	3.892	3.892	3.989	23.447
RTB if Project is Implemented	5.451	2.595	2.376	2.376	2.376	2.435	17.609
Net change in RTB	1.559	(1.297)	(1.516)	(1.516)	(1.516)	(1.553)	(5.838)
RTB Variance Analysis (if Project is Implemented)							
Net Δ RTB funded by Plan(s)	-	-	-	-	-	-	-
Variance to Plan	1.559	(1.297)	(1.516)	(1.516)	(1.516)	(1.553)	(5.838)
Total RTB Costs - by Cost Type (if Project is Implemented)							
App.Sup. - SDC 1	0.240	-	-	-	-	-	0.240
App.Sup. - SDC 2	-	-	-	-	-	-	-
App.Sup. - other	-	-	-	-	-	-	-
SW maintenance	3.121	0.117	-	-	-	-	3.238
SaaS	-	-	-	-	-	-	-
HW support	-	-	-	-	-	-	-
Other: IS	2.089	2.478	2.376	2.376	2.376	2.435	14.131
All IS-related RTB (sub-Total)	5.451	2.595	2.376	2.376	2.376	2.435	17.609
Business Support (sub-Total)	-	-	-	-	-	-	-
Total RTB Costs	5.451	2.595	2.376	2.376	2.376	2.435	17.609

Note: U.S. Policy dictates that RTB Variance = forecasted Net Δ RTB - Net Δ RTB funded by Investment Plan

4.3 NPV Summary

N/A

4.4 Customer Outreach Plan

N/A

4.5 Migration scope for US

Following is the migration scope for US. Further assessment would be done to determine the metrics of in scope services.

Category	Service	Scope	Action
ICE Platform	Email	Personal folders	Migrate
		Shared mailboxes	Migrate
		US Mailboxes	- Archive non-active Employee mailboxes

US Sanction Paper

			- Migrate active user mailboxes
		PST Archives	Assessment and recommendation on how to migrate user PST archives
		Legal Holds	Migrate legal holds and implement legal hold solution
		SMTP Relays	Continued operation of existing SMTP relays
	SharePoint 2010	Site collections	- Retain Information architecture - Migrate of all site collections
	Lync	All NG Users	- Migrate to 'Skype For business' - Continued hybrid operations
Legacy SharePoint	CNI Sites	Custom applications ¹	Migrate (Assumption) or redevelopment of all applications
	SP Sites	CNI Site collections ²	Migrate
Custom App SharePoint 2013	Custom SharePoint solution		Potentially Migrate (if kept on premise) or Redevelopment

¹ Full analysis not provided – assume an analysis and redevelopment of each application either to SharePoint on Premise (hybrid) or redevelopment using the new app model

² CNI Data may potentially remain on premise due to our security policies

Assess and propose delivery/migration strategy of the following services:

- Office 2010 upgrade to Office 2016/Pro-plus
- All other public shared drives
- Personal folders (if applicable) to Onedrive
- Legacy Sharepoint migration (2007/03)
- Any part of the business that is run from offshore

Implementation of Office 365 will be phased as follows:

1. Core Online – enabling online services (i.e Sharepoint Online) expected to be delivered early on to pilot users
2. Core Hybrid - timescales to be determined as per business readiness plans
3. Deployment Phase - timescales to be determined as per business readiness plans

Each phase will bring in more capabilities of Office 365 while offloading users from ICE.

US Sanction Paper

Title:	Data Visualization Expansion	Sanction Paper #:	USSC-17-299
Project #:	INVP 4606	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	September 13, 2017
Author:	Martin McDermott	Sponsor:	Anuraag Bhargava US CIO
Utility Service:	IS	Project Manager:	Jeffrey Dailey

1 Executive Summary

1.1 **Sanctioning Summary**

This paper requests sanction of INVP 4606 in the amount \$3.815M with a tolerance of +/- 10% for the purposes of full implementation.

This sanction amount is \$3.815M broken down into:

\$3.585M Capex

\$0.230M Opex

\$0.000M Removal

1.2 **Project Summary**

Building upon the success of the Data Visualization (Tableau) core implementation last year, this investment expands its use with additional data and analytics capabilities. Data Visualization will be extended with the build out of dashboards across more business areas in support of their reporting, data retention and regulatory obligations. In addition to enhanced data access, this investment will provide for more advanced analytics through the use of new tools and longer term storage of information within the environment for audit and trending. The investment will introduce additional dashboards within Finance, Customer and Operations in support of reporting requirements. There will be an expected annual run the business (RTB) of \$0.450M per year to support the expanded environment and dashboards.

1.3 **Summary of Projects**

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
INVP 4606		Data Visualization Expansion	3.815
Total			3.815

US Sanction Paper

1.4 Associated Projects

Project Number	Project Title	Estimate Amount (\$M)
4464	Data Visualization	7.934
Total		7.934

1.5 Prior Sanctioning History

N/A

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
Oct 2018	Closure

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input checked="" type="radio"/> Other	<p>This investment will advance the capabilities and use of visualization and data analytics within National Grid. In particular, the new capabilities will:</p> <ul style="list-style-type: none"> • Allow access of additional types of data • Cleanse and store data • Provide advanced analysis and reporting of data <p>Further, this investment will advance and build on the foundation created as part of the Data Visualization core project.</p>

1.8 Asset Management Risk Score

Asset Management Risk Score: N/A

Primary Risk Score Driver: (Policy Driven Projects Only)

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

US Sanction Paper

1.9 Complexity Level

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

Complexity Score: 11

1.10 Process Hazard Assessment

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

☐ Yes ☒ No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY18 - 22	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	\$0.105M

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

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

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
CapEx	0.000	1.150	2.435	0.000	0.000	0.000	0.000	3.585
OpEx	0.000	0.135	0.095	0.000	0.000	0.000	0.000	0.230
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	1.285	2.530	0.000	0.000	0.000	0.000	3.815

US Sanction Paper

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	Jun 2017
Project Sanction	Sep 2017
Begin Requirements and Design	Oct 2017
Begin Development and Implementation	Dec 2017
Move to Production / Last Go Live	Jun 2018
Project Complete	Jul 2018
Sanction Closure	Oct 2018

1.15 Resources, Operations and Procurement

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

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

N/A



US Sanction Paper

1.17 Climate Change

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

1.18 List References

N/A

US Sanction Paper

2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on September 13, 2017:

- (a) APPROVE this paper and the investment of \$3.815M and a tolerance of +/-10%.
- (b) APPROVE the run the business (RTB) impact of \$0.450M (per annum) for 5 years
- (c) NOTE that Jeffrey Dailey is the Project Manager and has the approved financial delegation.

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

Christopher Kelly
Senior Vice President, Electric Process and Engineering

US Sanction Paper

3 Sanction Paper Detail

Title:	Data Visualization Expansion	Sanction Paper #:	USSC-17-299
Project #:	INVP 4606	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	September 13, 2017
Author:	Martin McDermott	Sponsor:	Anuraag Bhargava US CIO
Utility Service:	IS	Project Manager:	Jeffrey Dailey

3.1 Background

In support of reporting and data analytics needs, National Grid recently undertook the implementation of a core Data Visualization environment (Tableau/Alteryx) and the build out of several dashboards to enhance business function reporting capability. The initial implementation has been met with success and there is value in expanding the use of the environment to additional business areas along with increasing functionality to the tool. Because of the already shown success this investment seeks to further the use by introducing the tool to additional business areas, creating new business dashboards, adding new features to the tool set and extending the environment to retain enhanced data for further advanced analysis.

3.2 Drivers

This project will extend the use and deliver additional capability that provides the opportunity to:

- Enable capability to provide greater insight for decision-making through data
- Provide an enterprise platform for processing and analyzing data
- Automate standard reports which are currently performed manually
- Allow for self-service reporting to provide timely access of information
- Retain data for trending and decision support

3.3 Project Description

This investment will bring additional functionality into the Data Visualization environment which will allow access to more types of data including internally stored data, cloud hosted data, and publicly available data. The environment will be extended to store cleansed and combined data for further analytics and trending analysis, along with meeting data retention obligations.

US Sanction Paper

The Data Visualization environment will be extended out to additional business areas with the introduction of new business dashboards within Finance, Customer and Operations to support business reporting and analysis requirements. The investment includes identifying requirements for reporting, configuration and building reports, in addition to training on the use of the environment's tool set.

As part of the investment, the Company will be partnering with a third party, who will assist in the build out of the data storage environment and use of the additional tools, along with data requirements, dashboard creation and end user training. The third party will also assist in the support of the environment as it gets transitioned to an end state support structure.

3.4 Benefits Summary

Type	Benefit	Description
Direct	Reporting self Service	Extension of the data Visualization environment providing access to additional data sources; it provides the ability for more business areas to access, analyze and report data independent of IS involvement.
Direct	Risk reduction on current tools	As outdated technology is no longer supported this investment will transition more of the reporting to the newly developed environment reducing the potential for a loss of reporting capability and data.
Intangible (Indirect benefits)	Enable deeper insights and promote and enable decisions based upon data analytics	In many areas reporting is done through flat files (Excel and PPT). With the use of a data visualization tool, users can select and process data within seconds compared to creating Excel based macros or performing lookups. Additionally, since data preparation will be easier, the ability to blend multiple data sources together will be easier, meaning that there are no roadblocks to having all data available for analytics
Intangible (Indirect benefits)	Increase automation	Business analysts will be able to focus on data analytics for decision-making instead of focusing on the need to clean, prepare and aggregate data sources. The project will provide the tools to automate this process resulting in minimal manual effort for monthly reporting and freeing analysts to perform more analysis on data.
Intangible (Indirect benefits)	Improved accuracy of reports	The data workflow from source will be documented and automated, which will reduce the likelihood of manual errors in reporting and

US Sanction Paper

		data.
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3.5 Business and Customer Issues

None

3.6 Alternatives

Alternative 1: Do Nothing

Doing nothing is not a valid option, as the implementation of the core Data Visualization environment has benefitted the business areas utilizing the tool with the ability to quickly reveal status and trends to aid in decision making. After implementation of the Data Visualization environment, it has become apparent that more areas of the Company can benefit from utilizing the environment for meeting their reporting requirements and allowing in depth analysis.

Alternative 2: Delay the Investment

Delaying the Investment would not be a prudent option, with the ground work already in place with the creation of the core Data Visualization environment additional benefits can quickly be realized through the continued rollout to more business areas of the Company. The business areas which are currently utilizing the tools have seen a shift with less time spent generating and reviewing reports, with more time being available to act on the information. At this point, there is an increasing demand for new dashboards to replace or augment current reports.

Alternative 3: Invest in an Alternate tool set for Data Visualization

Investing in an alternate tool set for Data Visualization would diminish the investment made in the creation of the core Data Visualization environment. Although there may be a need to augment the tool set at some unknown time in the future, the environment should be utilized to its full capabilities sooner rather than later to provide analytics and reporting the business requires.

3.7 Safety, Environmental and Project Planning Issues

None

US Sanction Paper

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	There is risk of a new SI and an incomplete transition of knowledge	1	2	2	2	2	Accept	Ensure existing SI is available for transition of knowledge	Insufficient level of support for environment	Re-engage original SI for improved transition
2	There is risk that the addition of new dashboards will continue to require FW rule changes	3	1	2	3	6	Mitigate	Work with DR&S to establish a trust with Azure	Delays in testing and implementing new dashboards	Same as pre-trigger
3	There is risk that the cloud team will not have sufficient resources to support this effort	2	1	2	2	4	Mitigate	Work with Cloud Team mgmt to ensure appropriate resource planning against requirements	Delays in testing and implementing new functionality	Same as pre-trigger
4	There is risk that unanticipated additional licensing will be required to support new functionality	1	3	1	3	1	Mitigate	Verify use cases against current licensing model	Unable to further expand Dashboard development	Secure funding for additional licensing

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

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

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

US Sanction Paper

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
INV P 4606	Data Visualization Expansion	Est Lvl (+/- 10%)	CapEx	0.000	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	3.585
			OpEx	0.000	0.135	0.095	0.000	0.000	0.000	0.000	0.230
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	1.285	2.530	0.000	0.000	0.000	0.000	3.815

3.11.2 Project Budget Summary Table

Project Costs per Business Plan

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
CapEx	0.000	1.000	1.800	0.000	0.000	0.000	0.000	2.800
OpEx	0.000	0.100	0.810	0.000	0.000	0.000	0.000	0.910
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	1.100	2.610	0.000	0.000	0.000	0.000	3.710

Variance (Business Plan-Project Estimate)

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
CapEx	0.000	(0.150)	(0.635)	0.000	0.000	0.000	0.000	(0.785)
OpEx	0.000	(0.035)	0.715	0.000	0.000	0.000	0.000	0.680
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	(0.185)	0.080	0.000	0.000	0.000	0.000	(0.105)

3.11.3 Cost Assumptions

- This investment will be managed by a National Grid Project Manager.
- Project will utilize internal National Grid Resources, external consultants, as well as Verizon, CSC and IBM technical resources.
- Costs of license and services have been confirmed .
- The accuracy level of estimate for each project is identified in table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

This is not a NPV Investment.

US Sanction Paper

3.11.5 Additional Impacts

N/A

3.12 Statements of Support

3.12.1 Supporters

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

Role	Individual
Business Representative	Rory Abbazio
Head of PDM	Deborah Rollins
Relationship Manager	Richard Sheer
Program Delivery Director	Jeffrey Dailey
IS Finance Management	Chip Benson
IS Regulatory	Dan DeMauro
DR&S	Elaine Wilson
Service Delivery	Mark Mirizio
Enterprise Architecture	Svetlana Lyba

3.12.2 Reviewers

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

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

US Sanction Paper

3.13 Benefitting Operating Companies

This project will benefit all the companies listed below.

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

US Sanction Paper

4 Appendices

4.1 Sanction Request Breakdown by Project

N/A

4.2 Project Cost Breakdown

Project Cost Breakdown			
Cost Category	sub-category	\$ (millions)	Name of Firm(s) providing
Personnel	NG Resources	0.070	
	SDC Time & Materials	-	
	SDC Fixed-Price	-	
	All other personnel	-	
	TOTAL Personnel Costs	0.070	
Hardware	Purchase	-	
	Lease	-	
Software		1.118	Tableau, Alteryx, Maestro, Alation
Risk Margin		0.335	
Other		2.291	VM Server (Azure), SI Vendor (TBD)
TOTAL Costs		3.815	

Vendor/Supplier Breakdown for 1-slide PowerPoint Summary: In order to complete the 1-slide Summary that accompanies each Investment Paper, it is necessary to identify key vendors and the spending amounts associated with each. The table below provides the information necessary to address this portion of the 1-Slide Summary.

Vendor	\$ millions
SDC.1 - IBM	-
SDC.2 - Wipro	-
SDC.3 - tbd	-
IBM, non-SDC	-
Wipro, non-SDC	-
SI Vendor (TBD)	2.015
Alteryx	0.965
Azure	0.146
Maestro	0.114
Alation	0.039
Other	-

US Sanction Paper

4.3 IS Ongoing Operational Costs (RTB)

Summary Analysis of RTB Costs							
All figures in \$ millions	Yr. 1 17/18	Yr. 2 18/19	Yr. 3 19/20	Yr. 4 20/21	Yr. 5 21/22	Yr. 6+	Total
Forecast of RTB Impact							
RTB if Status Quo Continues	-	-	-	-	-	-	-
RTB if Project is Implemented	-	0.253	0.337	0.490	0.525	0.676	2.281
Net change in RTB	-	0.253	0.337	0.490	0.525	0.676	2.281
RTB Variance Analysis (if Project is Implemented)							
Net Δ RTB funded by Plan(s)	-	-	-	-	-	-	-
Variance to Plan	-	0.253	0.337	0.490	0.525	0.676	2.281
Total RTB Costs - by Cost Type (if Project is Implemented)							
App.Sup. - SDC 1	-	-	-	-	-	-	-
App.Sup. - SDC 2	-	-	-	-	-	-	-
App.Sup. - other	-	-	-	-	-	-	-
SW maintenance	-	-	-	-	-	-	-
SaaS	-	-	-	-	-	-	-
HW support	-	-	-	-	-	-	-
Other: IS	-	0.253	0.337	0.490	0.525	0.676	2.281
All IS-related RTB (sub-Total)	-	0.253	0.337	0.490	0.525	0.676	2.281
Business Support (sub-Total)	-	-	-	-	-	-	-
Total RTB Costs	-	0.253	0.337	0.490	0.525	0.676	2.281

Note: U.S. Policy dictates that RTB Variance = forecasted Net Δ RTB - Net Δ RTB funded by Investment Plan

This is a supplemental table - it is NOT required to be pasted in the Investment Paper							
Net Change in RTB - by Cost Type							
App.Sup. - SDC 1	-	-	-	-	-	-	-
App.Sup. - SDC 2	-	-	-	-	-	-	-
App.Sup. - other	-	-	-	-	-	-	-
SW maintenance	-	-	-	-	-	-	-
SaaS	-	-	-	-	-	-	-
HW support	-	-	-	-	-	-	-
Other: IS	-	0.253	0.337	0.490	0.525	0.676	2.281
All IS-related RTB (sub-Total)	-	0.253	0.337	0.490	0.525	0.676	2.281
Business Support (sub-Total)	-	-	-	-	-	-	-
Total Net Change in RTB	-	0.253	0.337	0.490	0.525	0.676	2.281

US Sanction Paper

4.4 *NPV Summary*

N/A

4.5 *Customer Outreach Plan*

N/A

US Sanction Paper

Title:	US CNI EMS-Lifecycle Hardware and Software Upgrade	Sanction Paper #:	USSC-17-152
Project #:	INVP 4568	Sanction Type:	Sanction
Operating Company:	Allocated	Date of Request:	March 27, 2017
Author:	Mike Gerolamo	Sponsor:	John Spink, VP Control Center Operations
Utility Service:	IS	Project Manager:	Phil Lavallee

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of INVP 4568 in the amount \$3.348M with a tolerance of +/- 10% for the purposes of Full Project Implementation.

This sanction amount is \$3.348M broken down into:

\$3.348M Capex
\$0.000M Opex
\$0.000M Removal

1.2 Project Summary

The server and workstation hardware for the Energy Management System (EMS) replacement project was purchased in 2010. The hardware is now near peak operating capacity and may constrain the capacity of the associated databases in EMS. The application vendor ASEA Brown Boveri (ABB), is recommending a hardware refresh for the EMS environments in order to increase the capacity of the databases to accommodate future growth. This Policy-driven investment will procure the equipment needed for the project stages for the hardware and software refresh of the current ABB EMS.

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
4568	Project Type	US CNI EMS-Lifecycle Hardware and Software	3.348
Total			3.348

US Sanction Paper

1.4 Associated Projects

N/A

1.5 Prior Sanctioning History

N/A

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
May 2017	Project Closure

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	This project aligns with the US CNI End State Vision (ESV) and Target Operating Model (TOM) to replace assets in a timeframe before they become end of vendor support, in order to meet all business SLAs.

1.8 Asset Management Risk Score

Asset Management Risk Score: 44

Primary Risk Score Driver: (Policy Driven Projects Only)

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

1.9 Complexity Level

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

Complexity Score: 20

US Sanction Paper

1.10 Process Hazard Assessment

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

☐ Yes ☒ No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY18-22	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="radio"/> Over <input type="radio"/> Under <input checked="" type="radio"/> NA	\$0M

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

Re-allocations of funds within the US business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements. Future fiscal year forecasts will be addressed in future year business plans.

1.13 Current Planning Horizon

		Current Planning Horizon						Total
		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	
CapEx	0.000	3.348	0.000	0.000	0.000	0.000	0.000	3.348
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
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	3.348	0.000	0.000	0.000	0.000	0.000	3.348

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	Jan 2017
Full Sanction	Mar 2017
Purchase of Equipment	Mar 2017
Project Complete	Mar 2017
Project Closure Sanction	May 2017

US Sanction Paper

1.15 Resources, Operations and Procurement

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

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

N/A

1.17 Climate Change

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

1.18 List References

N/A

US Sanction Paper

2 Decisions

The Senior Executive Sanctioning Committee (SESC) at a meeting held on March 27, 2017:

- (a) APPROVED this paper and the investment of \$3.348M and a tolerance of +/-10%.
- (b) NOTED that Phil Lavallee has the approved financial delegation.

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

Margaret Smyth
US Chief Financial Officer
Chair, US Sanctioning Committee

US Sanction Paper

3 Sanction Paper Detail

Title:	US CNI EMS-Lifecycle Hardware and Software Upgrade	Sanction Paper #:	USSC-17-152
Project #:	INVP 4568	Sanction Type:	Sanction
Operating Company:	Allocated	Date of Request:	March 27, 2017
Author:	Mike Gerolamo	Sponsor:	John Spink, VP Control Center Operations
Utility Service:	IS	Project Manager:	Phil Lavallee

3.1 *Background*

The existing NY and NE CNI EMS systems are currently near peak operating capacity, and are not able to accept the system software upgrade that is needed to keep these mission critical systems at the highest level of availability. Running the EMS systems on this hardware and software leaves National Grid at risk of potential irrecoverable hardware failures. In the event that a system or application were to go down, the System Operators may lose visibility of the grid and potentially the control of devices and equipment that they can remotely operate from the Control Center. Loss of visibility and/or control can cause both reputational and financial impacts to National Grid from both our regulators and governmental agencies.

National Grid has developed a plan to replace these critical assets with new hardware and software.

3.2 *Drivers*

The program is driven by the US IS CNI department's mission to respond quickly and effectively to the numerous policy-driven, business, and regulatory needs that arise in support of the US Electric Control Rooms.

Key Business Drivers:

- Maintain EMS reliability in support of Control Center Operations.
- Preserving reputation of National Grid by maintaining system availability.
- Accommodate increasing point counts driven by Distributed Generation.

Technology Drivers:

- Maintain EMS on the latest Hardware and software, which preserves manufacturers support through maintenance agreements.

US Sanction Paper

3.3 Project Description

This Policy-driven investment will procure the equipment needed for the project stages for 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 near peak capacity, 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 hardware replacement would allow for an increased capacity of the EMS databases, to accommodate future growth in National Grid territories receiving Supervisory Control and Data Acquisition (SCADA) data. This helps National Grid stay compliant with a regulatory requirement to share any and all transmission SCADA data with regional ISOs and interconnecting utilities, via Inter-Control Center Communications Protocol (ICCP).

The project will also replace the aging hardware in the EMS environments. It is no longer possible to obtain like-for-like replacements of this aged hardware under support from the system vendor, which increases risk of overall component failure.

Additionally, the NY & NE systems are currently operating R5.5 of the EMS Software, and the current mature vendor release is 6.6. A later project will upgrade the software and allow National Grid to remain on track with the latest EMS solution, while mitigating the risk of future large jumps in release software that may increase financial and functional risks.

3.4 Benefits Summary

As the business continues to commission new devices, particularly distributed generation, the required database sizing increases. Current hardware will not support the database expansion or the existing mature EMS ABB software release. Project will ensure compliance for business growth, and provide avoidance of risk around unsupported hardware.

3.5 Business and Customer Issues

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

US Sanction Paper

3.6 Alternatives

Alternative 1: Delay the Project

This alternative is not a viable option, because it puts the existing system at risk of system failure without the ability to procure new equipment. The current Electric Control roadmap identifies the next opportunity to upgrade software near 2020-2021, which would render all hardware out of support and not replaceable in the marketplace.

Alternative 2: Move forward with a Software only project, without new Hardware

This alternative is not a viable option, as the vendor will not support a software upgrade without hardware that is can be supported.

3.7 Safety, Environmental and Project Planning Issues

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

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	Project depends on purchase of large quantities of equipment with high level of Procurement resources involved	4	3	3	12	12	Mitigate	Early engagement and mobilization of National Grid procurement resources and vendors	Backlog of procurement requests for other projects.	Priorities outstanding procurement activities

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

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

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

US Sanction Paper

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

					Current Planning Horizon						
Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total
					2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	
4568	US CNI EMS-Lifecycle Hardware and Software Upgrade	+/- 10%	CapEx	0.000	3.348	0.000	0.000	0.000	0.000	0.000	3.348
			OpEx	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	
			Total	0.000	3.348	0.000	0.000	0.000	0.000	3.348	
Total Project Sanction			CapEx	0.000	3.348	0.000	0.000	0.000	0.000	3.348	
			OpEx	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	
			Total	0.000	3.348	0.000	0.000	0.000	0.000	3.348	

3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

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

Variance (Business Plan-Project Estimate)

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
CapEx	0.000	(3.348)	0.000	0.000	0.000	0.000	0.000	(3.348)
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	(3.348)	0.000	0.000	0.000	0.000	0.000	(3.348)

3.11.3 Cost Assumptions

This estimate was developed in 2017 using the standard IS estimating methodology. The accuracy level of estimate for each project is identified in table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

This is not an NPV Project.

3.11.4.1 NPV Summary Table

N/A

US Sanction Paper

3.11.4.2 NPV Assumptions and Calculations

N/A

3.11.5 Additional Impacts

None.

3.12 Statements of Support

3.12.1 Supporters

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

Role	Individual's Name
Business Executive Sponsor	John Spink
Head of PDM	Jeff Dailey obo Deb Rollins
Relationship Manager	Aman Aneja
Program Delivery Manager	Phil Lavallee
IS Finance Management	Chip Benson
IS Regulatory	Dan DeMauro
DR&S	Elaine Wilson
Service Delivery	Brian Detota
Enterprise Architecture	Joe Clinchot

3.12.2 Reviewers

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

Function	Individual	Area
Regulatory	Zschokke, Peter	All
Jurisdictional Delegate(s)	Harbaugh, Mark	Electric - NY
	Anand, Sonny	Electric - NE
	Hill, Terron	FERC
Procurement	Curran, Art	All

4 Appendices

4.1 Sanction Request Breakdown by Project

N/A

US Sanction Paper

4.2 Other Appendices

4.2.1 Project Cost Breakdown

Project Cost Breakdown			
Cost Category	sub-category	\$ (millions)	Name of Firm(s) providing
Personnel	NG Resources	-	
	SDC Time & Materials	-	
	SDC Fixed-Price	-	
	All other personnel	-	
	TOTAL Personnel Costs	-	
Hardware	Purchase	3.057	
	Lease	-	
Software		-	
Risk Margin		-	
Other		0.291	
TOTAL Costs		3.348	

4.2.2 Benefiting Operating Companies

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

Benefiting Operating Companies Table:

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

4.2.3 IS Ongoing Operational Costs (RTB):

This project will not change IS ongoing operations support costs. These are also known as Run the Business (RTB) costs.

4.3 NPV Summary

N/A

4.4 Customer Outreach Plan

N/A



Planning & Performance Management ▶
 FY18 - Investment Request Summaries - IRSs: Apps Interface Remediation



I Like It



Tags & Notes

nationalgrid		Investment Request Summary - IS US		FISCAL YEAR 2018																																													
INV ID:	4706	Project Name: Apps Interface Remediation																																															
Program:	Asset Health																																																
Sponsor:	John Gilbert	Title: Global Head IS Service Delivery, Global IS																																															
Relationship Manager:	Bill Kearns	Title: IS Relationship Manager, Global IS																																															
Prog Delivery Manager:	Dave McCune	Title: Programme Delivery, Global IS																																															
Paper Author:	Nicola Pennington / Steve Trezza	Title: Business Consltant - Corporate IS																																															
IS Roadmap Category:	IS Assurance	Business Area:	Corporate IS	Portfolio:	IS for IS																																												
<input type="checkbox"/> In-Flight Project?	Invest Classification: Medium	Category:	Policy Driven	Primary Policy Driver:	Reliability																																												
					Region: US																																												
<input checked="" type="checkbox"/> Growth Playbook Project?	<input type="checkbox"/> Shaping Our Future Project?	<input type="checkbox"/> Energy Efficiency Project?																																															
<p>Project Description: The context for the project with background information</p> <p>The primary driver for this project is to mitigate the risks of continuing to be reliant on out of support infrastructure. These risks are :</p> <ul style="list-style-type: none"> Increased Security risk as out of support infrastructure will not receive security patches. In the event of failure National Grid IS will be unable to meet the agreed Service Level Agreements (SLAs) for many key applications once the middleware infrastructure goes out of support. The 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. 																																																	
<p>Project Rationale: Highlight business challenge, capability or process the project addresses</p> <p>The Strategy roadmap for middleware that supports file transfers is SAP PI and Oracle Fusion. Work is required to migrate interfaces from legacy services to strategic services and decommission the legacy services.</p>																																																	
<p>Project Scope: Explain what is in scope and what is not in scope for the project</p> <p>The 1327 interfaces (523 FTS, 340 RDX, 245 MQSI, 253 JCAPS, 44 PM4D, 7 VB) included in this scope of work will be divided into sprints that will focus on a specific set of interfaces that touch specific sets of applications. Each sprint will be executed sequentially.</p>																																																	
<p>Project Dependencies: Identify any core program or project dependencies, please include INVP numbers if known</p> <p>INVP 3492 - Comprehensive Integration Services</p>																																																	
<p>Basic Project Assumptions:</p> <p>All migration work</p> <p>After discussion with finance it is assumed that the majority of this project is capex based on the assumption that the work is creating new interfaces as interfaces move to the new oracle fusion service, which significantly enhances current capability. It has been assumed that there will still be some opex required for requirements, and post implementation support.</p>																																																	
<p>Indicative Project Costs by Fiscal Year</p> <table border="1"> <thead> <tr> <th>(\$M)</th> <th>Prior Years</th> <th>FY 2018</th> <th>FY 2019</th> <th>FY 2020</th> <th>FY 2021</th> <th>FY 2022</th> <th>FY 2023</th> <th>FY 2024</th> <th>FY 2025</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>CapEx</td> <td></td> <td>2.600</td> <td>0.700</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>3.300</td> </tr> <tr> <td>OpEx</td> <td></td> <td>0.020</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.020</td> </tr> <tr> <td>Impact on RTB</td> <td></td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> </tr> </tbody> </table>						(\$M)	Prior Years	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Total	CapEx		2.600	0.700	0.000	0.000	0.000	0.000	0.000	0.000	3.300	OpEx		0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020	Impact on RTB		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(\$M)	Prior Years	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Total																																							
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Impact on RTB		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																																							
<p>Indicative Project Costs by Delivery Phase</p> <table border="1"> <thead> <tr> <th>(\$M)</th> <th>Start-up</th> <th>R & D</th> <th>D & I</th> <th>Closure</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>CapEx</td> <td></td> <td>0.600</td> <td>2.700</td> <td></td> <td>3.300</td> </tr> <tr> <td>OpEx</td> <td>0.010</td> <td>0.000</td> <td>0.000</td> <td>0.010</td> <td>0.020</td> </tr> </tbody> </table>						(\$M)	Start-up	R & D	D & I	Closure	Total	CapEx		0.600	2.700		3.300	OpEx	0.010	0.000	0.000	0.010	0.020																										
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OpEx	0.010	0.000	0.000	0.010	0.020																																												

Project Benefits - Type I only

(\$M)	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Total
Type I - CapEx									0.000
Type I - OpEx									0.000
Revenue Generation									0.000

Key Business Benefits:

Describe benefits, both financial and non-financial, and when those benefits will be delivered. Provide a clear & concise business case stating the investment drivers – why do we need to do something and why now? Explain any Regulatory considerations and how this initiative aligns with the US Business Strategy.

The impacts of this project on the Customer are based on a number of areas:

- Improves reliability and productivity
- Support Jurisdictional and business function initiatives
- Enables a better Customer Experience

Employees will be able to use an application with more functionality in a more intuitive manner. The Jurisdiction and business function will be able to utilize a more reliable and resilient application, that will help to provide customers with more options when interacting with the Company.

Investment Prioritization

Benefits				Cost			
	Impact	Weight	Score		Impact	Weight	Score
OpEx Annual Savings		10.3%	0	OpEx Cost	0.020	-24.4%	-244
CapEx Annual Savings		5.1%	0	CapEx Cost	3.300	-11.2%	-1
Revenue Generation (annual)		6.2%	0	RTB Efficiency	0.000	% -22.5%	0
Financial Control	Low	6.2%	0.062	Union/Labor Relations	Low	-9.8%	0
Soft Financial Benefits	Low	3.8%	0.038	Dependencies	High	-10.6%	-0.954
Regulatory Impact	Low	11.2%	0.112	EIapse Time Duration	High	-6.6%	-0.594
Process & Personal Safety	Low	19.4%	0.194	Change Management Effort	Medium	-14.9%	-0.447
Reliability	Medium	10.9%	0.327				
Customer & Community Responsiveness	Medium	5.3%	0.159				
Employee Satisfaction	Medium	4.6%	0.138				
Mitigates a Corporate Risk / Risk of not Doing	High= 40 or more	8.9%	0.801				
Jurisdictional Engagement	High	8.2%	1				
			Benefit Score: 2.57	Cost Score: -3.35			
				Overall Priority Score: -0.776			

Investment Risk and Complexity

Project Risk Score:	46	Risk Score Description: Risk Impact = 6 and Risk Likelihood = 7
Project Complexity Score::	21	Project Complexity Score Description:

Key Risks Description: Provide detail on project risks & mitigation strategy:

There is a risk of failure of these unsupported platforms, as the fact that many of these systems support key company operations. Thus, our ability to continue to provide safe and reliable service would be impacted if one of these systems were to fail.

Now that customers are demanding new services, without this investment of upgrading our underlying technology infrastructure, we cannot deliver these new strategic programs.

IS Project Dependencies if you don't see a project in the drop-down please contact the Planning & Performance team.

IS Projects: 4706 - Apps Interface Remediation

1. Has a dependency on IS Project;

2. Has a dependency on IS Project;

Benefiting Operating Companies: Check all that apply

- ☐ Select All Companies
 ☐ Clear All Companies
☐ Select All Gas
 ☐ Select All Electric
 ☐ Select All Gen

3. Has a dependency on IS Project;	<input checked="" type="checkbox"/> National Grid USA Parent
4. Has a dependency on IS Project;	<input checked="" type="checkbox"/> KeySpan Energy Development Corporation
5. Has a dependency on IS Project;	<input checked="" type="checkbox"/> KeySpan Services Inc.
6. Has a dependency on IS Project;	<input checked="" type="checkbox"/> KeySpan Energy Corp
	<input checked="" type="checkbox"/> KeySpan Energy Delivery New York
	<input checked="" type="checkbox"/> KeySpan Energy Delivery Long Island
	<input checked="" type="checkbox"/> KeySpan Generation LLC (PSA)
	<input checked="" type="checkbox"/> KeySpan Glenwood Energy Center
	<input checked="" type="checkbox"/> KeySpan Port Jefferson Energy Center
	<input checked="" type="checkbox"/> KeySpan Energy Trading Svc LLC
	<input checked="" type="checkbox"/> Niagara Mohawk Power Corp- Electric Distribution
	<input checked="" type="checkbox"/> Niagara Mohawk Power Corp - Gas
	<input checked="" type="checkbox"/> Niagara Mohawk Power Corp - Transmission
	<input checked="" type="checkbox"/> Massachusetts Electric Company
	<input checked="" type="checkbox"/> Massachusetts Electric Company - Transmission
	<input checked="" type="checkbox"/> Nantucket Electric Company
	<input checked="" type="checkbox"/> Boston Gas Company
	<input checked="" type="checkbox"/> Colonial Gas Company
	<input checked="" type="checkbox"/> Narragansett Gas Company
	<input checked="" type="checkbox"/> Narragansett Electric Company
	<input checked="" type="checkbox"/> Narragansett Electric Company - Transmission
	<input checked="" type="checkbox"/> New England Power Company - Transmission
	<input checked="" type="checkbox"/> New England Hydro - Trans Corp
	<input checked="" type="checkbox"/> New England Electric Trans Corp
	<input checked="" type="checkbox"/> NG LNG LP Regulated Entity

Business Initiative Dependencies

IS Projects: 4706 - Apps Interface Remediation

1. Has a dependency on Biz Initiative,
2. Has a dependency on Biz Initiative,
3. Has a dependency on Biz Initiative,
4. Has a dependency on Biz Initiative,

Project Relationships

☐ Minor Works

Project Relationship:

Related Projects:

Enabling IS Capabilities check all that apply

<input type="checkbox"/> Enterprise Content Management (ECM)	<input type="checkbox"/> Enterprise Mobility
<input checked="" type="checkbox"/> Comprehensive Integration Services (CIS)	<input type="checkbox"/> Reporting and Analytics
<input type="checkbox"/> Hybrid Cloud	<input type="checkbox"/> Networks
<input type="checkbox"/> Next Gen Workplace	

Key Milestone Dates:

 Select the 1st, 15th or last day of the month

Begin Start-up	Begin Requirements & Deign	Begin Development & Implementation	Begin User Acceptance Testing	Go Live	Project Completion	Project Closure
April, 2017					March, 2019	

Business Resource Estimates: # of Full Time Equivalents


Start-up	Requirements & Deign	Develop & Implement	Business Resources UAT	Go Live Readiness	Post Go Live Support
0	0	0	0	0	0

Resourcing Strategy:

Attached Supporting Documents

Recommendation Sign-off

Role	Name	Title	Date
Business Project Sponsor	John Gilbert	Global Head IS Service Delivery, Global IS	
Business Relationship Manager	Bill Kearns	IS Business Relationship Manager	
IS Program Delivery Manager	Dave McCune	IS Program Delivery Manager	





US Sanction Paper

Title:	US SAP: Infrastructure Landscape	Sanction Paper #:	USSC-17-200v2
Project #:	INVP 4348 Capex: S007675	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	September 13, 2017
Author / NG Representative:	Diane Beard / Ella Weisbord	Sponsor:	Anuraag Bhargava, SVP CIO
Utility Service:	IS	Project Manager:	Samir Parikh

1 Executive Summary

1.1 **Sanctioning Summary**

This paper requests sanction of INVP 4348 in the amount \$3.719M with a tolerance of +/- 10% for the purposes of Full Project Implementation.

This sanction amount is \$3.719M broken down into:

\$3.474M Capex
\$0.245M Opex
\$0.000M Removal

1.2 **Project Summary**

This project will create a permanent set of servers used for project development in support of initiatives pertaining to the SAP portfolio.

US Sanction Paper

1.3 Summary of Projects

Project Number	Project Title	Estimate Amount (\$M)
INVP 4348	US SAP: Infrastructure Landscape	3.719
Total		3.719

1.4 Associated Projects

Project Number	Project Title
4400	Annual HR & Payroll Mandatory Service
4397	Ariba TLS & CI
4578	Concur Travel & Expenses Management (T&E)

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Paper Title	Sanction Type	Tolerance
May 2017	USSC	\$1.195M	\$4.343M	US SAP: Infrastructure Landscape	Partial Sanction	25%

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
Jun 2018	Sanction Closure

US Sanction Paper

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	This project will set the background for all projects (mandatory and policy driven) within portfolio.

1.8 Asset Management Risk Score

Asset Management Risk Score: 44

Primary Risk Score Driver: (Policy Driven Projects Only)

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

1.9 Complexity Level

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

Complexity Score: 19

1.10 Process Hazard Assessment

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

☐ Yes
☒ No

US Sanction Paper

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY18-22	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input type="radio"/> Under <input checked="" type="radio"/> NA	\$0.000M

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

N/A

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
CapEx	0.000	3.474	0.000	0.000	0.000	0.000	0.000	3.474
OpEx	0.003	0.242	0.000	0.000	0.000	0.000	0.000	0.245
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	0.003	3.716	0.000	0.000	0.000	0.000	0.000	3.719

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	FEB 2017
Partial Sanction	MAY 2017
Begin Requirements and Design	MAY 2017
Begin Implementation	JUN 2017
Move to Production / First Quarter Go Live	JUL 2017
Project Sanction	SEP 2017
Move to Production / Second Quarter Go Live	DEC 2017
Move to Production / Third Quarter Go Live	MAR 2018
Project Complete	MAR 2018
Sanction Closure	JUN 2018

US Sanction Paper

1.15 Resources, Operations and Procurement

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

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

N/A

1.17 Climate Change

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

1.18 List References

N/A

US Sanction Paper

2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on September 13, 2017:

- (a) APPROVED this paper and the investment of \$3.719M and a tolerance of +/- 10%.
- (b) NOTED that Samir Parikh has the approved financial delegation.

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

Christopher Kelly
Senior Vice President, Electric Process and Engineering

US Sanction Paper

3 Sanction Paper Detail

Title:	US SAP: Infrastructure Landscape	Sanction Paper #:	USSC-17-200v2
Project #:	INVP 4348	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	September 13, 2017
Author / NG Representative:	Diane Beard / Ella Weisbord	Sponsor:	Anuraag Bhargava, SVP CIO
Utility Service:	IS	Project Manager:	Samir Parikh

3.1 Background

Obtaining project environments from the vendor, T-Systems, is a critical path task for SAP related projects and initiatives. Currently, National Grid IS must provision project server environments each time a new initiative is undertaken. This requires three-to-five months of lead time to prepare the project change request, receive and evaluate cost estimates, and ultimately receive the actual environments.

The goal of this investment is to create a permanent set of project server environments for future initiatives. By having a permanent set of project environments, we can alleviate bottlenecks and begin projects more efficiently. This initiative will support all projects within the SAP portfolio including mandatory items.

3.2 Drivers

The primary driver is to improve IS project implementation schedules by creating a landscape to support all projects and initiatives within the SAP Portfolio.

US Sanction Paper

3.3 Project Description

As part of this project, the following activities will be implemented:

- Purchase lease extensions from T-Systems and SAP HANA Enterprise Cloud (HEC) for a set of project environments required to deliver in-flight SAP Portfolio projects and mandates.
- Complete design assessment to determine a permanent set of critical SAP project environments that will require further extension.

3.4 Benefits Summary

This project is intended to support mandated projects by:

- Reducing the lead time to start projects and initiatives within the portfolio
- Increasing accuracy of cost estimates
- Alleviating project startup bottlenecks
- Increasing reliability for SAP related project delivery
- Reducing one-time startup costs associated with standing up new environments for each project

3.5 Business and Customer Issues

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

3.6 Alternatives

Alternative 1: Defer project / Do Nothing

This option will not address the business need for project environments to efficiently support initiatives in the SAP portfolio.

3.7 Safety, Environmental and Project Planning Issues

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

US Sanction Paper

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	Dependency on Host Transition decision making	2	2	2	4	4	Mitigate	Work with Service Delivery and Host Transition Team		Track Mitigation Plan and Take required/ appropriate actions

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

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

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

US Sanction Paper

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

					Current Planning Horizon							
Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total	
					2017/18	2018/19	2019/20	2020/21	2021/22	2022/23		
INVP 4348	US SAP: Infrastructure Landscape	+/- 10%	CapEx	0.000	3.474	0.000	0.000	0.000	0.000	0.000	0.000	3.474
			OpEx	0.003	0.242	0.000	0.000	0.000	0.000	0.000	0.000	0.245
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.003	3.716	0.000	0.000	0.000	0.000	0.000	0.000	3.719
Total Project Sanction			CapEx	0.000	3.474	0.000	0.000	0.000	0.000	0.000	0.000	3.474
			OpEx	0.003	0.242	0.000	0.000	0.000	0.000	0.000	0.000	0.245
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.003	3.716	0.000	0.000	0.000	0.000	0.000	0.000	3.719

3.11.2 Project Budget Summary Table

Project Costs per Business Plan

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
CapEx	0.000	3.474	0.000	0.000	0.000	0.000	0.000	3.474
OpEx	0.003	0.242	0.000	0.000	0.000	0.000	0.000	0.245
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.003	3.716	0.000	0.000	0.000	0.000	0.000	3.719

Variance (Business Plan-Project Estimate)

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

3.11.3 Cost Assumptions

This estimate was developed using standard IS estimating methodology. The accuracy level of the estimate for each project is identified in table 3.11.1.

US Sanction Paper

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

This is not an NPV project.

3.11.4.2 NPV Assumptions and Calculations

3.11.5 Additional Impacts

None

3.12 Statements of Support

3.12.1 Supporters

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

Role	Individual
Business Representative	Jason Gramas
Head of PDM	Deb Rollins
Relationship Manager	Joel Semel
Program Delivery Director	Samir Parikh
IS Finance Management	Chip Benson
IS Regulatory	Daniel DeMauro
DR&S	Elaine Wilson
Service Delivery	Brian Detota
Enterprise Architecture	Joe Clinchot

US Sanction Paper

3.12.2 Reviewers

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

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

4 Appendices

4.1 Sanction Request Breakdown by Project

N/A

4.2 Project Cost Breakdown

Project Cost Breakdown			
Cost Category	sub-category	\$ (millions)	Name of Firm(s) providing
Personnel	NG Resources	0.097	
	SDC Time & Materials	-	
	SDC Fixed-Price	-	
	All other personnel	-	
	TOTAL Personnel Costs	0.097	
Hardware	Purchase	-	
	Lease	3.510	
Software		-	
Risk Margin		0.103	
Other		0.008	
TOTAL Costs		3.719	

US Sanction Paper

4.2.1 Benefiting Operating Companies

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



US Sanction Paper

Title:	US SAP: Business Planning Consolidation (BPC) - HANA	Sanction Paper #:	USSC-17-228 v2
Project #:	INVP 4217	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	September 13, 2017
Author / NG Representative:	Diane Beard / Ella Weisbord	Sponsor:	Caroline Hon, VP Finance Excellence
Utility Service:	IS	Project Manager:	Samir Parikh

1 Executive Summary

1.1 **Sanctioning Summary**

This paper requests sanction of INVP 4217 in the amount \$2.893M with a tolerance of +/- 10% for the purposes of Development and Implementation.

The sanction amount of \$2.893M broken down into:

\$2.633M Capex

\$0.260M Opex

\$0.000M Removal

1.2 **Project Summary**

National Grid, through its SAP Business Planning and Consolidation (BPC) implementation, is looking to provide additional business benefits to the accounting and finance functions of the organization by updating from version 7.5 to 10.1. The goal of this Project is to create sustainable value across the entire National Grid organization by (1) automating the legal consolidations and management reporting processes and (2) providing critical information to support enhanced decision making for National Grid executives to provide consistency, automation, transparency, and improved forecasting capabilities.

1.3 **Summary of Projects**

Project Number	Project Title	Estimate Amount (\$M)
4217	US SAP: Business Planning Consolidation (BPC) - HANA	2.893
Total		2.893

US Sanction Paper

1.4 Associated Projects

N/A

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Paper Title	Sanction Type	Tolerance
Jun 2017	US USSC	\$1.161M	\$2.690M	INVP 4217 US SAP: Business Planning Consolidation (BPC) - HANA	Partial Sanction	25%

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
Feb 2018	Sanction Closure

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	This investment will support the upgrade of the SAP Business Planning Capability (BPC) platform to increase accessibility to planning capabilities, improve forecasting capabilities, and keep National Grid in compliance with vendor support policies.

US Sanction Paper

1.8 Asset Management Risk Score

Asset Management Risk Score: 39

Primary Risk Score Driver: (Policy Driven Projects Only)

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

1.9 Complexity Level

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

Complexity Score: 22

1.10 Process Hazard Assessment

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

☐ Yes ☒ No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY18-22	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	2.893M

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

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

US Sanction Paper

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
CapEx	0.000	2.633	0.000	0.000	0.000	0.000	0.000	2.633
OpEx	0.000	0.260	0.000	0.000	0.000	0.000	0.000	0.260
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	2.893	0.000	0.000	0.000	0.000	0.000	2.893

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	Apr 2017
Begin Requirements and Design	Jun 2017
Partial Sanction	Jun 2017
Project Sanction	Sep 2017
Begin Development and Implementation	Sep 2017
Move to Production / Last Go Live	Oct 2017
Project Complete	Nov 2017
Sanction Closure	Feb 2017

1.15 Resources, Operations and Procurement

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



US Sanction Paper

Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green

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

N/A

1.17 Climate Change

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

1.18 List References

N/A

US Sanction Paper

2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on September 13, 2017.

- (a) APPROVE this paper and the investment of \$2.893M and a tolerance of +/-10%.
- (b) APPROVED the run-the-Business (RTB) impact of \$0.013M for 3 months.
- (c) NOTE that Samir Parikh has the approved financial delegation.

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

Christopher Kelly
Senior Vice President, Electric Process and Engineering

US Sanction Paper

3 Sanction Paper Detail

Title:	US SAP: Business Planning Consolidation (BPC) - HANA	Sanction Paper #:	USSC-17-228 v2
Project #:	INVP 4217	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	September 13, 2017
Author / NG Representative:	Diane Beard / Ella Weisbord	Sponsor:	Caroline Hon, VP Finance Excellence
Utility Service:	IS	Project Manager:	Samir Parikh

3.1 Background

SAP's Business Planning and Consolidation (BPC) platform is a module that supports National Grid's financial processes, such as financial reporting, budgeting and forecasting. It allows for real-time monitoring of financial results and improved strategic decisions. SAP HANA is an in-memory database developed by SAP. BPC on HANA has been used by National Grid since November 2012. Upgrading the platform from version 7.5 to 10.1 will allow National Grid to utilize the current version's enhancements and leverage additional benefits, such as reading and aggregating data for reporting purposes, transforming data, and reporting on greater volumes of data.

3.2 Drivers

The project is policy driven by the need to keep the US SAP module in compliance with vendor upgrade requirements.

3.3 Project Description

The BPC upgrade will support the Finance organization's goal to deliver outstanding financial performance, as well as keep the US SAP module in compliance. In support of the core consolidation business requirements, the three model Consolidation approach will be used that will leverage SAP's US Generally Accepted Accounting Principle (GAAP) starter kit. Deploying this starter kit provides alignment with SAP's future upgrade path and provides robust functionality. The budget for the project is estimated based on a co-build approach that reduces overall cost, facilitates knowledge transfer, and enables National Grid to take ownership of the application once the application is deployed.

US Sanction Paper

3.4 Benefits Summary

The requests worked under this project are expected to support compliance with regulatory mandates, contribute to improved BPC HANA system reliability and business functionality, and fulfill the organization's operating requirements.

The project will enable accelerated real-time insights for financial variances. During the monthly consolidation process, BPC HANA provides the ability to check and confirm for foreign exchange rate variances as well as intercompany variances. Real-time variance analysis will allow for improved decision making and the ability to adjust course in a timely manner.

In addition, the upgrade will provide:

- Simplified Disclosure Compliance
- Enhanced Journal Management
- Improved Reporting
- Streamlined, Unified, and Harmonized User Experience
- Enhanced Manageability
- Improved System Performance, Integrity and Maintenance
- Expanded Mobile Delivery Options
- Simplified Hierarchy Maintenance
- Specific Industry or Line of Business Packaged Solutions

3.5 Business and Customer Issues

3.6 Alternatives

Alternative 1: Defer project / Do Nothing

This option is not viable as it will not address the business need for reliability and improvements to core end-user services.

3.7 Safety, Environmental and Project Planning Issues

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

US Sanction Paper

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	Business resources are not readily available as required	3	2	3	6	9	Mitigate	Activities requiring business resources will be planned and communicated in advance as possible to identify and circumvent any potential schedule conflicts.	The schedule may require adjustment to accommodate business resource availability and/or alternative resources may have to be found.	Project schedule and timeline would be re-evaluated based upon confirmed availability of business resources. Scope may have to be possibly altered to accommodate business resource availability as well.
2	Project scope additions or changes may impact schedule	2	3	3	6	6	Mitigate	Projects will use existing change control board (CCB) process to submit change requests for review and approval prior to commencing work.	The cost and timeline of the project may be impacted.	Project schedule would be re-evaluated and potentially extended. Additional funding may be required to pay for incremental change requests.

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

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

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A



US Sanction Paper

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

					Current Planning Horizon						
Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total
					2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
4217	US SAP: Business Planning Consolidation (BPC) - HANA	+/- 10%	CapEx	0.000	2.633	0.000	0.000	0.000	0.000	0.000	2.633
			OpEx	0.000	0.260	0.000	0.000	0.000	0.000	0.260	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	0.000	2.893	0.000	0.000	0.000	0.000	2.893	
Total Project Sanction			CapEx	0.000	2.633	0.000	0.000	0.000	0.000	0.000	2.633
			OpEx	0.000	0.260	0.000	0.000	0.000	0.000	0.000	0.260
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	2.893	0.000	0.000	0.000	0.000	2.893	

3.11.2 Project Budget Summary Table

Project Costs per Business Plan

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

Variance (Business Plan-Project Estimate)

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
CapEx	0.000	(2.633)	0.000	0.000	0.000	0.000	0.000	(2.633)
OpEx	0.000	(0.260)	0.000	0.000	0.000	0.000	0.000	(0.260)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	(2.893)	0.000	0.000	0.000	0.000	0.000	(2.893)

3.11.3 Cost Assumptions

This estimate was developed using standard IS estimating methodology. The accuracy level of the estimate for each project is identified in Table 3.11.1.

US Sanction Paper

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

This is not an NPV project.

3.11.4.2 NPV Assumptions and Calculations

3.11.5 Additional Impacts

None

3.12 Statements of Support

3.12.1 Supporters

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

Role	Individual's Name
Business Executive Sponsor	Caroline Hon
Relationship Manager	Joel Semel
Program Delivery Director	Samir Parikh
IS Finance Management	Chip Benson
IS Regulatory	Daniel DeMauro
DR&S	Elaine Wilson
Service Delivery	Brian Detota
Enterprise Architecture	Joe Clinchot

3.12.2 Reviewers

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

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

US Sanction Paper

4 Appendices

4.1 Other Appendices

4.1.1 Project Cost Breakdown

Project Cost Breakdown			
Cost Category	sub-category	\$ (millions)	Name of Firm(s) providing
Personnel	NG Resources	0.222	
	SDC Time & Materials	0.009	IBM
	SDC Fixed-Price	0.849	Wipro
	All other personnel	1.158	KPMG, SAP
	TOTAL Personnel Costs	2.237	
Hardware	Purchase	-	
	Lease	0.207	
Software		-	
Risk Margin		0.348	
Other		0.100	
TOTAL Costs		2.893	

US Sanction Paper

4.1.2 Benefiting Operating Companies

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

US Sanction Paper

4.1.3 IS Ongoing Operational Costs (RTB):

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

Summary Analysis of RTB Costs							
All figures in \$ millions	Yr. 1 17/18	Yr. 2 18/19	Yr. 3 19/20	Yr. 4 20/21	Yr. 5 21/22	Yr. 6+	Total
Forecast of RTB Impact							
RTB if Status Quo Continues	0.017	0.050	0.050	0.050	0.050	0.034	0.253
RTB if Project is Implemented	0.029	0.050	0.050	0.050	0.050	0.034	0.265
Net change in RTB	0.013	-	-	-	-	-	0.013
RTB Variance Analysis (if Project is Implemented)							
Net Δ RTB funded by Plan(s)	-	-	-	-	-	-	-
Variance to Plan	0.013	-	-	-	-	-	0.013
Total RTB Costs - by Cost Type (if Project is Implemented)							
App.Sup. - SDC 1	-	-	-	-	-	-	-
App.Sup. - SDC 2	0.029	0.050	0.050	0.050	0.050	0.034	0.265
App.Sup. - other	-	-	-	-	-	-	-
SW maintenance	-	-	-	-	-	-	-
SaaS	-	-	-	-	-	-	-
HW support	-	-	-	-	-	-	-
Other: IS	-	-	-	-	-	-	-
All IS-related RTB (sub-Total)	0.029	0.050	0.050	0.050	0.050	0.034	0.265
Business Support (sub-Total)	-	-	-	-	-	-	-
Total RTB Costs	0.029	0.050	0.050	0.050	0.050	0.034	0.265

Investment Proposal Summary Sheet

WAP Density Deployment – Project No. INVP 4680

Region:	US	Category:	Policy	Legal Entity:	Shared
Risk Score: 42	Primary Driver:		Reliability	Project Classification:	M

Project Description:

This paper requests sanction of INVP 4680 in the amount \$ 2.305M with a tolerance of +/- 10% for the purposes of full implementation.

This sanction amount is \$2.305M broken down into:

\$ 2.117M	Capex
\$ 0.188M	Opex
\$ 0.000M	Removal

Brief Description

This project is part of the Technology Improvement Program (TIP) under INVP 4663 Enhance and Enable End User Capabilities and 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.

Background

- The increasing number of devices using Wi-Fi bandwidth in company facilities is straining the capability to provide adequate wireless access service levels. This proposal would upgrade wireless networks to sufficient capacity for all users to connect 3 devices (e.g. phone, tablet and laptop). This program includes provisions to deploy Wireless Local Area Network (WLAN) capabilities at selected locations that currently have no wireless network service, and implements higher wireless device density at locations with legacy wireless infrastructures, to support users with multiple devices. The program also provides enhanced wireless connectivity for training centers and storm response locations.
- Wireless bridges within the current wireless network infrastructure are no longer supported by supplier network management contracts, as they do not meet current standards, which places risk to the reliability of the wireless networks and the ability to recover from operational service interruption events. To maintain the established level of reliability of wireless networks and to maintain current wireless service levels, legacy wireless bridges will be decommissioned and replaced by new wireless devices.

National Grid Confidential

Project Costs [\$]M		Prior Year FY16/17	Yr 1 FY17/18	Yr 2 FY18/19	Yr 3 FY19/20	Yr 4 FY20/21	Yr 5 FY21/22	Total
Start-Up - OPEX		\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Start-Up - CAPEX		\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Start-Up - risk margin		\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Start-Up SUBTOTAL		\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Requirements & Design - OPEX		\$0.020	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.020
Requirements & Design - CAPEX		\$0.180	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.180
Requirements & Design - risk margin		\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Requirements & Design SUBTOTAL		\$0.200	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.200
Development & Implementation - OPEX								
People		\$0.000	\$0.168	\$0.000	\$0.000	\$0.000	\$0.000	\$0.168
Software		\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Hardware		\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Telecommunications		\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Service Contracts		\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Risk Margin		\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Development & Implementation SUBTOTAL		\$0.000	\$0.168	\$0.000	\$0.000	\$0.000	\$0.000	\$0.168
Development & Implementation - CAPEX								
People		\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Software		\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Hardware		\$0.000	\$0.500	\$0.000	\$0.000	\$0.000	\$0.000	\$0.500
Telecommunications		\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Service Contracts		\$0.000	\$1.385	\$0.000	\$0.000	\$0.000	\$0.000	\$1.385
Risk Margin		\$0.000	\$0.052	\$0.000	\$0.000	\$0.000	\$0.000	\$0.052
Development & Implementation SUBTOTAL		\$0.000	\$1.937	\$0.000	\$0.000	\$0.000	\$0.000	\$1.937
TOTAL PROJECT COSTS		\$0.200	\$2.105	\$0.000	\$0.000	\$0.000	\$0.000	\$2.305
Non-regulated project - UPLIFT		\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Non-regulated project - TOTAL		\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Investment Plan No:	Budget OPEX	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
	Budget CAPEX	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Impact on RTB costs		\$0.000	\$0.253	\$0.337	\$0.337	\$0.337	\$0.337	\$1.601

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

TOTAL BENEFITS \$k							
---------------------------	--	--	--	--	--	--	--

Key Business Benefits:

Improved performance and security access to the wireless networks.

Key risks: <ul style="list-style-type: none"> • Ability of critical cabling vendors' and National Grid Facilities' resources to complete cabling work, and wireless device and power installations within the established end- to end schedule • Competing sites' initiatives and protocols which constrain wireless upgrade initiatives (e.g., site environmental and structural conditions , weather and National Grid network work freeze timelines, and site facility personnel capacity surges) • Sufficient sites' infrastructure prerequisites not being in place, constraining the ability to expand wireless networks (e.g., subnet IP address thresholds, license shortfalls, supporting fibre and cable network leading to the site and devices) 	Key Dates (Month/ Year): <table> <tr> <td>Start Up</td><td>Jan 2017</td></tr> <tr> <td>Partial Sanction</td><td>Feb 2017</td></tr> <tr> <td>Begin Requirements/Design</td><td>Feb 2017</td></tr> <tr> <td>Full Sanction</td><td>Jun 2017</td></tr> <tr> <td>Begin Dev & Implement</td><td>Jun 2017</td></tr> <tr> <td>Begin User Accept Testing</td><td></td></tr> <tr> <td>Move to Production / Last Go Live</td><td>Feb 2018</td></tr> <tr> <td>Project Complete</td><td>Mar 2018</td></tr> <tr> <td>Project Closure Sanction</td><td>Apr 2018</td></tr> </table>	Start Up	Jan 2017	Partial Sanction	Feb 2017	Begin Requirements/Design	Feb 2017	Full Sanction	Jun 2017	Begin Dev & Implement	Jun 2017	Begin User Accept Testing		Move to Production / Last Go Live	Feb 2018	Project Complete	Mar 2018	Project Closure Sanction	Apr 2018
Start Up	Jan 2017																		
Partial Sanction	Feb 2017																		
Begin Requirements/Design	Feb 2017																		
Full Sanction	Jun 2017																		
Begin Dev & Implement	Jun 2017																		
Begin User Accept Testing																			
Move to Production / Last Go Live	Feb 2018																		
Project Complete	Mar 2018																		
Project Closure Sanction	Apr 2018																		

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 PDM	William Kearns
Relationship Manager	William Kearns
Program Delivery Manager	David McCune
IS Finance Management	Chip Benson
IS Regulatory	Daniel DeMauro
DR&S	Elaine Wilson
Service Delivery	Brian Detota
Enterprise Architecture	Joseph Clinchot

RECOMMENDATIONS

The Sanctioning Authority is invited to:

- APPROVE the investment of \$2.305M including risk margin of \$0.205M by May 31, 2017
- NOTE that John Gilbert, Global Head IS Service Delivery, is the Project Sponsor
- NOTE that David Todd is the US IS Project Manager and has the approved financial delegation to deliver the project

Decision of the Sanctioning Authority

I hereby approve the recommendations made in this paper.

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

John Gilbert, Global Head IS Service Delivery



US Sanction Paper

Title:	US SAP: Governance Risk and Compliance (GRC) environment upgrade	Sanction Paper #:	USSC-17-229 v2
Project #:	INVP 4222	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	September 13, 2017
Author / NG Representative:	Diane Beard / Ella Weisbord	Sponsor:	Caroline Hon, VP Finance Excellence
Utility Service:	IS	Project Manager:	Samir Parikh

1 Executive Summary

1.1 **Sanctioning Summary**

This paper requests sanction of INVP 4222 in the amount \$2.668M with a tolerance of +/- 10% for the purposes of Development and Implementation.

This sanction amount is \$2.668M broken down into:

\$2.522M	Capex
\$0.146M	Opex
\$0.000M	Removal

1.2 **Project Summary**

This project updates the Governance, Risk and Compliance (GRC) solution of SAP to the vendor supported version. In addition, the project will update the GRC environments from Service Pack 4 to the latest version, Service Pack 17. These updates will ensure that the module, which provides control / roles segregation and Sarbanes-Oxley Act (SOX) guidelines, will be stable and incorporate the necessary program fixes in the new version. It will also integrate the newest features and improvements released by SAP.

1.3 **Summary of Projects**

Project Number	Project Title	Estimate Amount (\$M)
4222	US SAP: Governance, Risk, and Compliance (GRC) environment upgrade	2.668
Total		2.668

US Sanction Paper

1.4 Associated Projects

N/A

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Paper Title	Sanction Type	Tolerance
Jun 2017	US USSC	\$1.196M	\$2.441M	INVP 4222 US SAP: Governance Risk and Compliance (GRC) environment upgrade	Partial Sanction	25%

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
Feb 2018	Sanction Closure

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	<p>This investment will support the upgrade of the SAP Governance, Risk, and Compliance (GRC) solution to ensure National Grid is in compliance with vendor support policies and the program utilizes and supports regulations.</p> <p>This upgrade will address the following potential audit issues:</p> <ul style="list-style-type: none"> • Provide transport functionality for Separation Of Duty (SOD) rule set to maintain evidence of change control • Correct firefighter logging issues - SAP APD.11 (SAP Firefighter access review)

US Sanction Paper

1.8 Asset Management Risk Score

Asset Management Risk Score: 39

Primary Risk Score Driver: (Policy Driven Projects Only)

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

1.9 Complexity Level

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

Complexity Score: 15

1.10 Process Hazard Assessment

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

☐ Yes ☒ No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY18-22	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	2.668M

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

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

US Sanction Paper

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
CapEx	0.000	2.522	0.000	0.000	0.000	0.000	0.000	2.522
OpEx	0.000	0.146	0.000	0.000	0.000	0.000	0.000	0.146
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	2.668	0.000	0.000	0.000	0.000	0.000	2.668

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	Apr 2017
Begin Requirements and Design	Jun 2017
Partial Sanction	Jun 2017
Project Sanction	Sep 2017
Begin Development and Implementation	Sep 2017
Begin User Acceptance Testing	Oct 2017
Move to Production / Last Go Live	Nov 2017
Project Complete	Nov 2017
Sanction Closure	Feb 2018

1.15 Resources, Operations and Procurement

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



US Sanction Paper

Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green

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

N/A

1.17 Climate Change

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

1.18 List References

N/A

US Sanction Paper

2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on September 13, 2017:

- (a) APPROVE this paper and the investment of \$2.668M and a tolerance of +/-10%.
- (b) NOTE that Samir Parikh is the Project Manager and has the approved financial delegation.

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

Christopher Kelly
Senior Vice President, Electric Process and Engineering

US Sanction Paper

3 Sanction Paper Detail

Title:	US SAP: Governance Risk and Compliance (GRC) environment upgrade	Sanction Paper #:	USSC-17-229 v2
Project #:	INVP 4222	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	September 13, 2017
Author / NG Representative	Diane Beard / Ella Weisbord	Sponsor:	Caroline Hon, VP Finance Excellence
Utility Service:	IS	Project Manager:	Samir Parikh

3.1 Background

The SAP Governance, Risk and Compliance (GRC) solution consists of several modules that cover three main areas: analyze, manage, and monitor. GRC enables National Grid to manage user access and controls compliance, reduce risk in managing its back office operations, improve fraud prevention in business processes, and improve risk and audit management activities. The US SAP GRC solution was audited by National Grid's external auditor, Deloitte, and subsequently deemed this business critical application should not function without vendor support.

Highlighted GRC Modules:

- SAP GRC Access Control module facilitates clearly defined roles, manages role provisioning and super user access to the system.
- SAP GRC Risk Management module allows National Grid to perform risk management activities by identifying risk and implementing measures to mitigate the risk and its impacts.
- SAP GRC Firefighter (FF) is elevated access (outside of normal business roles) for specific users to support the business in case of incidents and/ or emergency requests. Once approved, the elevated access is provisioned for a temporary period. All actions performed by the user are logged in GRC for review and approval for the related transactional activity. All elevated access (FF activity) is subject to audit on a periodic basis.

National Grid implemented the GRC Access Control solution in November 2014, and its GRC environment is fourteen versions behind the current version. This introduces significant risk for monitoring Separation of Duties (SOD) in user access provisioning and controlling privileged "firefighter" (special elevated role) access.

US Sanction Paper

Past SOX control reviews (by National Grid's external auditor, Deloitte) have identified improvement opportunities related to the GRC firefighter log review process as well as a GRC upgrade opportunity. The SOX control reference is SAP APD.11 (SAP Firefighter access review).

3.2 Drivers

The project is necessary to keep the US SAP GRC solution in compliance with the vendor support policy. National Grid's US SAP GRC is currently on service level pack 4, which will be out of SAP support in December 2017.

3.3 Project Description

This project updates the GRC environments hosted by the vendor, T-Systems, to the latest (N-1) Service Pack and Patch level (from service pack 4 to service pack 17). These updates ensure improvements for system stability, apply bug fixes, and leverage any improvements and new features released by SAP.

3.4 Benefits Summary

This project is expected to contribute to improved GRC environments reliability and business functionality, fulfill the organization's operating requirements, and support compliance with regulatory mandates. In addition, this upgrade project will remediate audit recommendation (SAP APD.11).

In addition, this project will:

- Enable automated User Access Review capabilities within the GRC Access Controls suite to reduce the effort required to extract and send reports for user access reviews.
- Enable rule set transport functionality to eliminate variances in the SOD rule set that exist today in the landscape and demonstrate control over rule set design for audit purposes.
- Optimize GRC Rule sets, which will help our GRC administration team with day-to-day execution of Access Controls and general GRC performance.
- Validate rule set changes from SAP are incorporated into National Grid's SOD rule set to accurately identify risks in the landscape environment.
- Take advantage of performance enhancements made to the GRC suite including improved firefighter maintenance screens and improved firefighter log retrieval performance.

US Sanction Paper

3.5 Business and Customer Issues

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

3.6 Alternatives

Alternative 1: Defer project / Do Nothing

This option is not viable as it will not address the business need for reliability and improvements to core SAP end-user services.

3.7 Safety, Environmental and Project Planning Issues

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

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	Development (DEV) and/or testing (QA) environment may not be available at the required time due to commercial or operational constraints with our hosting provider.	4	4	4	16	16	Mitigate	SAP PDM and PM will work with hosting provider to prioritize delivery dates of most critical environments first. We will also escalate to IS Commercial as necessary any risks or issues we foresee. PCRs will also be submitted as far in advance as possible once environment timeline requirements are finalized.	The cost and timeline of the project may be impacted.	Project schedule and timeline would be re-evaluated based upon confirmed delivery dates from hosting provider.

3.9 Permitting

N/A

3.10 Investment Recovery

N/A

3.10.1 Investment Recovery and Regulatory Implications

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

US Sanction Paper

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

					Current Planning Horizon							
Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total	
					2017/18	2018/19	2019/20	2020/21	2021/22	2022/23		
4222	US SAP: Governance, Risk, and Compliance (GRC) environment upgrade	+/- 10%	CapEx	0.000	2.522	0.000	0.000	0.000	0.000	0.000	0.000	2.522
			OpEx	0.000	0.146	0.000	0.000	0.000	0.000	0.000	0.146	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	0.000	2.668	0.000	0.000	0.000	0.000	0.000	2.668	
Total Project Sanction			CapEx	0.000	2.522	0.000	0.000	0.000	0.000	0.000	2.522	
			OpEx	0.000	0.146	0.000	0.000	0.000	0.000	0.000	0.146	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	0.000	2.668	0.000	0.000	0.000	0.000	0.000	2.668	

3.11.2 Project Budget Summary Table

Project Costs per Business Plan

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

Variance (Business Plan-Project Estimate)

		Prior Yrs	Current Planning Horizon						Total
			Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
	\$M	(Actual)	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
CapEx		0.000	(2.522)	0.000	0.000	0.000	0.000	0.000	(2.522)
OpEx		0.000	(0.146)	0.000	0.000	0.000	0.000	0.000	(0.146)
Removal		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan		0.000	(2.668)	0.000	0.000	0.000	0.000	0.000	(2.668)

US Sanction Paper

3.11.3 Cost Assumptions

This estimate was developed using standard IS estimating methodology. The accuracy level of the estimate for each project is identified in Table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

3.11.4.2 NPV Assumptions and Calculations

3.11.5 Additional Impacts

None

3.12 Statements of Support

3.12.1 Supporters

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

Role	Individual's Name
Business Executive Sponsor	Caroline Hon, VP Finance Excellence
Relationship Manager	Joel Semel
Program Delivery Director	Samir Parikh
IS Finance Management	Chip Benson
IS Regulatory	Daniel DeMauro
DR&S	Elaine Wilson
Service Delivery	Brian Detota
Enterprise Architecture	Joe Clinchot

US Sanction Paper

3.12.2 Reviewers

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

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

4 Appendices

4.1 Other Appendices

4.1.1 Project Cost Breakdown

Project Cost Breakdown			
Cost Category	sub-category	\$ (millions)	Name of Firm(s) providing
Personnel	NG Resources	0.175	
	SDC Time & Materials	0.009	IBM
	SDC Fixed-Price	0.700	Wipro
	All other personnel	1.226	KPMG, T-Systems, SAP
	TOTAL Personnel Costs	2.110	
Hardware	Purchase	-	
	Lease	0.131	
Software		-	
Risk Margin		0.340	
Other		0.088	
TOTAL Costs		2.668	

4.1.2 Benefiting Operating Companies

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



US Sanction Paper

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

Impact on RTB		0.011	0.043	0.043	0.043				0.140
Indicative Project Costs by Delivery Phase									
(\$M)	Start-up	R & D		D & I		Closure		Total	
CapEx		0.8		1.588				2.366	
OpEx	0.318	0.333				0.159		0.810	
Project Benefits - Type I only									
(\$M)	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Total
Type I - CapEx									0.000
Type I - OpEx									0.000
Revenue Generation									0.000
Key Business Benefits:									
Describe benefits, both financial and non-financial, and when those benefits will be delivered. Provide a clear & concise business case stating the investment drivers -why do we need to do something and why now? Explain any Regulatory considerations and how this initiative aligns with the US Business Strategy.									
Consolidate the reporting solutions onto a single platform to reduce BAU costs including infrastructure hosting and application support costs. Simplify the reporting solution for the business users. Increase cross functional reporting capabilities.									
Investment Prioritization									
Benefits				Cost					
	Impact	Weight	Score		Impact	Weight	Score		
OpEx Annual Savings		10.3%	0	OpEx Cost	0.80	-8.4%	-196		
CapEx Annual Savings		51%	0	CapEx Cost	286	-11.2%	-1		
Revenue Generation (annual)		0%	0	RTB Efficiency	1272	%	63		
Financial Control	does not apply	0%	0	Union/Labor Relations	does not apply	-9%	0		
Soft Financial Benefits	Low	3.8%	0.038	Dependencies	Medium	-10.6%	-88		
Regulatory Impact	Medium	11.2%	0.336	Elastice Time Duration	Low	-6%	-066		
Process & Personal Safety	Low	194%	0.194	Change Management Effort	Low	-14.9%	-049		
Reliability	High	10.9%	0.981						
Customer & Community Responsiveness	does not apply	53%	0						
Employee Satisfaction	Medium	4.6%	0.138						
Mitigates a Corporate Risk Risk of not Doing	Low to 15	8%	0.089						
Jurisdictional Engagement	High	8%	1						
			Benefit Score:	2.51				Cost Score:	-4.41
				Overall Priority Score:	-1.898				
Investment Risk and Complexity									
Project Risk Score:	36	Risk Score Description: Based on financial impact (4) and likelihood (6)							
Project Complexity Score::	17	Project Complexity Score Description: Please see attached complexity matrix							
Key Risks Description: Provide detail on project risks & mitigation strategy:									

IS Project Dependencies

if you don't see a project in the drop-down please contact the Planning & Performance team.

IS Projects: 4562 - US SAP: Business Warehouse (BW) Consolidation to HANA Enterprise Cloud (HEC)

1. Has a dependency on IS Project;

2. Has a dependency on IS Project;

3. Has a dependency on IS Project;

4. Has a dependency on IS Project;

5. Has a dependency on IS Project;

6. Has a dependency on IS Project;

Business Initiative Dependencies

IS Projects: 4562 - US SAP: Business Warehouse (BW) Consolidation to HANA Enterprise Cloud (HEC)

1. Has a dependency on BI Initiative,

2. Has a dependency on BI Initiative,

3. Has a dependency on BI Initiative,

4. Has a dependency on BI Initiative,

Project Relationship

☐ Minor Works

Project Relationship:

Related Projects:

Enabling Operating Companies:

Check all that apply

☐ Select All Companies

☐ Clear All Companies

☐ Select All Gas

☐ Select All Electric

☐ Select All Generation

☒ National Grid USA Parent

☒ KeySpan Energy Development Corporation

☒ KeySpan Services Inc.

☒ KeySpan Energy Corp

☒ KeySpan Energy Delivery New York

☒ KeySpan Energy Delivery Long Island

☒ KeySpan Generation (PSA)

☒ KeySpan Glenwood Energy Center

☒ KeySpan Port Jefferson Energy Center

☒ KeySpan Energy Trading Svcs

☒ Niagara Mohawk Power Corp- Electric Distribution

☒ Niagara Mohawk Power Corp - Gas

☒ Niagara Mohawk Power Corp - Transmission

☒ Massachusetts Electric Company

☒ Massachusetts Electric Company - Transmission

☒ Nantucket Electric Company

☒ Boston Gas Company

☒ Colonial Gas Company

☒ Narragansett Gas Company

☒ Narragansett Electric Company

☒ Narragansett Electric Company - Transmission

☒ New England Power Company - Transmission

☒ New England Hydro - Trans Corp

☒ New England Electric Trans Corp

☐ NE Hydro Trans Electric Co

☒ NGENE Regulated Entity

Enabling IS Capabilities

check all that apply

☐ Enterprise Content Management (ECM)

☐ Enterprise Mobility

☐ Comprehensive Integration Services (CIS)

☐ Reporting and Analytics

☐ Hybrid Cloud

☐ Networks

☐ Next Gen Workplace

Key Milestone Dates

Select the 1st, 15th or last day of the month

Begin Start-up

Begin Requirements & Design

Begin Development & Implementation

Begin User Acceptance Testing

Go Live

Project Completion

Project Closure

April, 2018

March, 2019

Business Resource Estimates: # of Full Time Equivalents

Start-up

Requirements & Design

Develop & Implement

Business Resources IAT

Go Live Readiness

Post Go Live Support

0

0

0

0


0

0

Resourcing Strategy:

Attached Supporting Documents

INVP4562ComplexityMatrix.xlsx

Recommendation Sign-off			
Role	Name	Title	Date
Business Project Sponsor	Liddle, Evelyn B. (Kaye)	VP Performance	
Business Relationship Manager	Joel Semel	IS Business Relationship Manager	
IS Program Delivery Manager	Samir Parikh	IS Program Delivery Manager	
			

Resanction Request

Title:	Wireless Network Improvement	Sanction Paper #:	USSC-16-197 v2
Project #:	INVP 4364 Capex: S006921	Sanction Type:	Resanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	January 10, 2018
Author / NG Representative:	Neha Verma / Andrew Yee	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	David Todd / Neil Beasant

1 Executive Summary

This paper requests the resanction of INVP 4364 in the amount \$2.596 M with a tolerance of +/- 10% for the purposes of full implementation.

This sanction amount is \$2.596M broken down into:

\$2.282 M Capex

\$0.314 M Opex

Note: - The original requested sanction amount was \$1.810 M.

\$1.570 M Capex

\$0.240 M Opex

2 Resanction Details

2.1 Project Summary

This is a policy driven project to replace end of life equipment, decommission legacy wireless networks, and install and 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 wireless network for these prioritized sites by replacing out of support access points at field locations to ensure Wi-Fi vehicle communications remain supportable.

Primary drivers for the increased cost were the addition of three major sites (Res Woods, Hicksville, Metrotech) to the project scope after initial sanction. Significant additional costs were incurred for equipment and labor acquired to complete the upgrade of those sites.



Resanction Request

2.2 Summary of Projects

Project Number	Project Type (Elect only)	Project Title	Estimate Amount (\$M)
INVP4364		Wireless Networks Improvements	2.596
Total			2.596

2.3 Prior Sanctioning History

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

Date	Governan ce Body	Sanctione d Amount	Potential Project Investment	Paper Title	Sanction Type	Paper Reference Number	Tolerance
June 8, 2016	USSC	\$1.810M	\$1.810M	Wireless Network Improve ment	Full	USSC-16- 197	+/- 10%

Over / Under Expenditure Analysis

Summary Analysis (\$M)	Capex	Opex	Removal	Total
Resanction Amount	\$2.282M	\$0.314M	\$0.000M	\$2.596M
Latest Approval	\$1.570M	\$0.240M	\$0.000M	\$1.810M
Change*	\$0.712M	\$0.074M	\$0.000M	\$0.786M

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

Resanction Request

2.4 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total
					2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
INVP4364	Wireless Networks Improvements	Est Lvl (e.g. +/- 10%)	CapEx	2.948	(0.666)	0.000	0.000	0.000	0.000	0.000	2.282
			OpEx	0.254	0.060	0.000	0.000	0.000	0.000	0.314	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	3.202	(0.606)	0.000	0.000	0.000	0.000	2.596	
Total Project Sanction			CapEx	2.948	(0.666)	0.000	0.000	0.000	0.000	0.000	2.282
			OpEx	0.254	0.060	0.000	0.000	0.000	0.000	0.000	0.314
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	3.202	(0.606)	0.000	0.000	0.000	0.000	2.596	

2.5 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY18 - 22	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="radio"/> Over <input checked="" type="radio"/> Under <input type="radio"/> N/A	\$0.606M

2.6 Drivers

2.6.1 Detailed Analysis Table

The following table indicates the major key variations that account for the difference between the original sanction amount and the requested resanction amount. (Please see Section 2.6.2 for explanation)

Detail Analysis	Over/Under Expenditure?	Amount (\$M)
Key variation 1 – purchase of wireless and network equipment	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	\$0.653M
Key variation 2 – Contractor/Services	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	\$ 0.133M

Resanction Request

2.6.2 Explanation of Key Variations

The original scope of this project was to upgrade 21 Sites. At a point after sanction, it was decided that 3 major sites would be added to the scope. The 3 additional sites were Res Woods in Waltham, MA, Metrotech in Brooklyn, NY and Hicksville, NY. Significant additional cost was incurred due to the additional equipment and labor needed to complete those sites. The following key variations were taken into consideration:

Driver Type	Driver	Impact	Description
Equipment. (3 Additional Sites)	Additional equipment, for 24 sites vs original 21 sites	\$0.653M	Additional equipment for sites including Res Woods, all floors Metrotech, additional address Hicksville sites
Contractor/Services (3 Additional Sites)	Additional high performance equipment – contractor/services	\$0.133 M	Additional Verizon, cabling vendors, and power vendors services.

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

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

2.8 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	Jun 2016
Project Sanction	Jun 2016
Begin Requirements and Design	Jun 2016
Begin Development and Implementation	Aug 2016
Resanction	Jan 2018
Move to Production / Last Go Live	Feb 2018
Project Complete	Feb 2018
Closure Sanction	May 2018

2.9 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
May 2018	Closure Sanction

Resanction Request

3 Statements of Support

3.1 Supporters

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

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

3.2 Reviewers

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

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

Resanction Request

4 Decisions

The US Sanctioning Committee (USSC) at a meeting held on January 10, 2018

- (a) APPROVE this paper and the investment of \$2.596 M and a tolerance of +/-10%.
- (b) APPROVE the RTB impact of \$0.260M (per annum) for 5 years.
- (c) NOTE that David McCune is the Portfolio Director and has the approved financial delegation.

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

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

Resanction Request

5 Appendix

This project will benefit all of the listed companies below:-

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

US Sanction Paper

Title:	US MDS-Energy Accounting System Migration to Wholesale Settlement Application	Sanction Paper #:	USSC-17-351
Project #:	INVP 4481	Sanction Type:	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	November 8, 2017
Author:	Ashley Lemire	Sponsor:	John Spink, VP Control Center Operations
Utility Service:	IS	Project Manager:	Jeff Dailey

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of INVP 4481 in the amount \$0.490M with a tolerance of +/- 10% for the purposes of Requirements and Design.

This sanction amount is \$0.490M broken down into:

\$0.317M Capex

\$0.173M Opex

\$0.000M Removal

NOTE the potential investment of \$2.356M with a tolerance of +/-25 %, contingent upon submittal and approval of a Project Sanction paper following completion of Requirements and Design.

1.2 Project Summary

This policy-driven project will consolidate the existing separate wholesale settlement processing applications into a single application for New York (NY) and New England (NE), to improve upon the wholesale settlement market reporting and existing business processes. The expanded Wholesale Settlement Application (WSA) will provide enhanced functionality around wholesale settlement quality control in each load zone within the NY and NE jurisdictions. A consolidated, automated, and vendor supported wholesale settlement platform will reduce the risk of settlement reporting failure and data inconsistencies, making the settlement process more streamlined and efficient. As a result of the migration of Energy Accounting System (EAS) into WSA, the project will also decommission the existing EAS application.

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
4481		Energy Accounting System Migration to Wholesale Settlement Application	2.356
Total			2.356

US Sanction Paper

1.4 Associated Projects

N/A

1.5 Prior Sanctioning History

N/A

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
Apr 2018	Development and Implementation

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	Policy: This project will work to integrate the Energy Accounting System (EAS) functionality into the Wholesale Settlement Application (WSA), while also upgrading WSA.

1.8 Asset Management Risk Score

Asset Management Risk Score: 48

Primary Risk Score Driver: (Policy Driven Projects Only)

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

1.9 Complexity Level

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

Complexity Score: 20

US Sanction Paper

1.10 Process Hazard Assessment

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

☐ Yes ☒ No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY18-22	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input checked="" type="radio"/> Under <input type="radio"/> NA	\$0.730M

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

N/A

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
CapEx	0.000	0.267	1.825	0.000	0.000	0.000	0.000	2.092
OpEx	0.000	0.173	0.091	0.000	0.000	0.000	0.000	0.264
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	0.440	1.916	0.000	0.000	0.000	0.000	2.356

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	Aug 2017
Partial Sanction	Nov 2017
Begin Requirements and Design	Nov 2017
Project Sanction	Apr 2018
Begin Development and Implementation	May 2018
Move to Production / Last Go Live	Feb 2019
Project Complete	Feb 2019
Project Closure	May 2019

US Sanction Paper

1.15 Resources, Operations and Procurement

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

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

N/A

1.17 Climate Change

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

1.18 List References

N/A

US Sanction Paper

2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on November 8, 2017:

- (a) APPROVED the investment of \$0.490M and a tolerance of +/- 10% for the purposes of Requirements and Design.
- (b) NOTED the potential run-the-business (RTB) impact of \$0.151M (per annum) for 5 years.
- (c) NOTED the potential investment of \$2.356M and a tolerance of +/-25% contingent upon submittal and approval of a Project Sanction paper following completion of engineering and design.
- (d) NOTED that Jeff Dailey has the approved financial delegation to undertake the activities stated in (a).

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

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

US Sanction Paper

3 Sanction Paper Detail

Title:	US MDS-Energy Accounting System Migration to Wholesale Settlement Application	Sanction Paper #:	USSC-17-351
Project #:	INVP 4481	Sanction Type:	Partial Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	November 8, 2017
Author:	Ashley Lemire	Sponsor:	John Spink, VP Control Center Operations
Utility Service:	IS	Project Manager:	Jeff Dailey

3.1 Background

Wholesale Settlement is the process of reconciling the Generation and Transmission, minus line losses and unaccounted usage, for each customer in each load zone. The wholesale customer load is used to monetarily settle with the Independent System Operators (ISOs) and, therefore, all others, such as transmission companies, load serving entities (LSEs), energy supply companies (ESCOs), and municipal utilities and generators. It is also the basis for the retail settlement process for all customers. The process is supported by the data outputs from Energy Accounting System (EAS) in New York (NY) and the Wholesale Settlement Application (WSA) in New England (NE). The current version of WSA needs to be upgraded to enable Meter Data Services (MDS) Settlement to consistently provide high quality and dependable meter data settlement reporting to the ISO New England Inc. (ISO-NE). This keeps the Company in compliance with ISO-NE Revenue Billing and Accounting Manual. Separately, EAS is built on architecture that was retired in 2011. Due to the risk of EAS infrastructure and code, this functionality will be incorporated into the upgraded WSA application. The upgrade of WSA and the consolidation of EAS into WSA will eliminate reliance on the existing legacy developed code of EAS.

The current software version of WSA is outdated and is only compatible with the Windows Server 2003 operating system (OS). The end of support for this OS was July 14, 2015 resulting in the following services being unavailable:

- Security patches that help protect PCs from harmful viruses, spyware, and other malicious software
- Assisted technical support from Microsoft
- Software and content updates

US Sanction Paper

The goal is to address the intermittent performance problems by co-locating the database and application in the same Data Center.

The EAS application is based on a 30-year-old process diagram that is not adaptable for the new settlement requirements. Integration of EAS into WSA should also allow for simplified maintenance and implementation of the vendor developed product versions into the National Grid Information Systems (IS) environment, instead of being supported by the Critical National Infrastructure (CNI) team. With CNI maintaining the server, a strain is put on resources dedicated to Control Room mission critical applications

EAS has experienced Priority 1 (P1) or Priority 2 (P2) incidents where work has had to be completed manually. P1 and P2 outage time is defined as incidents when all or almost all of the critical functions of an application are not working as expected. When an incident occurs in EAS, manual effort may circumvent the process and has to date, but this is not sustainable in the long-term. As such, the technology doesn't allow for business process continuity.

There are no standard regulatory fines. However, there is the potential for exposure for a market participant complaint at the Federal Energy Regulatory Commission (FERC) or in court. This is in addition to the risk of reputational damage. The ISO-NE may also invoke proceedings for tariff violations against New England Power (NEP), as the Host Participant in NE, or the NYISO against Niagara Mohawk, as the Meter Authority in NY.

The NY territory is at risk with the Critical National Infrastructure (CNI) customers who require a timely settlement of the usage from their interval meters on a daily basis, as well as a resettlement on a quarterly basis, from the data inputted into EAS and settled with the NYISO. While there is no history of penalties, it is more efficient to implement preventative measures by integrating EAS with WSA and upgrading the WSA platform.

3.2 Drivers

The applications are used in the wholesale settlement process and both are currently on technology platforms that are at risk of failure; thus, risking settlement legal challenges. If a failure occurs to the system, there is a legitimate chance that it might not be recoverable.

Driving another risk is the difficulty in finding an expert to resolve issues in a timely manner, due to the retired software version. Any request for application changes can only be "hard coded," as there is no front-end customization or user control options.

NY's manual settlement process puts National Grid at risk of not being able to meet deadlines and ensuring that the input is accurate. Non-adherence to the NYISO Revenue Billing and Accounting Manual could result in a tariff violation. Additionally, National Grid is often scrutinized for accuracy by market generators and other capacity and energy market participants. Reputational damage has occurred and continues to be a major risk.

US Sanction Paper

3.3 Project Description

This project will consolidate the existing wholesale settlement processing applications into a single application for NY and NE. EAS is used in NY and contains the data required for the completion of the wholesale settlement process; while WSA is the automated application used in NE for the process. The functionalities of EAS will be migrated into the WSA, to improve upon the wholesale settlement market reporting and existing business processes. This project will combine these platforms and upgrade WSA, to provide functionality and reliability improvements for the wholesale settlement process.

Project components will include:

- Purchase and implementation of upgraded WSA
- Migration and testing of EAS capabilities into the upgraded WSA
- Decommissioning of the existing EAS application
- Tested disaster recovery plan

3.4 Benefits Summary

- This upgrade will help alleviate some of the processing and analytics time required for the NE wholesale settlement process.
- This investment will have a positive impact on our ability to complete the daily settlement and reconciliation process, as the automation of the load data will mitigate the risk of manual error and shorten the time required to complete the tasks associated with the process.
- By consolidating the two platforms and upgrading to a later version of WSA, we will insure a disaster recovery plan and site tested for the NY Wholesale Energy Settlement Market and improve performance.
- Stability and availability of a key business critical application.

3.5 Business and Customer Issues

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

3.6 Alternatives

Alternative 1: Do Nothing/Defer

This is not an option. While manual intervention has successfully mitigated system failures to date, this is not sustainable for the long-term, due to the resource efforts required and added manual risk. The business is projecting this to be increasingly difficult, as both the system and infrastructure have been classified as unsupported and internal business experts are no longer available. Non-adherence to the NYISO

US Sanction Paper

Revenue Billing and Accounting Manual could result in a tariff violation and reputational damage to the Company.

3.7 Safety, Environmental and Project Planning Issues

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

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	Availability of Bridge Consulting team for project - during project timeline	2	1	4	2	8	Mitigate	Initiate Procurement process during start-up and notify Bridge of schedule needs	None	None
2	Availability of DXC and Verizon Partners as necessary	3	1	4	3	#	Mitigate	Initiate DXC and Verizon involvement in project as early as possible in Requirements stage.	None	None

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

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

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A



US Sanction Paper

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

					Current Planning Horizon						
Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total
					2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
4481	Energy Accounting System Migration to Wholesale Settlement Application	+/- 25%	CapEx	0.000	0.267	1.825	0.000	0.000	0.000	0.000	2.092
			OpEx	0.000	0.173	0.091	0.000	0.000	0.000	0.000	0.264
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	0.440	1.916	0.000	0.000	0.000	0.000	2.356
Total Project Sanction			CapEx	0.000	0.267	1.825	0.000	0.000	0.000	0.000	2.092
			OpEx	0.000	0.173	0.091	0.000	0.000	0.000	0.000	0.264
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	0.440	1.916	0.000	0.000	0.000	0.000	2.356

3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
CapEx	0.000	1.543	0.617	0.000	0.000	0.000	0.000	2.160
OpEx	0.000	0.661	0.265	0.000	0.000	0.000	0.000	0.926
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	2.204	0.882	0.000	0.000	0.000	0.000	3.086

Variance (Business Plan-Project Estimate)

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
CapEx	0.000	1.276	(1.208)	0.000	0.000	0.000	0.000	0.068
OpEx	0.000	0.488	0.174	0.000	0.000	0.000	0.000	0.662
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	1.764	(1.034)	0.000	0.000	0.000	0.000	0.730

3.11.3 Cost Assumptions

This estimate was developed in 2017 using the standard IS estimating methodology. The accuracy level of estimate for each project is identified in Table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

This is not a NPV project.

3.11.4.1 NPV Summary Table

N/A

US Sanction Paper

3.11.4.2 NPV Assumptions and Calculations

3.11.5 Additional Impacts

None

3.12 Statements of Support

3.12.1 Supporters

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

Role	Individual
Business Representative	John Bruckner
Head of PDM	Deb Rollins
Relationship Manager	Aman Aneja
Program Delivery Director	Jeff Dailey
IS Finance Management	Chip Benson
IS Regulatory	Dan DeMauro
DR&S	Elaine Wilson
Service Delivery	Brian Detota
Enterprise Architecture	Joe Clinchot

3.12.2 Reviewers

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

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

US Sanction Paper

4 Appendices

4.1 Sanction Request Breakdown by Project

\$M	4481
CapEx	0.317
OpEx	0.173
Removal	
Total	0.490

4.2 Other Appendices

4.2.1 Project Cost Breakdown

Project Cost Breakdown			
Cost Category	sub-category	\$ (millions)	Name of Firm(s) providing
Personnel	NG Resources	0.353	
	SDC Time & Materials	0.156	
	SDC Fixed-Price	0.040	
	All other personnel	1.225	
	TOTAL Personnel Costs	1.774	
Hardware	Purchase	-	
	Lease	-	
Software		-	
Risk Margin		0.412	
Other		0.170	
TOTAL Costs		2.356	

4.2.2 Benefitting Operating Companies

The following are the benefitting operating companies:

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp	Transmission	NY
New England Power Company	Transmission	MA

US Sanction Paper

4.2.3 IS Ongoing Operational Costs (RTB)

This project will increase IS ongoing operations support costs as per the following table. These are known as Run the Business (RTB) costs. Note: RTB costs will be refined following execution of Requirements and Design.

Summary Analysis of RTB Costs							
All figures in \$ millions	Yr. 1 17/18	Yr. 2 18/19	Yr. 3 19/20	Yr. 4 20/21	Yr. 5 21/22	Yr. 6+	Total
Forecast of RTB Impact							
RTB if Status Quo Continues	-	0.005	0.054	0.054	0.054	0.108	0.276
RTB if Project is Implemented	-	0.017	0.203	0.203	0.203	0.404	1.030
Net change in RTB	-	0.012	0.149	0.149	0.149	0.295	0.754
RTB Variance Analysis (if Project is Implemented)							
Net Δ RTB funded by Plan(s)	-	-	-	-	-	-	-
Variance to Plan	-	0.012	0.149	0.149	0.149	0.295	0.754
Total RTB Costs - by Cost Type (if Project is Implemented)							
App.Sup. - SDC 1	-	0.001	0.006	0.006	0.006	0.012	0.030
App.Sup. - SDC 2	-	-	-	-	-	-	-
App.Sup. - other	-	-	-	-	-	-	-
SW maintenance	-	-	-	-	-	-	-
SaaS	-	-	-	-	-	-	-
HW support	-	-	-	-	-	-	-
Other: IS	-	-	-	-	-	-	-
All IS-related RTB (sub-Total)	-	0.001	0.006	0.006	0.006	0.012	0.030
Business Support (sub-Total)	-	0.016	0.197	0.197	0.197	0.392	0.999
Total RTB Costs	-	0.017	0.203	0.203	0.203	0.404	1.030

4.3 NPV Summary

N/A

4.4 Customer Outreach Plan

N/A

Key Business Benefits:

- Compliance with FERC regulatory requirements

- Resolve replication issues

[illegible]

Project Risk Score:	41	<p><i>Risk Score Description:</i></p> <p>Risk score was calculated based on Financial Impact (5) and likelihood of failure (6)</p>
Project Complexity Score::	19	<p><i>Project Complexity Score Description:</i></p> <p>Please see complexity matrix attached</p>

Key Risks Description: Provide detail on project risks & mitigation strategy:

IS Projects: 4563 - US SAP: FERC on HANA (FOH) Upgrade		<input type="checkbox"/> Select All Companies <input type="checkbox"/> Clear All Companies <input type="checkbox"/> Select All Gas <input type="checkbox"/> Select All Electric <input type="checkbox"/> Select All Gen
1. Has a	dependency on IS Project;	<input checked="" type="checkbox"/> National Grid USA Parent <input checked="" type="checkbox"/> KeySpan Energy Development Corporation <input checked="" type="checkbox"/> KeySpan Services Inc. <input checked="" type="checkbox"/> KeySpan Energy Corp <input checked="" type="checkbox"/> KeySpan Energy Delivery New York
2. Has a	dependency on IS Project;	
3. Has a	dependency on IS Project;	
4. Has a	dependency on IS Project;	


 Planning & Performance Management ›
 FY19 - Investment Request Summaries - IRs: CSS Retail Bill Design Refresh


I Like It



Tags & Notes

nationalgrid		Investment Request Summary - IS US		FISCAL YEAR 2019	
INV ID:	4704Q	Project Name:	CSS Retail Bill Design Refresh		
Program:	NY REV	IRS Status:	INACTIVE		
Sponsor:	Allison, Jody	Title:	VP Billing Collections Strategy and Operations		
Relationship Manager:	Joel Semel	Title:	Director IT Business Relations		
Progr Delivery Director:	Deborah Rollins	Title:	Director IT Customer Relations		
Paper Author:	Douglas McCarthy / Phyllis Agin	Title:	Business Consultant / Program Delivery Consultant		
		Business Area:	Customer & Digital	Portfolio:	Customer & Digital
<input type="checkbox"/> In-Flight Project?	Invest Classification: Medium	Category:	Policy Driven	Primary Policy Driver:	Region: US
Strategic Program:	End to End Process (Primary)::	Business Priority:	High	IS Focus Area:	Application Strategy:
Not Applicable	End to End Process (Secondary):				
<p>Project Description: The context for the project with background information</p> <p>The last major bill redesign at National Grid concluded in 2007 with the rollout of the HP-Exstream software and the new “blue-bar” design. This new format rolled out first to Niagara Mohawk in 2007, then New England Electric in 2008, Rhode Island Gas in 2012, and KEDLI in 2013. This new format was to be rolled out to the remaining companies (KEDNY and MA gas) in the 2016 CRIS conversion; however that project was halted.</p> <p>The company now operates with two sets of composition software and two designs. The CRIS software and design serving KEDNY and MA gas is very old and in need of replacement. It is very risk-prone and lacks sufficient basic IS support. CRIS correspondence/letters is now supported by hard-coded CRIS logic and a completely different ISIS/Papyrus software set which is extremely difficult to maintain.</p> <p>The newer “blue bar” bill has several variants and supports many special programs and billing requirements including Standard and Summary, and Streetlight / Traffic Signal formats including Budget billing, demand and time-of-use, payment plans, net metering, and marketer supply.</p> <p>Project Rationale: Highlight business challenge, capability or process the project addresses</p> <p>In 2015-2016, a team engaged with the three major contact centers to understand and document from their perspective the customer experience with the two bill formats, what they were most challenged by, and what their priorities would be for change. The company performs customer satisfaction surveys on a regular basis and feedback on bill accuracy and format are topics that appear in those surveys. This combined set of information was built into an action list organized into five areas.</p> <p>The now 10-year-old “blue bar” bill needs a refresh, and the priorities from contact center engagement need to be addressed. New “best practices” need to be identified and built into the refresh, preferably using the Strategic Solutions team. The CRIS composition software and design must be retired, bringing the CRIS bill data feed into the HP Exstream toolset. CRIS correspondence/letters must also be moved into the HP Exstream toolset. Imaging and eBill have already been addressed. The company desires to roll-out a refresh to all jurisdictions (NY, MA, RI) at one time.</p> <p>Project Scope: Explain what is in scope and what is not in scope for the project</p> <p>All US distribution companies. Project would entail these elements:</p> <ul style="list-style-type: none"> • Prioritize elements - address most critical needs from contact center and customer satisfaction information gathering • Review of best practices - new “best practices” to be identified and built into the refresh, preferably using the Strategic Solutions team • Requirements definition - new elements, high priority items • Detail design • Blueprinting • Coding and testing - Exstream, CSS, CRIS • Print & Mail vendor preparation • Vendor materials preparation • Imaging vendor preparation • Change Management – internal, external, customer • Testing – user acceptance, integration, parallel • Enable toggle on/off for color • CRIS cutover - retire CRIS composition software and design; move the CRIS bill data feed into the HP Exstream toolset • Move CRIS correspondence/letters into the HP Exstream toolset • Implement imaging and eBill <p>The company desires to roll-out a refresh to all jurisdictions (NY, MA, RI) at the same time.</p>					

Project Dependencies: Identify any core program or project dependencies, please include INVP numbers if known

Basic Project Assumptions:

Cost allocator to all US distribution companies H173 (# of bills rendered). Cost elements for this project include:

- IS Project Manager
- IS Project Delivery Manager
- IS & CSS Billing Subject Matter Experts (SMEs)
- Business Consultants
- IS Business Analyst
- Solution Architects
- Testers
- System Integration SMEs
- Run the Business (RTB) Resources

Initial Costs by Year

(\$M)	Prior Years	FY0	FY1	FY2	FY3	FY4	FY5	FY6	FY7	Total
CapEx		00	91							91
OpEx		00	00							00
Impact on RTB										00

Initial Costs by Phase

(\$M)	Start-up	R & D	D & I	Closure	Total
CapEx		90	91		181
OpEx	00	00	10	0	10

Benefits by Type

(\$M)	FY0	FY1	FY2	FY3	FY4	FY5	FY6	FY7	Total
Type I - CapEx									00
Type I - OpEx									00
Revenue Generation									00

Key Business Benefits:

Describe benefits, both financial and non-financial, and when those benefits will be delivered. Provide a clear & concise business case stating the investment drivers – why do we need to do something and why now? Explain any Regulatory considerations and how this initiative aligns with the US Business Strategy.

- The bill refresh and changes implemented will result in direct benefits to customer satisfaction and effectiveness of customer interactions – both direct and digital channels.
- New “best practices” will give the company a “current” customer interaction – which occurs 6.5 million times each month. No other form of communication affects the company/customers more..
- Bringing the CRIS bill data feed and CRIS correspondence/letters into the HP Extream toolset will enable full IS support capabilities.
- Imaging and eBilling will naturally follow as a set of benefits to this project.

Investment

Benefits				Cost			
	Impact	Weight	Score		Impact	Weight	Score
OpEx Annual Savings		10.3%	0	OpEx Cost	0.217	-2.4%	73
CapEx Annual Savings		5.1%	0	CapEx Cost	2.108	-11.2%	-1
Revenue Generation (annual)		6.2%	0	RTB Efficiency	0.000	% -22.5%	0
Financial Control	does not apply	6.2%	0	Union/Labor Relations	does not apply	-98%	0
Soft Financial Benefits	does not apply	3.8%	0	Dependencies	does not apply	-10.6%	0
Regulatory Impact	does not apply	11.2%	0	Elapse Time Duration	does not apply	-6.6%	0
Process & Personal Safety	does not apply	19%	0	Change Management Effort	does not apply	-14%	0
Reliability	does not apply	10.9%	0				
Customer & Community Responsiveness	does not apply	5.3%	0				

Employee Satisfaction	does not apply	46%	0
Mitigates a Corporate Risk / Risk of not Doing	does not apply	8.9%	0
Jurisdictional Engagement	does not apply	8.2%	0
Benefit Score: 0.00			Cost Score: -1.74
Overall Priority Score: -1.74			

Investment Risk and Complexity

Project Risk Score:	49	Risk Score Description: Risk mitigation - Elimination of CRIS Bill and Letter Composition Software; Customer Experience Transformation driven with significant benefits to customer with consistency and content.
Project Complexity Score::	0	Project Complexity Score Description:

Key Risks Description: Provide detail on project risks & mitigation strategy:

IS Dependent

if you don't see a project in the drop-down please contact the Planning & Performance team.

IS Projects: 4704Q - CSS Retail Bill Design Refresh

Has a dependency on IS Project;

Has a dependency on IS Project;

Has a dependency on IS Project;

Has a dependency on IS Project;

Has a dependency on IS Project;

Has a dependency on IS Project;

Business Unit Dependent

IS Projects: 4704Q - CSS Retail Bill Design Refresh

Has a dependency on Business Unit Initiative;

Has a dependency on Business Unit Initiative;

Has a dependency on Business Unit Initiative;

Has a dependency on Business Unit Initiative;

Project Relationship

Minor Works

Project Relationship:

Related Projects:

Enterprise Capabilities

Enterprise Content Management (ECM)

Enterprise Mobility

Comprehensive Integration Services (CIS)

Reporting and Analytics

Hybrid Cloud


Networks

Next Gen Workplace

Key Dates

Select the 1st, 15th or last day of the month

Initial Estimated Duration (Months):

Begin Start-up	Begin Requirements & Design	Begin Development & Implementation	Begin User Acceptance Testing	Go Live	Project Completion	Project Closure
February, 2019	March, 2019	July, 2019	February, 2020	March, 2020	March, 2020	June, 2020
Business Resource Estimates:						
# of FTEs						
Start-up 0	Requirements & Design 0	Develop & Implement 0	Business Resources UAT 0	Go Live Readiness 0	Post Go Live Support 0	
Resourcing Strategy:						
Attached Supporting Documents						
Recommendation Info						
Role	Name	Title			Date	
Business Project Sponsor	Allison, Jody	VP Billing Collections Strategy and Operations				
Business Relationship Manager	Joel Semel	IS Business Relationship Manager				
IS Program Delivery Manager	Deborah Rollins	IS Program Delivery Manager				
						

US Sanction Paper

Title:	US VSTIG Bandwidth Upgrade Phase 2	Sanction Paper #:	USSC-16-222
Project #:	4280	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	July 13, 2016
Author:	Karen Denne	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	Lee Denny

1 **Executive Summary**

1.1 **Sanctioning Summary**

This paper requests **sanction** of **INVP4280** in the amount **\$3.538M** with a tolerance of +/- 10% for the purposes of **Full implementation**.

This sanction amount is \$3.538M broken down into:

3.508M Capex

0.030M Opex

\$0.000M Removal

1.2 **Project Summary**

The purpose of the Verizon Secured Telecommunications Gateway (VSTIG) network services is to connect National Grid securely to the internet and other external business partners. Due to the growth of these services, and other demands within the VSTIG environment, an upgrade is now required. The utilization of both VSTIGs (Billerica and Ashburn) 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 (see appendix 4.2.4 for further explanation), Wide Area Network (WAN) and cloud services.

US Sanction Paper

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
INVP4280	IS4IS	US VSTIG Bandwidth Upgrade Phase 2	3.538
Total			3.538

1.4 Associated Projects

Previous VSTIG Upgrade Projects:

Project	Status	Comment
VSTIG Phase 1 (INVP3538)	In progress	Objective to increase bandwidth from 200mb/s to 300mb/s required to alleviate most pressing capacity constraints.

1.5 Prior Sanctioning History

N/A

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
6/30/2017	Closure Paper

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	The investment supports the “Line of Sight” objectives of: (a) Deliver Operational Excellence by ensuring the delivery of reliable internet services which supports critical business processes, including capacity and security management.

US Sanction Paper

1.8 Asset Management Risk Score

Asset Management Risk Score: _____ 42

Primary Risk Score Driver: (Policy Driven Projects Only)

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

1.9 Complexity Level

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

Complexity Score: _28_____

1.10 Process Hazard Assessment

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

☐ Yes ☒ No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
FY17(Playbook, IS Assurance)	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input checked="" type="radio"/> Under <input type="radio"/> NA	\$0.015m opex \$0.627m capex

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

N/A

US Sanction Paper

1.13 Current Planning Horizon

		Current Planning Horizon						
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total
\$M	Prior Yrs	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	
CapEx	0.000	3.273	0.234	0.000	0.000	0.000	0.000	3.507
OpEx	0.000	0.030	0.000	0.000	0.000	0.000	0.000	0.030
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	3.303	0.234	0.000	0.000	0.000	0.000	3.538

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	Apr 2016
Full Sanction	Jul 2016
Begin Requirements and Design	Jul 2016
Begin Development and Implementation	Oct 2016
Move to Production	Mar/Apr 2017
Project Complete	May 2017
Project Closure	Jul 2017

1.15 Resources, Operations and Procurement

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



US Sanction Paper

Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
--	---------------------------	-----------------------------	--

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

None at this time.

1.17 **Climate Change**

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

1.18 **List References**

1	Total Cost of Ownership (TCO) log
2	
3	

US Sanction Paper

2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on July 13, 2016:

- (a) APPROVED this paper and the investment of \$3.538M and a tolerance of +/-10%.
- (b) APPROVED the RTB impact of \$0.595M (per annum) for 5 years.
- (c) NOTED that Lee Denny has the approved financial delegation.

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

Ross Turrini

Senior Vice President US Sanctioning Committee Co – Chair Person

US Sanction Paper

3 Sanction Paper Detail

Title:	US VSTIG Bandwidth Upgrade Phase 2	Sanction Paper #:	USSC-16-222
Project #:	4280	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	July 13, 2016
Author:	Karen Denne	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	Lee Denny

3.1 Background

The purpose of the VSTIG network services is to connect National Grid securely to the internet and other external business partners. Due to the growth of these services, and demands within the VSTIG environment, an upgrade is now required. The utilization of both VSTIGs (Billerica and Ashburn) are reaching their capacity limits of the network hardware, which, if not addressed, will lead to poor network performance, impact key business processes, and result in potential loss of gateway services (such as internet access, cloud services and guest wireless internet access).

Bandwidth requirements are predicted to rise and therefore peak utilization will be hit with increasing frequency. The observed increase of bandwidth utilization is approximately 10mb/s per month; in addition there are a number of planned and in progress projects which require significant bandwidth requirements. In particular the legacy DMZ migration (see appendix 4.2.4 for further explanation) is dependent upon the bandwidth upgrade. Due to the growth of internet services and demands within the VSTIG environment an upgrade is now required.

The bandwidth upgrade has been split into the following phases:

Project	Summary	Delivery
Phase 1 Upgrade	To increase bandwidth from 200mb/s to 300mb/s required to alleviate most pressing capacity constraints.	In progress planned completion July 2016
Phase 2 Upgrade	To increase capacity from 300mb/s up to 1,000mb/s (1gb/s) where upon the anticipated capacity constraints on VSTIG will be alleviated in short to medium term.	Planned completion May 2017

US Sanction Paper

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 capacity to be increased up to 1gb/s per VSTIG, with the technical ability to scale up and down as required. 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 DMZ migration.

The VSTIG services are provided via two separate Verizon datacenters, one in Billerica MA and the other in Ashburn VA. This dual datacenter configuration provides both service redundancy (fail over) and geographic diversity. Due to the increasing capacity constraints on VSTIG a prior tactical decision was made to remove some of the reserve bandwidth associated with the disaster recovery and failover capability. This means that there is currently limited functionality in the event of the failure of one of the VSTIGs which could significantly impact National Grid, its suppliers and its customers. This Phase 2 upgrade will allow for reinstatement of full Disaster Recovery capability.

3.2 Drivers

The main drivers are:

- Capacity has reached the limits, with constant demand for more. Demand is growing at an average of 10mb/s per month.
- Inflight projects and future projects such as legacy DMZ migration that require increased network bandwidth, that can’t be provided unless the network is upgraded.
- Poor network performance issues and potential loss of service due to the above 2 bullet points.
- The functionality & capability provided by the upgrade is required to enable the execution of Digital Risk & Security strategy for a more granular view and processing of network traffic in/out of National Grid.
- Current state includes reduced Disaster Recovery and failover capability as some of the reserve bandwidth has been removed to allow for production network traffic.

US Sanction Paper

3.3 Project Description

The current VSTIG network is designed as a series of “three security layers” with the Network Traffic having to pass through each layer before proceeding to the next. This project will make improvements to the overall design of VSTIGs, which will enable much more efficient use of the network, and support National Grid’s strategic direction of increased use of “external” cloud based service providers. Phase 2 will also deliver a network capacity upgrade from 300mb/s to 1gb/s. This will mitigate the current risk associated with the amount of bandwidth already in use today and provide room for growth for new services and future projects, including those that have a dependancy on this phase 2 upgrade, such as legacy DMZ migration to VSTIG. The deployment date and time will be agreed with the Business and a robust roll back plan will be in place to ensure minimal risk to business operations. The project activities will be carried out by the Verizon project team and will be managed by the National Grid project manager to track project activities against the plan and costs against sanctioned budget. It will be delivered using the standard Solution Delivery Framework (SDF), with engagement from Solution Architecture and Digital Risk and Security on the design.

3.4 Benefits Summary

The project will:

- Mitigate the risk of ‘poor’ network performance or loss of service should the network utilization reach maximum utilization.
- Reinstate full Disaster Recovery capability.
- Enable future projects that require additional network bandwidth to be implemented, such as legacy DMZ migration.
- Position the business to adapt cloud services from variety of future eco partners.
- Provide new functionality and capability to scale up capacity to 10gb/s, which will enable future bandwidth upgrades to be made more easily.

3.5 Business and Customer Issues

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

3.6 Alternatives

- **Alternative 1: Do Nothing/Defer** – this is not a viable option. Phase 1 VSTIG upgrade delivery only alleviates the most pressing capacity constraints. Utilization of the VSTIGs is continually increasing, with peak utilization expected to be hit with increasing frequency, leading to poor network performance and potential loss of services. Do nothing/deferring will not reinstate Disaster Recovery capability.

US Sanction Paper

Prevent implementation of any new & inflight projects which require an increase in bandwidth, and prevents National Grid from utilizing cloud service providers.

- **Alternative 2: Partial VSTIG upgrade** – a partial upgrade will not provide enough capacity to meet the forecasted demand, and it will not mitigate the poor performance of the network, and will not reinstate the Disaster Recovery capability.

3.7 Safety, Environmental and Project Planning Issues

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	There is a risk that due to complexity of change across all business areas the migration could be more complex than originally envisioned and as a result the project timescale could be extended.	3	2	2	6	6	Mitigate	Risk margin included to allow for more complex implementation. If project timescales project to go into next fiscal year then to be input into investment planning.	Managed by PMB through allocation of risk margin if required.	Allocation of funding from risk margin as required to cover additional complexities as discovered in design phase.
2	Change freezes or other scheduling restrictions from the business could impact on deployment schedule.	3	2	3	6	9	Accept	Contingency to allow for extension of cutover schedule if required by the business due to change freeze or other scheduling restrictions.	Potential impact on project timescales due to rescheduling around change freezes or other critical events.	Early engagement of CSM's and business areas to agree change windows and line up application test resources.
3	Business engagement will be required to agree change windows for migration and partake in application testing. If this is not available the project timescale will be impacted.	3	2	4	6	12	Mitigate	Early engagement with business through BRM and CSM's to identify applications and services impacted and schedule change where possible in line with existing maintenance windows.	Risk to project timescales and impact on risk margin if no business acceptance of change windows.	Acceptance of a level of risk in terms of scheduling change. Use of overnight windows instead of pure reliance on weekend changes which severely limits ability to expedite project.

3.9 Permitting

N/A

US Sanction Paper

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

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

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
INVP4280	US VSTIG Bandwidth Upgrade Phase 2	Est Lvl (e.g. +/- 10%)	CapEx	0.000	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	3.507
			OpEx	0.000	0.030	0.000	0.000	0.000	0.000	0.000	0.030
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	3.303	0.234	0.000	0.000	0.000	0.000	3.538

3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

	Prior Yrs	Current Planning Horizon						Total
		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	
CapEx	0.000	3.900	0.000	0.000	0.000	0.000	0.000	3.900
OpEx	0.000	0.045	0.000	0.000	0.000	0.000	0.000	0.045
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	3.945	0.000	0.000	0.000	0.000	0.000	3.945

Variance (Business Plan-Project Estimate)

	Prior Yrs	Current Planning Horizon						Total
		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	
CapEx	0.000	0.627	(0.234)	0.000	0.000	0.000	0.000	0.393
OpEx	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.015
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	0.642	(0.234)	0.000	0.000	0.000	0.000	0.407

US Sanction Paper

3.11.3 Cost Assumptions

This estimate was developed in 2016 using the standard IS estimating methodology. The accuracy level of estimate for each project is identified in table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

This is not an NPV Project.

3.11.4.2 NPV Assumptions and Calculations

N/A

3.11.5 Additional Impacts

None.

3.12 Statements of Support

3.12.1 Supporters

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

Role	Individual's Name
Business Executive Sponsor	Chris Kelly
Head of BRM/Strategy	Graham Pool
Head of PDM	Tom Cunningham
Relationship Manager	Graham Pool
Program Delivery Manager	Vikki Alder-Smith
IS Finance Management	Chip Bensen
IS Regulatory	Dan DeMauro
DR&S	Muks Ravipaty
Service Delivery	Brian Detota
Enterprise Architecture	Joe Clinchot

3.12.2 Reviewers

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

US Sanction Paper

Function	Individual	Area
Finance	Hayes, Bill	All
Regulatory	Zschokke, Peter	All
Jurisdictional Delegate(s)	Patterson, James	New England – Electric
	Harbaugh, Mark	New York – Electric
	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 Other Appendices

4.2.1 Project Cost Breakdown

Project Cost Breakdown			
Cost Category	sub-category	\$ (millions)	Name of Firm(s) providing
Personnel	NG Resources	0.346	
	SDC Time & Materials	0.004	
	SDC Fixed-Price	-	
	All other personnel	0.891	
	TOTAL Personnel Costs	1.242	
Hardware	Purchase	1.981	
	Lease	-	
Software		-	
Risk Margin		0.150	
Other		0.165	
TOTAL Costs		3.538	

4.2.2 Benefiting Operating Companies

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp.- Electric Distr.	Electric Distribution	NY
Massachusetts Electric Company	Electric Distribution	MA
KeySpan Energy Delivery New York	Gas Distribution	NY
KeySpan Energy Delivery Long Island	Gas Distribution	NY



US Sanction Paper

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

US Sanction Paper

4.2.3 IS Ongoing Operational Costs (RTB):

Summary Analysis of RTB Costs							
All figures in \$ millions	Yr. 1 16/17	Yr. 2 17/18	Yr. 3 18/19	Yr. 4 19/20	Yr. 5 20/21	Yr. 6+	Total
Forecast of RTB Impact							
RTB if Status Quo Continues	1.732	1.750	1.750	1.750	1.750	2.101	10.835
RTB if Project is Implemented	1.881	2.346	2.346	2.346	2.346	2.815	14.079
Net change in RTB	0.149	0.595	0.595	0.595	0.595	0.714	3.244
RTB Variance Analysis (if Project is Implemented)							
Net Δ RTB funded by Plan(s)	0.210	0.420	0.420	0.420	0.420	0.420	2.310
Variance to Plan	(0.061)	0.175	0.175	0.175	0.175	0.294	0.934
Total RTB Costs - by Cost Type (if Project is Implemented)							
App.Sup. - SDC 1	-	-	-	-	-	-	-
App.Sup. - SDC 2	-	-	-	-	-	-	-
App.Sup. - other	-	-	-	-	-	-	-
SW maintenance	-	-	-	-	-	-	-
SaaS	-	-	-	-	-	-	-
HW support	-	-	-	-	-	-	-
Other: IS	1.881	2.346	2.346	2.346	2.346	2.815	14.079
All IS-related RTB (sub-Total)	1.881	2.346	2.346	2.346	2.346	2.815	14.079
Business Support (sub-Total)	-	-	-	-	-	-	-
Total RTB Costs	1.881	2.346	2.346	2.346	2.346	2.815	14.079

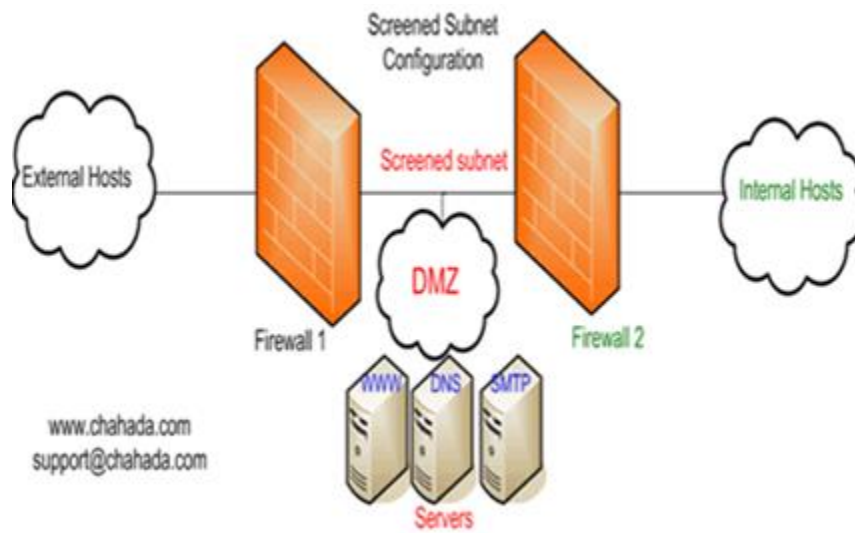
Full year RTB cost \$595k, this is included within the IS Service Delivery budget plans.

4.2.4 Further explanation of DMZ

The concepts of a De- Militarized (DMZ) in networking and firewalls are about putting servers or data that have to be exposed to the internet in a separate zone. If this zone is hacked through firewall 1 being breached it means the hackers have not got through firewall 2 and our core and business critical data has not been exposed. Typical examples are shown below, i.e our web facing servers.

Please note that the illustration below is not from NG network but demonstrates a generic setup.

US Sanction Paper





Planning & Performance Management >
 FY18 - Investment Request Summaries - IRSs: Data Centre Consolidation efforts



I Like It



Tags & Notes

nationalgrid		Investment Request Summary - IS US		FISCAL YEAR 2018																																													
INV ID:	4709	Project Name: Data Centre Consolidation efforts																																															
Program:	Service Strategy Roadmap																																																
Sponsor:	John Gilbert	Title: Global Head IS Service Delivery, Global IS																																															
Relationship Manager:	Graham Pool	Title: IS Relationship Manager, Global IS																																															
Prog Delivery Manager:	Tom Cunningham	Title: Head of Programme Delivery, Global IS																																															
Paper Author:	Nicola Pennington / Steve Trezza	Title: Business Consultant - Corporate IS																																															
IS Roadmap Category:	IS Assurance	Business Area:	Corporate IS	Portfolio:	IS for IS																																												
<input type="checkbox"/> In-Flight Project?	Invest Classification: Medium	Category:	Policy Driven	Primary Policy Driver:	Reliability																																												
					Region: US																																												
<input checked="" type="checkbox"/> Growth Playbook Project? <input type="checkbox"/> Shaping Our Future Project? <input type="checkbox"/> Energy Efficiency Project?																																																	
<p>Project Description: The context for the project with background information 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.</p> <p>Project Rationale: Highlight business challenge, capability or process the project addresses In addition there is a risk to continuing to run systems in the legacy data centres. A number of mission critical systems remain in the legacy data centers running in aged systems connected to aged network platforms. There is a likelihood that either the compute platform or network could fail and the hardware would not easily be restored. A compute platform failure would impact one system, but a network failure could impact multiple systems.</p> <p>Reliability - Old technology is vulnerable to more DRS threats - removing the old technology will mitigate this risk.</p> <p>Project Scope: Explain what is in scope and what is not in scope for the project This project will implement an agreed plan to decommission, move or agree ongoing support arrangements to retain equipment in Legacy Data centres.</p> <p>Project Dependencies: Identify any core program or project dependencies, please include INVP numbers if known There are no dependencies for this project to start.</p> <p>Basic Project Assumptions: It is expected that all decommission activities will not be within CSC contract and will require funds. There will be some activities particularly around coordination of plans for "retained applications" which will require NG input and therefore a NG project manager.</p>																																																	
Indicative Project Costs by Fiscal Year <table border="1"> <thead> <tr> <th>(\$M)</th> <th>Prior Years</th> <th>FY 2018</th> <th>FY 2019</th> <th>FY 2020</th> <th>FY 2021</th> <th>FY 2022</th> <th>FY 2023</th> <th>FY 2024</th> <th>FY 2025</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>CapEx</td> <td></td> <td>2.000</td> <td>1.000</td> <td>0.500</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>3.500</td> </tr> <tr> <td>OpEx</td> <td></td> <td>0.500</td> <td>0.250</td> <td>0.250</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>1.000</td> </tr> <tr> <td>Impact on RTB</td> <td></td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> <td>0.000</td> </tr> </tbody> </table>						(\$M)	Prior Years	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Total	CapEx		2.000	1.000	0.500	0.000	0.000	0.000	0.000	0.000	3.500	OpEx		0.500	0.250	0.250	0.000	0.000	0.000	0.000	0.000	1.000	Impact on RTB		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(\$M)	Prior Years	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Total																																							
CapEx		2.000	1.000	0.500	0.000	0.000	0.000	0.000	0.000	3.500																																							
OpEx		0.500	0.250	0.250	0.000	0.000	0.000	0.000	0.000	1.000																																							
Impact on RTB		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																																							
Indicative Project Costs by Delivery Phase <table border="1"> <thead> <tr> <th>(\$M)</th> <th>Start-up</th> <th>R & D</th> <th>D & I</th> <th>Closure</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>CapEx</td> <td></td> <td>0.500</td> <td>3.000</td> <td></td> <td>3.500</td> </tr> <tr> <td>OpEx</td> <td>0.020</td> <td>0.175</td> <td>0.800</td> <td>0.005</td> <td>1.000</td> </tr> </tbody> </table>						(\$M)	Start-up	R & D	D & I	Closure	Total	CapEx		0.500	3.000		3.500	OpEx	0.020	0.175	0.800	0.005	1.000																										
(\$M)	Start-up	R & D	D & I	Closure	Total																																												
CapEx		0.500	3.000		3.500																																												
OpEx	0.020	0.175	0.800	0.005	1.000																																												
Project Benefits - Type I only																																																	

(\$M)	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Total
Type I - CapEx									0.000
Type I - OpEx									0.000
Revenue Generation									0.000

Key Business Benefits:

Describe benefits, both financial and non-financial, and when those benefits will be delivered. Provide a clear & concise business case stating the investment drivers – why do we need to do something and why now? Explain any Regulatory considerations and how this initiative aligns with the US Business Strategy.

The impacts of this project on the Customer are based on a number of areas:

- Improves reliability and productivity
- Support Jurisdictional and business function initiatives
- Enables a better Customer Experience

There is a risk of failure of unsupported platforms and the fact that many of these systems support key company operations. Thus, our ability to continue to provide safe and reliable service to our customers would be impacted if one of these systems were to fail.

Investment Prioritization

Benefits				Cost			
	Impact	Weight	Score		Impact	Weight	Score
OpEx Annual Savings		10.3%	0	OpEx Cost	1.000	-24.4%	-2.196
CapEx Annual Savings		5.1%	0	CapEx Cost	3.500	-11.2%	-1
Revenue Generation (annual)		6.2%	0	RTB Efficiency	0.000	% -22.5%	0
Financial Control	Low	6.2%	0.062	Union/Labor Relations	Low	-9.8%	0
Soft Financial Benefits	Low	3.8%	0.038	Dependencies	Low	-10.6%	-0.106
Regulatory Impact	does not apply	11.2%	0	Elapse Time Duration	Medium	-6.6%	-0.198
Process & Personal Safety	does not apply	19.4%	0	Change Management Effort	Medium	-14.9%	-0.447
Reliability	Medium	10.9%	0.327				
Customer & Community Responsiveness	Medium	5.3%	0.159				
Employee Satisfaction	Low	4.6%	0.046				
Mitigates a Corporate Risk / Risk of not Doing	High= 40 or more	8.9%	0.801				
Jurisdictional Engagement	High	8.2%	1				
Benefit Score: 2.17				Cost Score: -4.05			
Overall Priority Score: -1.882							

Investment Risk and Complexity

Project Risk Score:	41	Risk Score Description: Reliability - 5, likelihood 6
Project Complexity Score::	20	Project Complexity Score Description:

Key Risks Description: Provide detail on project risks & mitigation strategy:

There is a risk of failure of these unsupported platforms, as the fact that many of these systems support key company operations. Thus, our ability to continue to provide safe and reliable service would be impacted if one of these systems were to fail.

Now that customers are demanding new services, without this investment of upgrading our underlying technology infrastructure, we cannot deliver these new strategic programs.

IS Project Dependencies if you don't see a project in the drop-down please contact the Planning & Performance team.

IS Projects: 4709 - Data Centre Consolidation efforts

1. Has a dependency on IS Project;
2. Has a dependency on IS Project;
3. Has a dependency on IS Project;

Benefiting Operating Companies: Check all that apply

- ☐ Select All Companies
 ☐ Clear All Companies
☐ Select All Gas
 ☐ Select All Electric
 ☐ Select All Gen
☒ National Grid USA Parent
☒ KeySpan Energy Development Corporation
☒ KeySpan Services Inc.

4. Has a dependency on IS Project;	<input checked="" type="checkbox"/> KeySpan Energy Corp
5. Has a dependency on IS Project;	<input checked="" type="checkbox"/> KeySpan Energy Delivery New York
6. Has a dependency on IS Project;	<input checked="" type="checkbox"/> KeySpan Energy Delivery Long Island
	<input checked="" type="checkbox"/> KeySpan Generation LLC (PSA)
	<input checked="" type="checkbox"/> KeySpan Glenwood Energy Center
	<input checked="" type="checkbox"/> KeySpan Port Jefferson Energy Center
	<input checked="" type="checkbox"/> KeySpan Energy Trading Svc LLC
	<input checked="" type="checkbox"/> Niagara Mohawk Power Corp- Electric Distribution
	<input checked="" type="checkbox"/> Niagara Mohawk Power Corp - Gas
	<input checked="" type="checkbox"/> Niagara Mohawk Power Corp - Transmission
	<input checked="" type="checkbox"/> Massachusetts Electric Company
	<input checked="" type="checkbox"/> Massachusetts Electric Company - Transmission
	<input checked="" type="checkbox"/> Nantucket Electric Company
	<input checked="" type="checkbox"/> Boston Gas Company
	<input checked="" type="checkbox"/> Colonial Gas Company
	<input checked="" type="checkbox"/> Narragansett Gas Company
	<input checked="" type="checkbox"/> Narragansett Electric Company
	<input checked="" type="checkbox"/> Narragansett Electric Company - Transmission
	<input checked="" type="checkbox"/> New England Power Company - Transmission
	<input checked="" type="checkbox"/> New England Hydro - Trans Corp
	<input checked="" type="checkbox"/> New England Electric Trans Corp
	<input checked="" type="checkbox"/> NG LNG LP Regulated Entity

Business Initiative Dependencies

IS Projects: 4709 - Data Centre Consolidation efforts

1. Has a dependency on Biz Initiative,

2. Has a dependency on Biz Initiative,

3. Has a dependency on Biz Initiative,

4. Has a dependency on Biz Initiative,

Project Relationships

☐ Minor Works Project Relationship:

Related Projects:

Enabling IS Capabilities check all that apply

<input type="checkbox"/> Enterprise Content Management (ECM)	<input type="checkbox"/> Enterprise Mobility
<input type="checkbox"/> Comprehensive Integration Services (CIS)	<input type="checkbox"/> Reporting and Analytics
<input type="checkbox"/> Hybrid Cloud	<input type="checkbox"/> Networks
<input type="checkbox"/> Next Gen Workplace	

Key Milestone Dates:

 Select the 1st, 15th or last day of the month

Begin Start-up	Begin Requirements & Deign	Begin Development & Implementation	Begin User Acceptance Testing	Go Live	Project Completion	Project Closure
July, 2017					March, 2020	

Business Resource Estimates: # of Full Time Equivalents


Start-up	Requirements & Deign	Develop & Implement	Business Resources UAT	Go Live Readiness	Post Go Live Support
0	0	0	0	0	0

Resourcing Strategy:

Attached Supporting Documents

Recommendation Sign-off

Role	Name	Title	Date
Business Project Sponsor	John Gilbert	Global Head IS Service Delivery, Global IS	
Business Relationship Manager	Graham Pool	IS Business Relationship Manager	
IS Program Delivery Manager	Tom Cunningham	IS Program Delivery Manager	



US Sanction Paper

Title:	US Foundation Hosting Renewal	Sanction Paper #:	USSC-17-333
Project #:	INVP 4761	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	October 11, 2017
Author:	Friya Jamshedji / Nicola Pennington	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	David Petrick

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of INVP 4761 in the amount \$6.193M with a tolerance of +/- 10% for the purposes of full Implementation.

This sanction amount is \$6.193M broken down into:

*\$4.621M Capex
\$1.572M Opex
\$0.000M Removal*

1.2 Project Summary

In order to address its growing business environment, National Grid must enhance its SAP and High Performance Analytic Appliance (HANA) application support and hosting services. Currently, the application hosting support is provided by T-Systems out of Houston, Texas and SAP HANA services are provided by SAP HANA Enterprise Cloud (HEC) out of Virginia. This project and Freudenberg Information Technology (FIT) will consolidate these two datacenters under one platform for both primary and Disaster Recovery (DR) in the US. The new service provider FIT was selected through a formal Request For Proposal (RFP) process supported by INVP 3924.

FIT will supply Platform as a Service (PaaS) for SAP and HANA applications, and ancillary applications including PowerPlan, Open Text, uPerform and SABRIX. National Grid IS will work with FIT to move the SAP application portfolio to a new datacenter.

By moving to the new platform, National Grid will eliminate the need to renegotiate contract extensions with current hosting providers SAP, T-Systems and Wipro as well as having to conduct costly upgrades of the existing SAP infrastructure hosted by T-Systems.

US Sanction Paper

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
4761		US Foundation Hosting Renewal	6.193
Total			6.193

1.4 Associated Projects

Project Number	Project Title	Estimate Amount (\$M)
3924	SAP: Host Transition	0.550
Total		0.550

1.5 Prior Sanctioning History

N/A

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
Oct 2018	Closure

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	This policy driven project will consolidate datacenters for SAP and HANA under one platform for both primary and Disaster Recovery (DR) in the US with the newly selected service provider FIT.

US Sanction Paper

1.8 Asset Management Risk Score

Asset Management Risk Score: 44

Primary Risk Score Driver: (Policy Driven Projects Only)

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

1.9 Complexity Level

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

Complexity Score: 24

1.10 Process Hazard Assessment

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

☐ Yes ☒ No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY18-22	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	\$6.193M

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

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

US Sanction Paper

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
CapEx	0.000	2.763	1.858	0.000	0.000	0.000	0.000	4.621
OpEx	0.000	1.358	0.214	0.000	0.000	0.000	0.000	1.572
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	4.122	2.072	0.000	0.000	0.000	0.000	6.193

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	Aug 2017
Begin Transition Planning	Sep 2017
Begin Data Migration and Testing	Oct 2017
Project Sanction	Oct 2017
Move to Production / Last Go Live	Jun 2018
Full Project Complete including Ancillary Systems	Jul 2018
Sanction Closure	Oct 2018

1.15 Resources, Operations and Procurement

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

US Sanction Paper

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

N/A

1.17 Climate Change

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

1.18 List References

N/A

US Sanction Paper

2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on October 11, 2017:

- (a) APPROVE this paper and the investment of \$6.193M and a tolerance of +/-10%.
- (b) NOTE that David Petrick is the Project Manager and has the approved financial delegation.

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

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

US Sanction Paper

3 Sanction Paper Detail

Title:	US Foundation Hosting Renewal	Sanction Paper #:	USSC-17-333
Project #:	INVP 4761	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	October 11, 2017
Author:	Friya Jamshedji / Nicola Pennington	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	David Petrick

3.1 *Background*

National Grid seeks to replace its incumbent SAP hosting provider in an effort to better meet Company requirements. Desired capabilities include automated monitoring, faster environment provisioning, and the support of multiple environment refreshes. The new service provider FIT is expected to proactively perform patches and upgrades, follow early incident detection protocols, and has a proven record of high quality root cause analysis and document provisioning. The new service will have flexibility to grow, modernize, and quickly scale in order to meet National Grid requirements. It will also have the ability to quickly provision new instances and support tiered storage environments. National Grid IS will work with FIT to move the SAP application portfolio to a new datacenter.

3.2 *Drivers*

To address its growing business environment and leverage the full benefits that the SAP/HANA applications offer, National Grid must enhance its SAP/HANA application support and hosting services. There is also a need to streamline and simplify application support by combining the two separate datacenters. This will allow for economies of scale, high availability and fault tolerance. It will also decrease the time it takes to bring the Disaster Recovery (DR) environment online for business use.

3.3 *Project Description*

The project will consolidate current SAP and HEC/HANA hosting under one platform with the newly selected service provider FIT. FIT will supply PaaS support for SAP and HANA applications, and ancillary applications including PowerPlan, Open Text, uPerform, and SABRIX.

The scope of the consolidation effort includes: PaaS Support; Data Center facilities; Transition planning and implementation; Performance and Regression testing; Disaster

US Sanction Paper

Recovery; Service Level Agreements (SLAs); DR&S-Compliance; Service Management and Service Improvement.

As a part of this project, the following activities will be conducted:

- Plan the transition to the new service provider FIT
- Implement SAP on New Infrastructure
 - Infrastructure Buildout
 - Primary Site/DR Site (Stand up LAN, Servers and Storage, Install SAP Environments including PowerPlan, etc.), Testing and Implementation.
 - Circuit Buildouts from Primary Data Centre (DC) & Disaster Recovery (DR) Sites to NG Verizon Network Cloud
 - Standup Production, Development, Quality Assurance (QA) and Project Environments
 - Application Migration, Testing and Implementation of HANA Platform – HEC (SAP HANA Enterprise Cloud) - Transition to run under the host provider under the common location
 - Address Security Risks from the National Grid IS Risk Register
 - Testing of the Service (Regression, Performance and Security)
 - Implementation of the New Service
- Service Management Integration and Training
 - Integrate with National Grid ServiceNow for problem management, incident management, change management and service catalog.

As a part of this project the Service Provider will be required to:

- Provide a Tier 3 datacenter to host the above applications with mature, proven, stable environments leveraging current technologies including processing platforms, high availability, redundancy, virtualization, network failover, disk mirroring, rapid provisioning, and flexible demand management. The datacenter environment management must be highly automated with advanced alerting systems and dedicated experts at-the-ready to address issues within agreed to SLA timeframes;
- Provide SAP Basis support with certified experts for Business As Usual (BAU) and Projects, HANA, Business Objects, Power Plan, Sabrix, Open Text and uPerform applications (plus ancillary systems noted in detailed requirements);
- Lead the consolidation effort of our current US SAP datacenter and HANA datacenter into one datacenter hosting both environments;
- Provide Disaster Recovery with the same attributes as the Production datacenter; that is safe, secure, resilient and can be brought online within a short period of time;
- Execute PaaS support duties and datacenter hosting activities in a professional manner utilizing well-established, measureable, communicated and documented processes and procedures; and
- Act as a strategic advisor promoting the use of new and advanced application functionality to help address National Grid's business needs, and practice

US Sanction Paper

continuous service improvements by streamlining processes and procedures, implementing online “self-service” functionality where appropriate and adopting new technologies to improve performance while reducing costs.

The US SAP/HANA hosted applications will be required to integrate with existing systems within the National Grid Network, as well as external sources such as banks, financial institutions, etc. These processes will all be provided in keeping with National Grid Digital Risk and Security (DR&S) compliance standards.

3.4 Benefits Summary

The key benefits of this project are as follows:

- The new hosting agreement will be provided at a lower cost while leveraging a simpler support structure and streamline project delivery services.
- Provide increased reliability and availability of the SAP Production, non-production and project environments leveraging High-Availability infrastructure.
- Increase system availability by decreasing the time needed to move processing to DR sites if/when needed and reduce time and costs associated with standing up new environments.
- This project will improve the DR&S security compliance posture of the US SAP landscape.

3.5 Business and Customer Issues

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

3.6 Alternatives

Alternative 1: Do Nothing

Doing nothing will not address the primary drivers listed in Section 3.2. This option is not viable.

Alternative 2: Defer project

Deferring the project will delay the realization of benefits and will require execution of renegotiated contract extensions with current hosting providers SAP, T-Systems and Wipro. Additionally, the SAP infrastructure at T-Systems will have to be upgraded.

3.7 Safety, Environmental and Project Planning Issues

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

US Sanction Paper

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	There is a risk that Sanctioning approval will not be secured when needed. Sanctioning approval is needed to engage the preferred vendor asp to help ensure that the project timeline is met.	4	5	5	20	20	Mitigate	Keeping US CIO and Sanctioning team briefed in regards to needing to fast-track the funding approvals. Creating and submitting all sanctioning requirements as soon as possible and monitor the review/sign-		If funding is not approved in a timely manner the project implementation is at risk. The timeline will have to be reevaluated and a decision made as to whether to proceed or cancel the project.
2	Circuit Build out from NG Verizon cloud to new Datacenter is critical path for testing and implementation.	3	1	5	3	15	Mitigate	When final two vendors are selected, orders to implement circuits to both vendors will be initiated. When finalist is determined, circuit order to runner-up will be cancelled and Verizon made whole (~20k). This process will expedite the circuit Build out by one month.	There is still a risk that the circuit will not be installed in ~90 day window or have initial testing issues once it is installed.	Joint planning activities, full transparency of progress and issues. Highly coordinated task management and activity reporting.
3	There is a risk that Items found during Penetration test can not be mitigated before go-live	3	3	4	9	12	Mitigate	Need to assess timing of pen testing and what time will be available to address any risks identified.		

3.9 Permitting

N/A

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

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

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

US Sanction Paper

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
					2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
4761	US Foundation Hosting Renewal	+/- 10%	CapEx	0.000	2.763	1.858	0.000	0.000	0.000	0.000	4.621
			OpEx	0.000	1.358	0.214	0.000	0.000	0.000	0.000	1.572
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	4.122	2.072	0.000	0.000	0.000	0.000	6.193
Total Project Sanction			CapEx	0.000	2.763	1.858	0.000	0.000	0.000	0.000	4.621
			OpEx	0.000	1.358	0.214	0.000	0.000	0.000	0.000	1.572
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	4.122	2.072	0.000	0.000	0.000	0.000	6.193

3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

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

Variance (Business Plan-Project Estimate)

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
CapEx	0.000	(2.763)	(1.858)	0.000	0.000	0.000	0.000	(4.621)
OpEx	0.000	(1.358)	(0.214)	0.000	0.000	0.000	0.000	(1.572)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	(4.122)	(2.072)	0.000	0.000	0.000	0.000	(6.193)

3.11.3 Cost Assumptions

This estimate was developed in 2017 using the standard IS estimating methodology. The accuracy level of estimate for each project is identified in Table 3.11.1

3.11.4 Net Present Value / Cost Benefit Analysis

This is not an NPV project.

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3.11.4.1 NPV Summary Table

N/A

3.11.4.2 NPV Assumptions and Calculations

N/A

3.11.5 Additional Impacts

None.

3.12 Statements of Support

3.12.1 Supporters

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

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

3.12.2 Reviewers

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

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

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4 Appendices

4.1 Sanction Request Breakdown by Project

N/A

4.2 Other Appendices

4.2.1 Project Cost Breakdown

Project Cost Breakdown			
Cost Category	sub-category	\$ (millions)	Name of Firm(s) providing
Personnel	NG Resources	0.887	
	SDC Time & Materials	0.103	
	SDC Fixed-Price	0.750	
	All other personnel	1.553	
	TOTAL Personnel Costs	3.293	
Hardware	Purchase	-	
	Lease	-	
Software		0.247	
Risk Margin		0.624	
Other		2.029	
TOTAL Costs		6.193	

A major component of the other costs include service provider environment hosting and implementation costs.

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4.2.2 Benefiting Operating Companies

Benefiting Operating Companies Table:

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

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4.2.3 IS Ongoing Operational Costs (RTB):

This project will decrease the IS on-going operations support costs as part of the Implementation phase. These are also known as Run the Business (RTB) costs.

Decrease in RTB will be observed by implementing this project since this project will combine current datacenters into one datacenter to reduce costs and improve service; consolidate from a two to one vendor support model along with automation of service requests and environment management there by achieving the project goals outlined in section 3.2.

Summary Analysis of RTB Costs							
All figures in \$ millions	Yr. 1 17/18	Yr. 2 18/19	Yr. 3 19/20	Yr. 4 20/21	Yr. 5 21/22	Yr. 6+	Total
Forecast of RTB Impact							
RTB if Status Quo Continues	1.574	6.707	6.844	6.844	-	-	21.969
RTB if Project is Implemented	1.460	4.445	4.285	4.285	-	-	14.475
Net change in RTB	(0.114)	(2.261)	(2.559)	(2.559)	-	-	(7.494)
RTB Variance Analysis (if Project is Implemented)							
Net Δ RTB funded by Plan(s)	-	-	-	-	-	-	-
Variance to Plan	(0.114)	(2.261)	(2.559)	(2.559)	-	-	(7.494)
Total RTB Costs - by Cost Type (if Project is Implemented)							
App.Sup. - SDC 1	-	-	-	-	-	-	-
App.Sup. - SDC 2	-	-	-	-	-	-	-
App.Sup. - other	-	-	-	-	-	-	-
SW maintenance	-	0.137	0.182	0.182	-	-	0.502
SaaS	-	-	-	-	-	-	-
HW support	1.411	4.213	4.040	4.040	-	-	13.704
Other: IS	0.049	0.096	0.062	0.062	-	-	0.269
All IS-related RTB (sub-Total)	1.460	4.445	4.285	4.285	-	-	14.475
Business Support (sub-Total)	-	-	-	-	-	-	-
Total RTB Costs	1.460	4.445	4.285	4.285	-	-	14.475

4.3 NPV Summary

N/A

4.4 Customer Outreach Plan

N/A

Investment Proposal Summary Sheet

VC Upgrade – Res Woods – Project No. INVP 4632

Region:	US	Category:	Policy	Legal Entity:	Shared
Risk Score:	31	Primary Driver:	Reliability	Project Classification:	M

Project Description:

This paper requests sanction of INVP 4632 in the amount \$1.883M with a tolerance of +/- 10% for the purposes of full implementation.

This sanction amount is \$1.883M broken down into:

\$ 1.866M	Capex
\$ 0.017M	Opex
\$ 0.000M	Removal

Brief Description

This project is part of the Technology Improvement program (TIP) under INVP 4663 Enhance and Enable End user Capabilities. The current video conferencing units at Reservoir Woods are on old technology meaning that they are not able to integrate with the rest of the Video conferencing estate and do not provide a consistent user interface. This project will replace the Video Conference units in Res Woods 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.

Background

Improvements to the effectiveness of meetings are enabled through video conference services. The current services at Reservoir Woods are inconsistent; users find them difficult to use and performance of the service is unreliable. This restricts the number of people using the service and minimizes the opportunity for the Company in providing service to customers. To improve consistency, this project proposes to upgrade videoconference capability at Reservoir Woods to improve the user interface and ensure flexible, compatible technology is in use to ease ability for future upgrades.

National Grid Confidential

Project Costs [\$]M	Prior Year 16/17	Yr 1 17/18	Yr 2 18/19	Yr 3 19/20	Yr 4 20/21	Yr 5 21/22	Total
Start-Up - OPEX	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Start-Up - CAPEX	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Start-Up - risk margin	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Start-Up SUBTOTAL	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Requirements & Design - OPEX	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Requirements & Design - CAPEX	\$1.041	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$1.041
Requirements & Design - risk margin	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Requirements & Design SUBTOTAL	\$1.041	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$1.041
Development & Implementation - OPEX							
People	\$0.000	\$0.017	\$0.000	\$0.000	\$0.000	\$0.000	\$0.017
Software	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Hardware	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Telecommunications	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Service Contracts	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Risk Margin	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Development & Implementation SUBTOTAL	\$0.000	\$0.017	\$0.000	\$0.000	\$0.000	\$0.000	\$0.017
Development & Implementation - CAPEX							
People	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Software	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Hardware	\$0.164	\$0.124	\$0.000	\$0.000	\$0.000	\$0.000	\$0.288
Telecommunications	\$0.000	\$0.494	\$0.000	\$0.000	\$0.000	\$0.000	\$0.484
Service Contracts	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Risk Margin	\$0.000	\$0.043	\$0.000	\$0.000	\$0.000	\$0.000	\$0.043
Development & Implementation SUBTOTAL	\$0.164	\$0.661	\$0.000	\$0.000	\$0.000	\$0.000	\$0.825
TOTAL PROJECT COSTS	\$1.205	\$0.661	\$0.000	\$0.000	\$0.000	\$0.000	\$1.883
Non-regulated project - UPLIFT	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Non-regulated project - TOTAL	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Non-regulated project – UPLIFT	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Non-regulated project – TOTAL	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
Investment Plan No: INVP 4632	Budget OPEX	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
	Budget CAPEX	\$0.000	\$0.155	\$0.000	\$0.000	\$0.000	\$0.000
Impact on RTB costs	\$0.000	-0.058	-0.048	-0.048	-0.048	-0.048	-0.250

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

TOTAL BENEFITS \$k						
Key Business Benefits:						
Provision of a consistent and reliable service for users of video conferencing						

Key risks: <ul style="list-style-type: none"> There is a risk that the delivery of the video conferencing equipment may be delayed causing a delay in implementation. Facilities may run into HVAC or other structural issues during their weekend efforts 	Key Dates (Month/ Year): <table> <tr> <td>Start Up</td><td>Jan 2017</td></tr> <tr> <td>Partial Sanction</td><td>Feb 2017</td></tr> <tr> <td>Begin Requirements/Design</td><td>Feb 2017</td></tr> <tr> <td>Full Sanction</td><td>Jun 2017</td></tr> <tr> <td>Begin Dev & Implement</td><td>Feb 2017</td></tr> <tr> <td>Begin User Accept Testing</td><td>Mar 2017</td></tr> <tr> <td>Move to Production / Last Go Live</td><td>Jun 2017</td></tr> <tr> <td>Project Complete</td><td>Jul 2017</td></tr> <tr> <td>Project Closure Sanction</td><td>Jul 2017</td></tr> </table>	Start Up	Jan 2017	Partial Sanction	Feb 2017	Begin Requirements/Design	Feb 2017	Full Sanction	Jun 2017	Begin Dev & Implement	Feb 2017	Begin User Accept Testing	Mar 2017	Move to Production / Last Go Live	Jun 2017	Project Complete	Jul 2017	Project Closure Sanction	Jul 2017
Start Up	Jan 2017																		
Partial Sanction	Feb 2017																		
Begin Requirements/Design	Feb 2017																		
Full Sanction	Jun 2017																		
Begin Dev & Implement	Feb 2017																		
Begin User Accept Testing	Mar 2017																		
Move to Production / Last Go Live	Jun 2017																		
Project Complete	Jul 2017																		
Project Closure Sanction	Jul 2017																		

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 PDM	Bill Kearns
Relationship Manager	Bill Kearns
Program Delivery Manager	Dave McCune
IS Finance Management	Chip Benson
IS Regulatory	Dan DeMauro
DR&S	Elaine Wilson
Service Delivery	Brian Detota
Enterprise Architecture	Joe Clinchot

RECOMMENDATIONS


The Sanctioning Authority is invited to:

- APPROVE the investment of \$1.883M including risk margin of \$0.043M by May 31, 2017
- NOTE that John Gilbert, Global Head IS Service Delivery, is the Project Sponsor
- NOTE that John Braziel, is the Project Manager and has the approved financial delegation to deliver the project

Decision of the Sanctioning Authority

I hereby approve the recommendations made in this paper.

Signature..... Date.....
John Gilbert, Global Head IS Service Delivery



Investment Request Summary - IS US

FISCAL YEAR 2019

INV ID: 4830

Project Name: Migration of Oracle to Linux

Program: Enterprise Services

IRS Status: ACTIVE

Sponsor: Gilbert, John

Title: Global Head IS Service Delivery, Global IS

Relationship Manager: Brian Detota

Title: IS Relationship Manager, Global IS

Progr Delivery Director: Helen Smith

Title: Head of Programme Delivery

Paper Author:

Title:

Business Area: IS - Infrastructure

Portfolio: IS for IS

☐ In-Flight Project?

Invest Classification: Medium

Category: Policy Driven

Primary Policy Driver: Reliability

Region: US

Strategic Program: End to End Process (Primary)::

Business Priority: High

IS Focus Area: Future Proof Our Business

Application Strategy: Re-Platform

Tech Modernization

End to End Process (Secondary):

Project Description: The context for the project with background information

This project will migrate our Oracle Database applications that reside on expensive Unix P-Series hardware, to less expensive Wintel/Linux based hardware. Funding for the Wintel hardware along with the application effort to repurpose from Unix to Linux will be covered from this project.

Project Rationale: Highlight business challenge, capability or process the project addresses

RTB savings are expected after the project migrations.

Project Scope: Explain what is in scope and what is not in scope for the project

Initial project will be an F&A to assess cost of migration and potential cost savings.

Project Dependencies: Identify any core program or project dependencies, please include INVP numbers if known

INVP 4982 Refresh of Vblocks Technologies and INVP 4988 Refresh of Data Center Storage Technologies.

Basic Project Assumptions:

Potential high business impact, F&A will confirm level of business resources required.

Indicative Project Costs by Fiscal Year

(\$M)	Prior Years	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Total
CapEx		0.300	0.300	0.000	0.000	0.000	0.000	0.000	0.000	0.600
OpEx		0.245	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.275
Impact on RTB		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Indicative Project Costs by Delivery Phase

(\$M)	Start-up	R & D	D & I	Closure	Total
CapEx		0.100	2.000		2.100

IS Projects: 4830 - Migration of Oracle to Linux

1. Has a dependency on IS Project;
2. Has a dependency on IS Project;
3. Has a dependency on IS Project;
4. Has a dependency on IS Project;
5. Has a dependency on IS Project;
6. Has a dependency on IS Project;

Business Initiative Dependencies

IS Projects: 4830 - Migration of Oracle to Linux

1. Has a dependency on Biz Initiative,
2. Has a dependency on Biz Initiative,
3. Has a dependency on Biz Initiative,
4. Has a dependency on Biz Initiative,

Project Relationships

☐ Minor Works

Project Relationship:

Related Projects:

- ☐ Select All Companies
- ☐ Clear All Companies
- ☐ Select All Gas
- ☐ Select All Electric
- Gen
- ☒ National Grid USA Parent
- ☒ KeySpan Energy Development Corporation
- ☒ KeySpan Services Inc.
- ☒ KeySpan Energy Corp
- ☒ KeySpan Energy Delivery New York
- ☒ KeySpan Energy Delivery Long Island
- ☒ KeySpan Generation LLC (PSA)
- ☒ KeySpan Glenwood Energy Center
- ☒ KeySpan Port Jefferson Energy Center
- ☒ KeySpan Energy Trading Svc LLC
- ☒ Niagara Mohawk Power Corp- Electric Distribution
- ☒ Niagara Mohawk Power Corp - Gas
- ☒ Niagara Mohawk Power Corp - Transmission
- ☒ Massachusetts Electric Company
- ☒ Massachusetts Electric Company - Transmission
- ☒ Nantucket Electric Company
- ☒ Boston Gas Company
- ☒ Colonial Gas Company
- ☒ Narragansett Gas Company
- ☒ Narragansett Electric Company
- ☒ Narragansett Electric Company - Transmission
- ☒ New England Power Company - Transmission
- ☒ New England Hydro - Trans Corp
- ☒ New England Electric Trans Corp
- ☐ NE Hydro Trans Electric Co
- ☒ NG LNG LP Regulated Entity

Enabling IS Capabilities check all that apply

- ☐ Enterprise Content Management (ECM)
- ☐ Enterprise Mobility
- ☐ Comprehensive Integration Services (CIS)
- ☐ Reporting and Analytics
- ☐ Hybrid Cloud
- ☐ Networks
- ☐ Next Gen Workplace

Key Milestone Dates: Select the 1st, 15th or last day of the month

Indicative Estimated Duration (Months):

Begin Start-up	Begin Requirements & Deign	Begin Development & Implementation	Begin User Acceptance Testing	Go Live	Project Completion	Project Closure
August, 2018				August, 2019		

Business Resource Estimates: # of Full Time Equivalents

Start-up	Requirements & Deign	Develop & Implement	Business Resources UAT	Go Live Readiness	Post Go Live Support
0	0	0	0	0	0

Resourcing Strategy:

Attached Supporting Documents

Recommendation Sign-off

1/22/2018

FY19 - Investment Request Summaries - IRSs - Migration of Oracle to Linux

Role	Name	Title	Date
Business Project Sponsor	Gilbert, John	Global Head IS Service Delivery, Global IS	
Business Relationship Manager	Brian Detota	IS Business Relationship Manager	
IS Program Delivery Manager	Helen Smith	IS Program Delivery Manager	
			

Resanction Request

Title:	Ariba TLS and CI Upgrade	Sanction Paper #:	USSC-17-155+
Project #:	INVP 4397	Sanction Type:	Resanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	April 12, 2017
Author / NG Representative:	Diane Beard / Ella Weisbord	Sponsor:	Doneen Hobbs, SVP Shared Services
Utility Service:	IS	Project Manager:	Samir Parikh

1 Executive Summary

This paper requests the resanction of INVP 4397 in the amount \$1.729M with a tolerance of +/- 10% for the purposes of Full implementation.

This sanction amount is \$1.729M broken down into:

- \$1.462M Capex
- \$0.267M Opex
- \$0.000M Removal

Note the originally requested sanction amount of \$0.934M.

2 Resanction Details

2.1 Project Summary

The project will address the upgrade of two Systems Applications Processing (SAP) Enterprise Infrastructure components to mitigate the risk of losing the Ariba connection to National Grid suppliers for the purposes of collaboration, and network activities such as the sending and receiving of purchase orders, as well as other necessary interfaces, such as GridForce. The TLS (Transport Layer Security) provides inbound and outbound communications security over the internet and was required to be upgraded to industry acceptable version 1.2 on December 2016. If TLS isn't upgraded, National Grid will not be able to connect to Ariba's supplier collaboration and housing catalogs, and network activities, such as sending and receiving purchase orders. The Ariba Cloud Integration (CI) component will need to be upgraded to the most current supported version at the point of implementation. As of May 2016, National Grid's system landscape is operating on an unsupported version (CI-4) and not able to make service requests to resolve production issues.

Resanction Request

2.2 Summary of Projects

Project Number	Project Title	Estimate Amount (\$M)
INVP 4397	Ariba TLS and CI Upgrade	1.729
Total		1.729

2.3 Prior Sanctioning History

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

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Paper Title	Sanction Type	Paper Reference Number	Tolerance
Oct 2016	ISSC	\$0.934M	\$0.934M	Ariba TLS and CI Upgrade	Full		10%

Over / Under Expenditure Analysis

Summary Analysis (\$M)	Capex	Opex	Removal	Total
Resanction Amount	1.462	0.267	0.000	1.729
Latest Approval	0.834	0.100	0.000	0.934
Change*	0.628	0.167	0.000	0.795

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

Resanction Request

2.4 Cost Summary Table

					Current Planning Horizon							
Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +		
					2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Total	
INVP 4397	Ariba TLS and CI Upgrade	+/- 10%	CapEx	0.261	1.201	0.000	0.000	0.000	0.000	0.000	0.000	1.462
			OpEx	0.267	0.000	0.000	0.000	0.000	0.000	0.000	0.267	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	0.528	1.201	0.000	0.000	0.000	0.000	0.000	1.729	
Total Project Sanction			CapEx	0.261	1.201	0.000	0.000	0.000	0.000	0.000	1.462	
			OpEx	0.267	0.000	0.000	0.000	0.000	0.000	0.000	0.267	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	0.528	1.201	0.000	0.000	0.000	0.000	0.000	1.729	

2.5 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY18 - 22	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input type="radio"/> Under <input checked="" type="radio"/> N/A	\$0.000M

2.6 Drivers

2.6.1 Detailed Analysis Table

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

Detail Analysis	Over/Under Expenditure?	Amount (\$M)
Increased risk	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	0.381
Increased vendor labor costs (Wipro & SAP)	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	0.197
Ariba Cloud hosting environments	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	0.136
Increased NG resources	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	0.081

Resanction Request

2.6.2 Explanation of Key Variations

SAP had requested a dedicated set of server environments (development and two quality assurance) for the upgrades, with a potential increase in T-Systems hosting costs of \$685K. Alternatively, National Grid is proceeding with implementing the upgrade on existing SAP environments and sharing them with the Power Plan Remediation and Human Resources Service Pack (HRSP) projects. This decision has the following impact:

- **Increased risk margin (\$0.381M)**
 - Having shared environments will increase the risk between other initiatives, such as Power Plan rehabilitation program and the mandatory annual HR Service Pack releases, due to different project timelines (mock cutover dates and environment refreshes) and go-live dates.
 - Including the Ariba upgrade will increase overall SAP portfolio risk in the event that there are delays from the other projects or in case an issue with the Ariba upgrade delays the other projects.

Negotiations with the providers (Wipro and SAP) took longer than expected, which resulted in the following:

- **Increase in vendor labor cost (\$0.197M)**

From \$689k (Wipro only) to \$886k (Wipro and SAP). Under the new agreement:

 - **Wipro** will support
 - Upgrade of all non-Ariba TLS interfaces
 - JVM Upgrade
 - Environment management
 - Mock and deployment cutover support
 - Testing support
 - Knowledge transfer with SAP and
 - Documentation
 - **SAP** will support the upgrade
 - The SAP estimate includes the upgrade of Ariba TLS interfaces to v1.2
 - Upgrade Cloud Integrator from version CI4 to CI9
- **Use of dedicated server environments (\$0.136M)**
 - Inclusion of two Ariba Cloud hosting environments and setup costs.
- **Increased NG Resources (\$0.081M)**
 - Includes a full time Business Analyst and Project Manager.
 - Increased roles for Solution Architect, Digital Risk and Security Consultant, and SAP Portfolio support.

Resanction Request

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

Re-allocations of funds within the US business has been managed to meet jurisdictional budgetary, statutory and regulatory requirements. Future fiscal year forecasts will be addressed in future year business plans.

2.8 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	May 2016
Begin Requirements and Design	Jun 2016
Full Sanction	Oct 2016
Scope re-evaluation	Mar 2017
Full Resanction	Apr 2017
Begin Development and Implementation	May 2017
Move to Production / Last Go Live	Jul 2017
Project Complete	Aug 2017
Closure Sanction	Oct 2017

2.9 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
Oct 2017	Project Closure

3 Statements of Support

3.1 Supporters

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

Role	Individual's Name
Business Executive Sponsor	Doneen Hobbs
Head of PDM	Deborah Rollins
Relationship Manager	Joel Semel
Program Delivery Manager	Samir Parikh
IS Finance Management	Chip Benson
IS Regulatory	Daniel DeMauro
DR&S	Elaine Wilson
Service Delivery	Brian Detota
Enterprise Architecture	Henrik Magnusson

Resanction Request

3.2 Reviewers

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

Function	Individual	Area
Regulatory	Zschokke, Peter	All
Jurisdictional Delegate(s)	Anand, Sonny	New England - Electric
	Harbaugh, Mark	New York - Electric
	Hill, Terron	FERC
	Brown, Laurie	New York - Gas
	Currie, John	New England - Gas
Procurement	Curran, Art	All

Resanction Request

4 Decisions

The US Sanctioning Committee (USSC) at a meeting held on April 12, 2017:

- (a) APPROVED this paper and the investment of \$1.729M and a tolerance of +/-10%.
- (b) NOTED that Samir Parikh has the approved financial delegation.

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

Christopher Kelly
Senior Vice President, Electric Process & Engineering
US Sanctioning Committee Co – Chair Person

US Sanction Paper

Title:	Aging Systems Stabilization/Upgrade Program	Sanction Paper #:	USSC-16-198
Project #:	4188	Sanction Type:	Sanction
Operating Company:	National Grid Electric Svc.	Date of Request:	June 8, 2016
Author:	Martin McDermott	Sponsor:	Thomas Bennett VP Gas System Engineering Gas Systems
Utility Service:	IS	Project Manager:	Sally Seltzer

1 **Executive Summary**

1.1 **Sanctioning Summary**

This paper requests sanction of INVP 4188 in the amount \$1.950 M with a tolerance of +/- 10% for the purposes of *Full implementation*.

This sanction amount is \$1.950 M broken down into:

*\$1.5 M Capex
\$0.45 M Opex
\$0.000 M Removal*

1.2 **Project Summary**

The purpose of this investment is to create a Program of Work and provide a funding source for various Operation applications system stabilization/upgrade efforts over the course of the year. Several Operations applications are dependent on outdated and soon to be non-supported operating systems, components and platforms such as Windows 2003. This investment will upgrade, enhance and replatform some of the higher at risk Operations applications and replace outdated components. These are items that are imperative initiatives to keep critical systems running, and providing the level of service that the business requires. The program team will evaluate each candidate system to determine the most critical to be funded through this investment. This investment will be run as a program of work which will have a Governance Board which will consist of the functional area owners that could have their system updated (Gas, Electric, other). The individual Projects within his Program will follow the normal Governance Process based on each projects level of spend. The Program Board will approve the individual initiatives based on level of spend and provide overall governance of the program. A Closure Report will be presented to the USSC at the completion of the program detailing the individual Projects undertaken and related investment spending within the program.

US Sanction Paper

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
INVP 4188		Aging Systems Stabilization	1.950
Total			1.950

1.4 Associated Projects

N/A

1.5 Prior Sanctioning History

N/A

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
7/12/2017	Program Close

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	Reliability

1.8 Asset Management Risk Score

Asset Management Risk Score: 48

Primary Risk Score Driver: (Policy Driven Projects Only)

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

US Sanction Paper

1.9 Complexity Level

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

Complexity Score:

1.10 Process Hazard Assessment

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

☐ Yes ☒ No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
FY17 IS Investment Plan Capex	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input type="radio"/> Under <input checked="" type="radio"/> NA	\$0.000M
FY 17 IS Investment Plan Opex	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input type="radio"/> Under <input checked="" type="radio"/> NA	\$0.000M

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

N/A

US Sanction Paper

1.13 Current Planning Horizon

		Current Planning Horizon						Total
		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	
CapEx	0.000	1.500	0.000	0.000	0.000	0.000	0.000	1.500
OpEx	0.000	0.450	0.000	0.000	0.000	0.000	0.000	0.450
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	1.950	0.000	0.000	0.000	0.000	0.000	1.950

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	Apr 2016
USSC Sanctioning	Jun 2016
Begin Requirements and Design	Jun 2016
Begin Development and Implementation	Oct 2016
Move to Production	Mar 2017
Project Complete	Apr 2017
Project Closure	Jul 2017

1.15 Resources, Operations and Procurement

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



US Sanction Paper

Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
---------------------------------------	---------------------------	-----------------------------	--

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

None identified at this stage.

1.17 **Climate Change**

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

1.18 **List References**

1	INVP4188 – TCO Log

US Sanction Paper

2 Decisions

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

- (a) APPROVED this paper and the investment of \$1.950M and a tolerance of +/-10%.
- (b) APPROVED the RTB impact of \$0.200M (per annum) for 5 years.
- (c) NOTED that Sally Seltzer has the approved financial delegation.

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

Ross Turrini

Senior Vice President US Sanctioning Committee Co - Chair Person

US Sanction Paper

3 Sanction Paper Detail

Title:	Aging Systems Stabilization/Upgrade Program	Sanction Paper #:	USSC-16-198
Project #:	4188	Sanction Type:	Sanction
Operating Company:	Allocated	Date of Request:	June 8, 2016
Author:	Martin McDermott	Sponsor:	Thomas Bennett VP Gas System Engineering Gas Systems
Utility Service:	IS	Project Manager:	Sally Seltzer

3.1 *Background*

National Grid's Electric and Gas Operations is dependent on several critical applications that are running on older technology and components which are beyond their support life cycle. The systems are prone to failure and becoming harder to maintain with limited knowledge of the technology. Additionally the older operating systems and components these applications are running on are no longer being supported by the vendors, leading to security risks as vulnerabilities are discovered but no longer fixed. The older systems in some cases are also holding back the roll-out of newer equipment to the workforce which is dependence on these applications which will not run on the newer technology.

3.2 *Drivers*

The key drivers of this Investment are:

- Deliver increase reliability of Operations Systems by moving to supported versions of the application, system and components.
- Reduce the risk of loss of system due to a failing components which are no longer supportable or available.
- These investments will enable more users the ability to utilize newer more readily available devices.

3.3 *Project Description*

This program will upgrade, replatform and enhance existing Operations applications which have components which are falling out of support and are no longer maintainable. This includes upgrading to the currently supported operating system, moving to supportable servers, upgrading the databases to the current support levels and replacing older components to bring the system into a fully reliable state. This project will also enhance or replace critical network components which are failing, going out of support or exceeding capacity.

US Sanction Paper

The table below contains a listing of applications currently under consideration for this year's stabilization effort, they have components which are currently out of support and are at risk. These applications along with others will be prioritized as part of the Program to bring them up to a supportable level so they can continue to be utilized. Also as part of this program the selected applications may have minor updates and additional features added to help stabilize the application as needed.

Candidate Systems	
MITS - Meter Inventory Tracking System	Upgrade database to current support level; Upgrade components; Upgrade Middleware
DTS - Damage Tracking System	Upgrade database to supported version; Upgrade Servers to supported version
AVLS - Vehicle Location System	Upgrade database, servers and components to supported versions.
ACIS - Alliance Contractor Information System	Upgrade database and servers to a supported version
RODs - Resources on Demand	Upgrade Servers to supported version
FORTIS - Gas Service Cards	Upgrade database to supported version
E-Permits	Upgrade database to supported version; Upgrade servers to a supported version
SEAL	Upgrade database, servers, components to supported versions
Cascade (Gas)	Upgrade middleware to a supportable product

The Program Governance committee will review, prioritize and make final recommendations on which applications get remediated and which may be deferred. Additional applications may be added to the list and some of the listed applications may get deferred for the next Program or a separate investment based on those recommendations.

3.4 Benefits Summary

- Several Operations applications are dependent on outdated and soon to be non-supported operating systems, components and platforms such as Windows 2003.
- This investment will upgrade, enhance and re-platform some of the higher at risk Operations applications and replace outdated components.
- These are items that are imperative initiatives to keep critical systems running, and providing the level of service that the business requires.

US Sanction Paper

3.5 *Business and Customer Issues*

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

3.6 *Alternatives*

Alternative 1: Do Nothing

Rejected - the applications are running on operating systems and components which support have ended or will be ending. If a component were to fail recovery may not be possible and the application could be lost to the business. Additionally as security risks are uncovered with the systems, they would no longer be patched leading to security risks.

Alternative 2: Defer the Investments

Rejected - based on the current dates of end of support and the risks associated with the failure of older components delaying the investment would lead to new higher risks and costs.

Alternative 3: Replace Applications

Rejected - It is not possible to replace all older applications in a short period of time. A review is being done to determine a road map and replacement strategies for the Operations applications. Although some applications may be replaced in the future, this effort will concentrate on replatform applications which will be utilized for the foreseeable future.

3.7 *Safety, Environmental and Project Planning Issues*

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

3.8 *Execution Risk Appraisal*

US Sanction Paper

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	Unavailability of Resources (Both IS and Business)	2	2	2	4	4	Mitigate	Availability of resources will be a selection criteria for Projects selected as part of this program.	The Program Manager will monitor resource availability	The Program Manager will responsible for mitigating the risk as part managing overall Program by shifting resources/projects.
2	Cost of remediation exceeds funding.	1	3	2	3	2	Avoid	Projects will be selected based on cost to ensure maximum remediation without exceeding spending limit.	The Program Manager will monitor spend to ensure costs stay within the funding limit of the program.	Individual Projects will be adjusted by the Program Manager to account for remediation overages.

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

3.11 **Financial Impact to National Grid**

3.11.1 **Cost Summary Table**



US Sanction Paper

					Current Planning Horizon						
Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total
					2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	
INVP 4188	Aging System Stabilization/Upgrade Program	+/- 10%	CapEx	0.000	1.500	0.000	0.000	0.000	0.000	0.000	1.500
			OpEx	0.000	0.450	0.000	0.000	0.000	0.000	0.450	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	0.000	1.950	0.000	0.000	0.000	0.000	1.950	
Total Project Sanction			CapEx	0.000	1.500	0.000	0.000	0.000	0.000	0.000	1.500
			OpEx	0.000	0.450	0.000	0.000	0.000	0.000	0.000	0.450
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	1.950	0.000	0.000	0.000	0.000	0.000	1.950

3.11.2 Project Budget Summary Table

Project Costs per Business Plan

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
		2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	
CapEx	0.000	1.500	0.000	0.000	0.000	0.000	0.000	1.500
OpEx	0.000	0.450	0.000	0.000	0.000	0.000	0.000	0.450
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	1.950	0.000	0.000	0.000	0.000	0.000	1.950

Variance (Business Plan-Project Estimate)

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

3.11.3 Cost Assumptions

This estimate was developed in 2016 using the standard IS estimating methodology. The accuracy level of estimate for each project is identified in table 3.11.1

3.11.4 Net Present Value / Cost Benefit Analysis

This is not a NPV project.

US Sanction Paper

3.11.5 Additional Impacts

None

3.12 Statements of Support

3.12.1 Supporters

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

Role	Individual's Name
Business Executive Sponsor	Thomas Bennett
Head of BRM/Strategy	Jon Poor
Head of PDM	Don Stahlin
Relationship Manager	Richard Sheer
Program Delivery Manager	Sally Seltzer
IS Finance Management	Chip Benson
IS Regulatory	Daniel DeMauro
DR&S	Mukund Ravipaty
Service Transition	William Kearns
Enterprise Architecture	Joseph 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
Jurisdictional Delegate(s)	Patterson, James	New England - Electric
	Harbaugh, Mark	New York - Electric
	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

US Sanction Paper

4.2 Other Appendices

4.2.1 Project Cost Breakdown

Project Cost Breakdown			
Cost Category	sub-category	\$ (millions)	Name of Firm(s) providing resources
Personnel	NG Resources	0.250	
	SDC Time & Materials	0.750	
	SDC Fixed-Price	-	
	All other personnel	0.000	
	TOTAL Personnel Costs	1.000	
Hardware	Purchase	0.000	
	Lease	0.250	
Software		0.250	
Risk Margin		0.000	
Other		0.450	
TOTAL Costs		1.950	

4.2.2 Benefiting Operating Companies

Operating Company Name	Business Area	State
Niagara Mohawk Power Corp - Electric	Electric Distribution	NY
Niagara Mohawk Power Corp – Gas	Gas Distribution	NY
Niagara Mohawk Power Corp - Transmission	Transmission	NY
KeySpan Energy Delivery NY	Gas Distribution	NY
KeySpan Energy Delivery LI	Gas Distribution	NY
Massachusetts Electric Company	Electric Distribution	MA
Massachusetts Electric Company – Transmission	Transmission	MA
Nantucket Electric Company	Electric Distribution	MA
Boston Gas Company	Gas Distribution	MA
Colonial Gas Company	Gas Distribution	MA
Narragansett Electric Company	Electric Distribution	RI
Narragansett Gas Company	Gas Distribution	RI
Narragansett Electric Company – Transmission	Transmission	RI
New England Power Company - Transmission	Transmission	MA, NH, RI, VT

US Sanction Paper

4.2.3 IS Ongoing Operational Costs (RTB)

Summary Analysis of RTB Costs							
All figures in \$ millions	Yr. 1 16/17	Yr. 2 17/18	Yr. 3 18/19	Yr. 4 19/20	Yr. 5 20/21	Yr. 6+	Total
<u>Forecast of RTB Impact</u>							
RTB if Status Quo Continues	-	-	-	-	-	-	-
RTB if Project is Implemented	.200	.200	.200	.200	.200	.200	1.200
Net change in RTB	.200	.200	.200	.200	.200	.200	1.200
<u>RTB Variance Analysis</u> (if Project is Implemented)							
Net Δ RTB funded by Plan(s)	.200	.200	.200	.200	.200	.200	1.200
Variance to Plan	.000	.000	.000	.000	.000	.000	.000
<u>Total RTB Costs - by Cost Type</u> (if Project is Implemented)							
App.Sup. - SDC 1	-	-	-	-	-	-	-
App.Sup. - SDC 2	-	-	-	-	-	-	-
App.Sup. - other	-	-	-	-	-	-	-
SW maintenance	-	-	-	-	-	-	-
SaaS	-	-	-	-	-	-	-
HW support	.100	.100	.100	.100	.100	.100	.600
Other: IS	.100	.100	.100	.100	.100	.100	.600
All IS-related RTB (sub-Total)	.200	.200	.200	.200	.200	.200	1.200
Business Support (sub-Total)	-	-	-	-	-	-	-
Total RTB Costs	.200	.200	.200	.200	.200	.200	1.200

US Sanction Paper

Title:	UNIX 51 Migration	Sanction Paper #:	USSC-16-321v2
Project #:	INVP 4461 Capex: S007584	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	October 11, 2017
Author:	Friya Jamshedji / Nicola Pennington	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	Bill Brosnan

1 Executive Summary

1.1 Sanctioning Summary

This paper requests sanction of INVP 4461 in the amount \$1.539M with a tolerance of +/- 10% for the purposes of Development and Implementation.

This sanction amount is \$1.539M broken down into:

\$1.496M Capex

\$0.043M Opex

\$0.000M Removal

1.2 Project Summary

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 FTS service (downstate) was developed almost 20 years ago and is running on an unsupported and unpatchable platform. 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. Migrating UNIX 51 interfaces to the CIS platform will enable decommissioning of the UNIX 51 server.

In Phase 1, analysis, tactical work and migration of the initial set of interfaces will be performed. Target completion for Phase 1 is November 2017. This project, Phase 2, will deliver the migration of the remaining set of business critical interfaces from the unsupported UNIX 51 platform onto the selected National Grid strategic middleware platform (CIS). By leveraging the experience, processes and infrastructure setup from Phase 1, the Phase 2 business critical interfaces are expected to be implemented more efficiently.

US Sanction Paper

1.3 Summary of Projects

Project Number	Project Type (Elec only)	Project Title	Estimate Amount (\$M)
4461		UNIX 51 Migration	1.539
Total			1.539

1.4 Associated Projects

Project Number	Project Title	Estimate Amount (\$M)
4706	1327 Interfaces - 523 FTS, 340 RDX, 245 MQSI, 253 JCAPS, 44 PM4D, 7 VB	3.320
4377	Data Centre Decommission (Melville)	4.025
Total		7.345

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Paper Title	Sanction Type	Tolerance
Feb 2017	USSC	\$0.802M	\$1.530M	UNIX 51 Migration	Partial	+/-25%

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
Jun 2018	Closure

US Sanction Paper

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	The FTS infrastructure UNIX 51 is out of support and unable to migrate to virtual servers in the DXC datacenter due to aged technology. This investment mitigates risk from out of support infrastructure and provides a centralized expandable environment (CIS) for additional interfaces to be implemented. Migrating to the CIS platform (built using Oracle's Oracle Fusion Middleware suite) will enable the decommissioning of UNIX 51.

1.8 Asset Management Risk Score

Asset Management Risk Score: 42

Primary Risk Score Driver: (Policy Driven Projects Only)

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

1.9 Complexity Level

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

Complexity Score: 24

1.10 Process Hazard Assessment

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

☐ Yes
☒ No

US Sanction Paper

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY18 –22	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	\$0.495M

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

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

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
CapEx	0.046	1.001	0.449	0.000	0.000	0.000	0.000	1.496
OpEx	0.002	0.041	0.000	0.000	0.000	0.000	0.000	0.043
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	0.048	1.043	0.449	0.000	0.000	0.000	0.000	1.539

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	Sep 2016
Partial Sanction	Feb 2017
Begin Phase 1	Feb 2017
Begin User Acceptance Testing Phase 1	Sep 2017
Project Sanction	Oct 2017
Move to Production Phase 1	Nov 2017
Begin Phase 2	Nov 2017
Begin User Acceptance Testing Phase 2	Dec 2017
Move to Production / Last Go-Live Phase 2	Apr 2018
Project Complete	Apr 2018
Sanction Closure	Jun 2018

US Sanction Paper

1.15 Resources, Operations and Procurement

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

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

1	<p>Issue - Availability of external Business Partner (Trading Partner) resources from Experian, ConEd, Pitney Bowes, Great Eastern, Western Union etc. to support the End to End Testing and Implementation of the External Interfaces.</p> <p>Mitigation Action – Proactively understand the needs of the Business Partners participation and submit Rough Order of Magnitude (ROM) estimates early.</p>
---	---

1.17 Climate Change

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

1.18 List References

N/A

US Sanction Paper

2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on October 11, 2017:

- (a) APPROVED this paper and the investment of \$1.539M and a tolerance of +/-10%.
- (b) APPROVED the run-the-business (RTB) impact of \$0.032M (per annum) for 5 years.
- (c) NOTED that Bill Brosnan has the approved financial delegation.

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

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

US Sanction Paper

3 Sanction Paper Detail

Title:	UNIX 51 Migration	Sanction Paper #:	USSC-16-321v2
Project #:	INVP 4461 Capex: S007584	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	October 11, 2017
Author:	Friya Jamshedji / Nicola Pennington	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	Bill Brosnan

3.1 Background

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. The business critical interfaces that utilize UNIX 51 from CRIS and CSS systems to numerous third parties are at risk of failure due to the reasons outlined below, with no viable contingency plan in place.

- The UNIX51 server is obsolete and operating on an unsupported platform. The version of MQ (messaging middleware) on UNIX51 has been out of support for 15 years
- Large file transfers cannot be processed. They need to be broken into smaller files and processed separately which increases the memory usage of the server and reduces the performance
- There is no Disaster Recovery for this solution. If the UNIX51 server were to fail, this would result in a lengthy delays in the restoration of services

The incidents are generally raised for the applications and not for the UNIX 51 server directly. Accordingly, the number of incidents that have occurred due to issues on UNIX 51 are difficult to identify. A major incident (P2) was reported on March 25 2017 that lasted 18 hours where CRIS, Experian and third party Novitex were impacted in terms of jobs unable to run or reach UNIX 51. There was another major incident (P2) raised in June 2016 as the UNIX51 server was not able to process any interface files that included more than fifty thousand records. The business was impacted for approximately 5 hours.

3.2 Drivers

The key drivers for this project are reliability, compliance and mitigation of the cyber security risk of running an unpatchable public facing system. This investment would support the closure of legacy datacenters (Melville) project INVP 4377, mitigate the risk

US Sanction Paper

of running the system on unsupported infrastructure (Refer risks ER025 ER054 from the IS Service Delivery Risk Register) and provide a centralized expandable environment for additional interfaces to be implemented. Implementing this project further reduces the risk for failure of business critical interfaces.

3.3 Project Description

This project will deliver the migration of the remaining set of business critical interfaces from the unsupported UNIX 51 platform to the selected National Grid strategic middleware platform.

In Phase 1, analysis, tactical work to review the interfaces, architecture and migration of the initial set of interfaces was performed. Phase1 activities included hardware capacity analysis, collection of Encryption/Decryption keys and security/group setup. The Production, Development and Quality Assurance (QA) environments were modified based on the results from the hardware and software capacity analysis. Development work, Configuration of Interfaces, Service Integration and Testing was performed for the Phase 1 Interfaces.

By leveraging the experience, processes and infrastructure setup from Phase 1, the Phase 2 interfaces are expected to be implemented more efficiently.

The following activities will be performed in Phase 2:

- Development and Configuration of remaining interfaces onto the Oracle Middleware platform
- Integration of the Service Oriented Architecture (SOA) and Managed File Transfer (MFT) middleware components
- Testing of Migrated Interfaces (Connectivity, Integration, Performance and Security)
- Work with External Business Partners (Trading Partners) to Configure and Test external interfaces including firewall rules
- Implementation of the remaining 50% Business Critical Interfaces in production

3.4 Benefits Summary

With migration to a supported middleware platform, this investment:

- Mitigates the risk of critical systems failure from running on out of support infrastructure
- Mitigates the cybersecurity risk of running unpatchable software
- Provides a centralized expandable environment for additional interfaces to be implemented
- Enables the decommissioning of obsolete UNIX51 platform
- Provides functional benefits which will enable improvements in the efficiency of data and file transfer.

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3.5 Business and Customer Issues

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

3.6 Alternatives

Alternative 1: Do Nothing

Do not migrate interfaces from UNIX 51 from legacy to strategic services. This option is not recommended as there will be high business impact when any interface fails. In addition, the existing interfaces will not have a reliable support model and there is a risk associated with aged infrastructure which may lead to failure of the system that could jeopardize the functionality of National Grid application systems, such as CRIS and CSS.

Alternative 2: Migrate UNIX 51 interfaces from National Grid Data Center to DXC Data Center

The FTP infrastructure UNIX 51 is out of support and due to aged hardware infrastructure, the interfaces cannot be migrated to the DXC Datacenter. This would require implementation of new hardware infrastructure in the National Grid legacy datacenter which is not recommended. This option does not resolve the cybersecurity risk of running unpatchable software either.

3.7 Safety, Environmental and Project Planning Issues

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

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	DR not yet tested on CIS platform	5	5	5	25	25	Mitigate	Team to consider extending PIS until the DR test is completed then we would have UNIX51 interfaces on the new CIS environment, and ensure that this critical environment has a tested DR. Work with DXC to understand if this can be accepted as one of NG's 6 DR tests for the year.	DR tests per the Business Resiliency Policy would have to be repeated in the future.	The project timeline/costs will have to be reevaluated and stakeholders informed.
2	Delays from Eco Partners in delivering timely commercial arrangements	3	4	4	12	12	Mitigate	Understand the needs of the eco partners participation and submit ROM estimates early.		The project timeline will have to be reevaluated and stakeholders informed.
3	NAS storage capacity - Cant allocate 625 GB for Prod environment	5	2	4	10	20	Mitigate	Option 1 - Perform analysis to identify the unused resources / reclaim the storage, if any. Option 2 - Nick Rodgers from NG capacity team is working with the DXC capacity team to procure needed storage.	Delays in Procurement of the storage from the DXC Newark Data Centre	The project timeline will have to be reevaluated and stakeholders informed.
4	Delays from Business Partners (Trading Partners) in delivering timely commercial arrangements	5	3	4	15	20	Mitigate	Understand the needs of the Business Partners participation and submit ROM estimates early.		The project timeline will have to be reevaluated and stakeholders informed.
5	Vulnerability Scan on MFT may require remediation prior to Go-Live	3	2	4	6	12	Mitigate	Address Critical/High findings from the Vulnerability Scan		The project timeline will have to be reevaluated and stakeholders informed.

3.9 Permitting

N/A

US Sanction Paper

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

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

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

					Current Planning Horizon						
Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total
					2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
4461	UNIX 51 Migration	+/- 10%	CapEx	0.046	1.001	0.449	0.000	0.000	0.000	0.000	1.496
			OpEx	0.002	0.041	0.000	0.000	0.000	0.000	0.043	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	0.048	1.043	0.449	0.000	0.000	0.000	1.539	
Total Project Sanction			CapEx	0.046	1.001	0.449	0.000	0.000	0.000	0.000	1.496
			OpEx	0.002	0.041	0.000	0.000	0.000	0.000	0.000	0.043
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.048	1.043	0.449	0.000	0.000	0.000	0.000	1.539

US Sanction Paper

3.11.2 Project Budget Summary Table

Project Costs Per Business Plan

		Current Planning Horizon						
		Prior Yrs (Actual)	Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23
\$M								Total
CapEx	0.046	0.957	0.000	0.000	0.000	0.000	0.000	1.003
OpEx	0.002	0.040	0.000	0.000	0.000	0.000	0.000	0.042
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.048	0.997	0.000	0.000	0.000	0.000	0.000	1.045

Variance (Business Plan-Project Estimate)

		Current Planning Horizon						
		Prior Yrs (Actual)	Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23
\$M								Total
CapEx	(0.000)	(0.044)	(0.449)	0.000	0.000	0.000	0.000	(0.493)
OpEx	0.000	(0.001)	0.000	0.000	0.000	0.000	0.000	(0.001)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	(0.046)	(0.449)	0.000	0.000	0.000	0.000	(0.495)

3.11.3 Cost Assumptions

This estimate was developed in 2017 using the standard IS estimating methodology. The accuracy level of estimate for each project is identified in Table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

This is not an NPV project.

3.11.4.1 NPV Summary Table

N/A

3.11.4.2 NPV Assumptions and Calculations

N/A

3.11.5 Additional Impacts

None.

US Sanction Paper

3.12 Statements of Support

3.12.1 Supporters

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

Role	Individual
Business Representative	John Gilbert
Head of PDM	Helen Smith
Relationship Manager	Bill Kearns
Program Delivery Director	Chris Granata
IS Finance Management	Chip Benson
IS Regulatory	Daniel DeMauro
DR&S	Elaine Wilson
Service Delivery	Brian Detota
Enterprise Architecture	Svetlana Lyba

3.12.2 Reviewers

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

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

US Sanction Paper

4 Appendices

4.1 Sanction Request Breakdown by Project

N/A

4.2 Other Appendices

4.2.1 Project Cost Breakdown

Project Cost Breakdown			
Cost Category	sub-category	\$ (millions)	Name of Firm(s) providing
Personnel	NG Resources	0.267	
	SDC Time & Materials	0.016	
	SDC Fixed-Price	0.766	
	All other personnel	0.204	
	TOTAL Personnel Costs	1.252	
Hardware	Purchase	-	
	Lease	-	
Software		0.099	
Risk Margin		0.094	
Other		0.095	
TOTAL Costs		1.539	

US Sanction Paper

4.2.2 Benefiting Operating Companies

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

US Sanction Paper

4.2.3 IS Ongoing Operational Costs (RTB)

This project will increase IS ongoing operations support costs as per the following table. These are also known as Run the Business (RTB) costs. RTB for Wipro CIS (FTS interfaces converted to CIS) will be covered under the CIS umbrella as the FTS interfaces from UNIX 51 will be converted to CIS. This is noted in the TCO log.

Summary Analysis of RTB Costs							
All figures in \$ millions	Yr. 1 16/17	Yr. 2 17/18	Yr. 3 18/19	Yr. 4 19/20	Yr. 5 20/21	Yr. 6+	Total
Forecast of RTB Impact							
RTB if Status Quo Continues	-	0.004	0.007	0.006	0.006	0.014	0.037
RTB if Project is Implemented	-	0.016	0.038	0.038	0.038	0.083	0.215
Net change in RTB	-	0.013	0.032	0.032	0.032	0.069	0.178
RTB Variance Analysis (if Project is Implemented)							
Net Δ RTB funded by Plan(s)	-	-	-	-	-	-	-
Variance to Plan	-	0.013	0.032	0.032	0.032	0.069	0.178
Total RTB Costs - by Cost Type (if Project is Implemented)							
App.Sup. - SDC 1	-	-	-	-	-	-	-
App.Sup. - SDC 2	-	0.001	0.002	0.002	0.002	0.005	0.012
App.Sup. - other	-	-	-	-	-	-	-
SW maintenance	-	0.013	0.031	0.031	0.031	0.067	0.174
SaaS	-	-	-	-	-	-	-
HW support	-	-	-	-	-	-	-
Other: IS	-	0.003	0.005	0.005	0.005	0.011	0.030
All IS-related RTB (sub-Total)	-	0.016	0.038	0.038	0.038	0.083	0.215
Business Support (sub-Total)	-	-	-	-	-	-	-
Total RTB Costs	-	0.016	0.038	0.038	0.038	0.083	0.215

4.3 NPV Summary

N/A

4.4 Customer Outreach Plan

N/A

US Sanction Paper

Title:	Enterprise Lab	Sanction Paper #:	
Project #:	INVP 4693	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	April 21, 2017
Author:	Susan Stallard/Alexis Shaw/David McCune	Sponsor:	Anuraag Bhargava, US CIO
Utility Service:	IS	Project Manager:	Alexis Shaw / David McCune

1 **Executive Summary**

1.1 **Sanctioning Summary**

This paper requests full sanction of INVP 4693 in the amount \$0.715M with a tolerance of +/- 10% for the purposes of designing, constructing, furnishing and equipping an Enterprise Laboratory at National Grid's Reservoir Woods, MA location full implementation.

This sanction amount is \$0.715M broken down into:

\$0.668M Capex
\$0.047M Opex
\$0.000M Removal

1.2 **Project Summary**

The project is an initiative within IS to construct and equip an Enterprise Laboratory, which will be available as a Proving Ground or Forum to accelerate the speed of innovation and new technology integration into the Enterprise. The E-Lab will be used to perform trials, tests, and showcase technologies for our customers. The Project Team will manage both the procurement and the suppliers' execution of the design, delivery and implementation of the construction and the technological aspects (hardware and software) that is required. The E-Lab will be located at Reservoir Woods on the second floor in the former High Density File (HDF) room W2-873.

1.3 **Summary of Projects**

Project Number	Project Title	Estimate Amount (\$M)
INVP4693	Enterprise Lab	0.715M

US Sanction Paper

1.4 Associated Projects

N/A

1.5 Prior Sanctioning History

N/A

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
January 2018	Closure

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input checked="" type="radio"/> Other	<p>There is an urgent need to establish an Enterprise Laboratory (E-Lab), to accelerate the speed of innovation and new technology integration into the Enterprise.</p>

1.8 Asset Management Risk Score

Asset Management Risk Score: N/A

Primary Risk Score Driver: (Policy Driven Projects Only)

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

US Sanction Paper

1.9 Complexity Level

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

Complexity Score: 15

1.10 Process Hazard Assessment

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

☐ Yes ☒ No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY18 - 22	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input type="radio"/> Over <input type="radio"/> Under <input checked="" type="radio"/> NA	\$0.00M

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

N/A

1.13 Current Planning Horizon

		Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
\$M	Prior Yrs	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
CapEx	0.290	0.378	0.000	0.000	0.000	0.000	0.000	0.668
OpEx	0.033	0.014	0.000	0.000	0.000	0.000	0.000	0.047
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	0.323	0.392	0.000	0.000	0.000	0.000	0.000	0.715

US Sanction Paper

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	Feb 2017
Sanction	April 2017
Begin Requirements and Design	April 2017
Permitting	Oct 2017
Construction/Development	Nov 2017
Implementation	Dec 2017
Closure	Jan 2018

1.15 Resources, Operations and Procurement

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



US Sanction Paper

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

1	Identification of owners of materials & files in the HDF room.
---	--

1.17 Climate Change

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

1.18 List References

N/A

US Sanction Paper

2 Decisions

The US IS Sanctioning Committee (ISSC) and Key External Stakeholders, reviewed and approved the content of the investment including:

- (a) APPROVED this paper and the investment of \$0.715M and a tolerance of +/-10%.
- (b) APPROVED the RTB Impact of \$0.105M (per annum) for 5 years.
- (c) NOTED that David McCune has the approved financial delegation.

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

Anuraag Bhargava
US CIO

US Sanction Paper

3 Sanction Paper Detail

Title:	Enterprise Lab	Sanction Paper #:	
Project #:	INVP 4693	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	April 21, 2017
Author:	Susan Stallard/Alexis Shaw/David McCune	Sponsor:	Anuraag Bhargava, US CIO
Utility Service:	IS	Project Manager:	Alexis Shaw / David McCune

3.1 *Background*

Currently there is no dedicated environment to validate the integration of future-state technologies within our enterprise's existing architecture, without jeopardy or risk to the enterprise.

3.2 *Drivers*

Prove business value of the new capabilities to National Grid Business Clients by demonstrating the new use cases in the E-Lab.

The E-lab will validate Proof Of Concept readiness and reduce to risk integrating new technologies to the broader enterprise.

3.3 *Project Description*

The architectural firm will (based on a planning meeting held on 3/9/17) prepare a cost proposal, area design and the construction documents for the design and construct of the E-Lab. Additionally the architectural vendor will research and investigate options and sources for holographic capability, thin skin LED windows, and Surface Book tables (Advanced Technology) to be utilized in the E-Lab.

The National Grid project team will prepare separate Business Requirements documents (BRD) to document the properties requirements and the technical requirements. The Properties BRD will include all furnishings, fixtures (lighting, doors, wall colors, wall coverings, etc.) and physical security requirements. The Technical BRD will include all end user computing equipment (laptops, desktops), infrastructure

US Sanction Paper

(encompassing network and WINTEL), software and Advanced Technology. The project team will procure the end user computing and infrastructure components.

Design and construct the E-Lab at the location of the High-Density file (HDF) room on the second floor at the National Grid's Reservoir Woods, MA. location. The project team will secure the necessary City of Waltham permitting and approvals.

Install and perform validation testing of all components and points of integration.

Additionally, the project team will work with the departments who have materials and files stored in the HDF room to identify storage needs, relocate files and where possible ship files to Iron Mountain for storage.

3.4 Benefits Summary

Proof of concepts of future-state technologies within our enterprise's existing architecture, will be able to be proven by the business with out jeopardy or risk to the enterprise.

3.5 Business and Customer Issues

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

3.6 Alternatives

Alternative 1: *Do nothing.* This alternative will not realize the value of demonstrating new capabilities and use cases to National Grid Business Users.

Alternative 2: *Expand usage the Innovation (NG) Lab.* This is not feasible as there is 1) limited space in the current NG lab location and 2) NG lab not designed as outward client facing space.

3.7 Safety, Environmental and Project Planning Issues

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

US Sanction Paper

3.8 Execution Risk Appraisal

Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
		Cost	Schedule	Cost	Schedule				
May be delays in the City of Waltham's permitting process	4	3	5	12	20	Mitigate	Monitoring permitting process by Properties PM	Schedule delays	Plan concurrent activities
May not be able to identify all the owners of materials in HDF room	2	2	2	4	4	Accept	Unable to identify owners	Relocation of files that should remain onsite	Not disposing of items that could be trash
May not be able to relocate all the materials from the HDF room	2	4	2	8	4	Accept	Notification by department that material need to stay on site.	Additional costs to relocate materials	Identify Alternative file storage areas
May run into issues with the HDF room configuration or construction components	2	4	5	8	10	Mitigate	Full analysis by architectural team,	Changes to design, delays in construction	detail review of designs by Properties PM
May not be possible to purchase all the equipment before FY end	4	2	5	8	20	Transfer	Receipt of Opex accounting code	Need Accounting code for procurements	make arrangements w/Verizon & SHI to order items at risk
Cost estimates are only preliminary	4	5	2	20	8	Mitigate	Initiation of project	Estimated could be wrong	Re-work figures once project scope is defined.
Software apps contracting may take a while	2	2	2	4	4	Accept	Comms from Mark Bradley	delays in implementing the software apps	planning for these in FY18 anyway
Delays by vendors in shipping materials and equipment.	3	2	5	6	15	Avoid	Work closely with vendors on delivery timelines	Unable to receipt equipment prior to FY end.	Monitor vendors delivery schedules

3.9 Permitting

Permit Name	Probability Required (Certain/ Likely/ Unlikely)	Duration To Acquire Permit	Status (Complete/ In Progress Not Applied For)	Estimated Completion Date
City of Waltham – Planning Department	Certain	90 days	Not Applied For - need construction documents	November 2017
City of Waltham – Fire Department	Certain	60 days	Not Applied For – need construction documents	November 2017

US Sanction Paper

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

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

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

					Current Planning Horizon						
Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total
					2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
INVP 4693	New Lab	Est Lvl +/- 10%	CapEx	0.290	0.378	0.000	0.000	0.000	0.000	0.000	0.668
			OpEx	0.033	0.014	0.000	0.000	0.000	0.000	0.047	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	0.323	0.392	0.000	0.000	0.000	0.000	0.715	
Total Project Sanction			CapEx	0.290	0.378	0.000	0.000	0.000	0.000	0.000	0.668
			OpEx	0.033	0.014	0.000	0.000	0.000	0.000	0.000	0.047
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.323	0.392	0.000	0.000	0.000	0.000	0.000	0.715

US Sanction Paper

3.11.2 Project Budget Summary Table

Project Costs per Business Plan

		Current Planning Horizon						
		Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +
\$M	(Actual)	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Total
CapEx	0.290	0.378	0.000	0.000	0.000	0.000	0.000	0.668
OpEx	0.033	0.014	0.000	0.000	0.000	0.000	0.000	0.047
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.323	0.392	0.000	0.000	0.000	0.000	0.000	0.715

Variance (Business Plan-Project Estimate)

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

3.11.3 Cost Assumptions

This estimate was developed in 2017 using the standard IS estimating methodology. The accuracy level of estimate for each project is identified in table 3.11.1

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

N/A

3.11.4.2 NPV Assumptions and Calculations

3.11.5 Additional Impacts

None.

US Sanction Paper

3.12 Statements of Support

3.12.1 Supporters

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

Role	Individual's Name
Business Executive Sponsor	Anuraag Bhargava
Head of PDM	Tom Cunningham
Relationship Manager	Graham Poole
Program Delivery Manager	David McCune
IS Finance Management	Chip Benson
IS Regulatory	Tom Gill
DR&S	Muks Ravipaty
Service Delivery	Brian Detota
Enterprise Architecture	Joseph Clinchot

3.12.2 Reviewers

N/A

US Sanction Paper

4 Appendices

4.1 Sanction Request Breakdown by Project

4.1.1 Project Cost Breakdown

Project Cost Breakdown			
Cost Category	sub-category	\$ (millions)	Name of Firm(s) providing resources
Personnel	NG Resources	0.035	National Grid
	SDC Time & Materials	0.018	IBM
	SDC Fixed-Price	-	
	All other personnel	0.049	Wintel, Verizon, Enduser Computing, Others
	TOTAL Personnel Costs	0.102	
Hardware	Purchase	0.165	Equipment
	Lease	-	
Software		0.012	
Risk Margin		0.042	
Other		0.395	Shared costs, AFUDC, other costs
TOTAL Costs		0.715	

US Sanction Paper

4.1.2 Benefiting Operating Companies

The following is the benefiting operating company:

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

US Sanction Paper

4.1.3 IS Ongoing Operational Costs (RTB):

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

Summary Analysis of RTB Costs							
All figures in \$ millions	Yr. 1 16/17	Yr. 2 17/18	Yr. 3 18/19	Yr. 4 19/20	Yr. 5 20/21	Yr. 6+	Total
<u>Forecast of RTB Impact</u>							
RTB if Status Quo Continues	-	-	-	-	-	-	-
RTB if Project is Implemented	-	0.044	0.105	0.105	0.105	0.172	0.530
Net change in RTB	-	0.044	0.105	0.105	0.105	0.172	0.530
<u>RTB Variance Analysis</u> (if Project is Implemented)							
Net Δ RTB funded by Plan(s)	-	-	-	-	-	-	-
Variance to Plan	-	0.044	0.105	0.105	0.105	0.172	0.530
<u>Total RTB Costs - by Cost Type</u> (if Project is Implemented)							
App.Sup. - SDC 1	-	-	-	-	-	-	-
App.Sup. - SDC 2	-	-	-	-	-	-	-
App.Sup. - other	-	-	-	-	-	-	-
SW maintenance	-	-	-	-	-	-	-
SaaS	-	-	-	-	-	-	-
HW support	-	-	-	-	-	-	-
Other: IS	-	0.044	0.105	0.105	0.105	0.172	0.530
All IS-related RTB (sub-Total)	-	0.044	0.105	0.105	0.105	0.172	0.530
Business Support (sub-Total)	-	-	-	-	-	-	-
Total RTB Costs	-	0.044	0.105	0.105	0.105	0.172	0.530



US Sanction Paper

Title:	Concur Expenses	Sanction Paper #:	USSC-17-301 v2
Project #:	INVP 4662	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	January 10, 2018
Author / NG Representative:	Diane Beard / Ella Weisbord	Sponsor:	Christopher McConnachie, VP Finance Services
Utility Service:	IS	Project Manager:	Samir Parikh

1 Executive Summary

1.1 **Sanctioning Summary**

This paper requests sanction of INVP 4662 in the amount \$2.412M with a tolerance of +/- 10% for the purposes of Development and Implementation.

The sanction amount of \$2.412M broken down into:

\$1.895M Capex
\$0.517M Opex
\$0.000M Removal

1.2 **Project Summary**

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

1.3 **Summary of Projects**

Project Number	Project Title	Estimate Amount (\$M)
INVP 4662	US SAP: Concur Travel & Expenses Management (T&E)	2.412
Total		2.412

US Sanction Paper

1.4 Associated Projects

N/A

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Paper Title	Sanction Type	Tolerance
Sep 2017	USSC	\$0.857 M	\$1.654M	Concur Expenses	Partial	+/- 25%
Mar 2017	ISSC	\$0.431 M	\$0.963M	Concur Licenses	Partial	+/- 25%

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
Jun 2018	Sanction Closure

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	This investment will support the implementation of new travel and expense end-to-end process.

US Sanction Paper

1.8 Asset Management Risk Score

Asset Management Risk Score: 26

Primary Risk Score Driver: (Policy Driven Projects Only)

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

1.9 Complexity Level

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

Complexity Score: 21

1.10 Process Hazard Assessment

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

☐ Yes ☒ No

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY18-22	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	2.412M

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

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



US Sanction Paper

1.13 Current Planning Horizon

\$M	Prior Yrs	Current Planning Horizon						Total
		Yr. 1 2017/18	Yr. 2 2018/19	Yr. 3 2019/20	Yr. 4 2020/21	Yr. 5 2021/22	Yr. 6 + 2022/23	
CapEx	0.000	1.895	0.000	0.000	0.000	0.000	0.000	1.895
OpEx	0.000	0.517	0.000	0.000	0.000	0.000	0.000	0.517
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CIAC/Reimbursement	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.000	2.412	0.000	0.000	0.000	0.000	0.000	2.412

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	Nov 2016
Partial Sanction	Dec 2016
Purchase of Licenses	Dec 2016
Partial Sanction	Sep 2017
Begin Requirements and Design	Sep 2017
Begin Development and Implementation	Nov 2017
Project Sanction	Jan 2018
Begin User Acceptance Testing	Jan 2018
Move to Production / Last Go Live	Feb 2018
Project Complete	Mar 2018
Sanction Closure	Jun 2018

1.15 Resources, Operations and Procurement

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



US Sanction Paper

Operational Impact			
Outage impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green
Procurement Impact			
Procurement impact on network system:	<input type="radio"/> Red	<input type="radio"/> Amber	<input checked="" type="radio"/> Green

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

N/A

1.17 Climate Change

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

1.18 List References

N/A

US Sanction Paper

2 Decisions

The US Sanctioning Committee (USSC) at a meeting held on January 10, 2018:

- (a) APPROVE this paper and the investment of \$2.412M and a tolerance of +/-10%.
- (b) APPROVE the run-the-business (RTB) impact of \$0.416M (per annum) for 5 years.
- (c) NOTE that Samir Parikh is the Project Manager and has the approved financial delegation.

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

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

US Sanction Paper

3 Sanction Paper Detail

Title:	Concur Expenses	Sanction Paper #:	USSC-17-301 V2
Project #:	INVP 4662	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	January 10, 2018
Author / NG Representative:	Diane Beard / Ella Weisbord	Sponsor:	Christopher McConnachie, VP Finance Services
Utility Service:	IS	Project Manager:	Samir Parikh

3.1 Background

Currently, National Grid employees book and plan their travel using a Travel Management Services Provider tool. After the trip is completed, employees must manually copy their expenses into the National Grid's SAP Expense Module. This manual process leaves room for error and creates significant administrative burden on employees and the National Grid Account Processing team. The acquired licenses will allow National Grid to use the Concur Expense and Smart Expense module. This will improve reporting, employee experience, and accuracy of data. Concur is an SAP application that integrates with National Grid's existing SAP functionality.

During the Requirements & Design phase, the project team identified the need to add Access Management controls. The project scope was increased to include integration with the Governance, Risk and Compliance (GRC) module of SAP. All employees will be extended access, as an enterprise-wide (birth right) role to Concur for employee expense creation. A subset of employees will also have corporate credit cards assigned to them when Concur goes live. The Concur application needs to integrate, and have the capability to support the existing SOX control framework. This requirement can be achieved through GRC with Greenlight Technologies and Concur HR integration with SAP (Concur HR Add-On).

3.2 Drivers

The project is driven by National Grid's need to improve its travel and expense end-to-end process, to improve the expense reporting, and to minimize risk of manual errors and administrative overhead.

US Sanction Paper

3.3 Project Description

During the Development and Implementation (D&I) phase of the project, the following should be accomplished:

- Coding and Configuration
- Integration Testing
- Regression Testing
- User Acceptance Testing
- Implementation
- Post Go-Live Support

This project addresses the following:

- Enablement Expenses and Corporate Card (PCard and Storm cards) functionality in Concur
- Fleet PCard business process changes to Concur
- Impact assessment on the existing functionality
- Review and identify the custom functionality
- Solution integration architecture and feasibility assessment
- Master Data synchronization and financial data reconciliation
- Business Intelligence (BI) reporting impacts, assessments and deployment of new roles
- Security Roles assessment, design and deployment of new roles
- Implementation of GRC Connector with Concur using Greenlight Technologies and Concur HR add-on
- Enable the Single Sign-on (SSO) for Concur Portal with Enterprise Portals
- Enable the Concur Mobile Apps through NG Enterprise Mobility Management platform
- Decommission of required business process functionalities and technical components across the applications

3.4 Benefits Summary

The primary benefits of this project are:

- Improving end-to-end travel and expense process
- Minimizing risk of human error
- Providing continuous insight into expenses with consistent, timely information
- Less administrative burden

US Sanction Paper

3.5 Business and Customer Issues

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

3.6 Alternatives

Alternative 1: Defer project / Do Nothing

This option is not preferred, as it will not address the business need for improvements to core end-user services. Concur expenses module supports most of National Grid business requirements, had seamless integration with the Concur Travel Management application already used by National Grid as well as other benefits listed in benefit section.

Alternative 2: Consideration of Other Products

Concur was chosen over other alternative suppliers because:

- Competitors didn't meet all or a majority of National Grid business requirements (must have).
- There was a seamless integration with the Concur Travel Management application.
- Mobile expense creation and approvals.
- Number of partnerships Concur has with travel merchants – enabling auto expense creation.
- Ability to use the Concur solution for all card types (Procurement Card, Storm Card and Corporate Travel Card).

3.7 Safety, Environmental and Project Planning Issues

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

3.8 Execution Risk Appraisal

N/A

3.9 Permitting

N/A

US Sanction Paper

3.10 Investment Recovery

3.10.1 Investment Recovery and Regulatory Implications

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

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

					Current Planning Horizon						
Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total
					2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
INVP 4662	US SAP: Concur Travel & Expenses Management (T&E)	+/- 10%	CapEx	0.000	1.895	0.000	0.000	0.000	0.000	0.000	1.895
			OpEx	0.000	0.517	0.000	0.000	0.000	0.000	0.517	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	0.000	2.412	0.000	0.000	0.000	0.000	2.412	
Total Project Sanction			CapEx	0.000	1.895	0.000	0.000	0.000	0.000	0.000	1.895
			OpEx	0.000	0.517	0.000	0.000	0.000	0.000	0.000	0.517
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.000	2.412	0.000	0.000	0.000	0.000	2.412	



US Sanction Paper

3.11.2 Project Budget Summary Table

Project Costs per Business Plan

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

Variance (Business Plan-Project Estimate)

		Current Planning Horizon						
		Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +
\$M	(Actual)	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Total
CapEx	0.000	(1.895)	0.000	0.000	0.000	0.000	0.000	(1.895)
OpEx	0.000	(0.517)	0.000	0.000	0.000	0.000	0.000	(0.517)
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.000	(2.412)	0.000	0.000	0.000	0.000	0.000	(2.412)

3.11.3 Cost Assumptions

This estimate was developed in 2018 using standard IS estimating methodology. The accuracy level of the estimate for each project is identified in Table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

3.11.4.2 NPV Assumptions and Calculations

3.11.5 Additional Impacts

None

US Sanction Paper

3.12 Statements of Support

3.12.1 Supporters

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

Role	Individual
Business Representative	Elisabeth Ziankoski
Head of PDM	Deb Rollins
Relationship Manager	Joel Semel
Program Delivery Director	Samir Parikh
IS Finance Management	Michele Harris
IS Regulatory	Daniel DeMauro
DR&S	Elaine Wilson
Service Delivery	Mark Mirizio
Enterprise Architecture	Joe Clinchot

3.12.2 Reviewers

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

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



US Sanction Paper

4 Appendices

4.1 Other Appendices

4.1.1 Project Cost Breakdown

Project Cost Breakdown			
Cost Category	sub-category	\$ (millions)	Name of Firm(s) providing
Personnel	NG Resources	0.249	
	SDC Time & Materials	0.007	IBM
	SDC Fixed-Price	1.268	Wipro
	All other personnel	0.531	Verizon and KPMG
	TOTAL Personnel Costs	2.055	
Hardware	Purchase	-	
	Lease	0.100	SAP HEC
Software		-	
Risk Margin		0.182	
Other		0.074	
TOTAL Costs		2.412	

US Sanction Paper

4.1.2 Benefiting Operating Companies

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

US Sanction Paper

4.1.3 IS Ongoing Operational Costs (RTB):

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

Summary Analysis of RTB Costs							
All figures in \$ millions	Yr. 1 17/18	Yr. 2 18/19	Yr. 3 19/20	Yr. 4 20/21	Yr. 5 21/22	Yr. 6+	Total
Forecast of RTB Impact							
RTB if Status Quo Continues	-	-	-	-	-	-	-
RTB if Project is Implemented	0.431	0.416	0.416	0.416	0.416	0.391	2.486
Net change in RTB	0.431	0.416	0.416	0.416	0.416	0.391	2.486
RTB Variance Analysis (if Project is Implemented)							
Net Δ RTB funded by Plan(s)	-	-	-	-	-	-	-
Variance to Plan	0.431	0.416	0.416	0.416	0.416	0.391	2.486
Total RTB Costs - by Cost Type (if Project is Implemented)							
App.Sup. - SDC 1	-	-	-	-	-	-	-
App.Sup. - SDC 2	-	-	-	-	-	-	-
App.Sup. - other	-	-	-	-	-	-	-
SW maintenance	0.431	0.416	0.416	0.416	0.416	0.391	2.486
SaaS	-	-	-	-	-	-	-
HW support	-	-	-	-	-	-	-
Other: IS	-	-	-	-	-	-	-
All IS-related RTB (sub-Total)	0.431	0.416	0.416	0.416	0.416	0.391	2.486
Business Support (sub-Total)	-	-	-	-	-	-	-
Total RTB Costs	0.431	0.416	0.416	0.416	0.416	0.391	2.486

Resanction Request

Title:	Network Improvements	Sanction Paper #:	USSC-17-385 v2
Project #:	INVP 4289 Capex: S007221	Sanction Type:	Resanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	January 10, 2018
Author / NG Representative:	Michael Davidof / Andrew Yee	Sponsor:	John Gilbert, Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	David Todd, Neil Beasant

1 Executive Summary

This paper requests the resanction of INVP 4289 in the amount \$1.508M with a tolerance of +/- 10% for the purposes of Full implementation.

This sanction amount is \$1.508M broken down into:

\$1.470M Capex

\$0.038M Opex

Note the originally requested sanction amount of \$0.987M

\$0.960M Capex

\$0.027M Opex

2 Resanction Details

2.1 Project Summary

This policy driven project will migrate 4 of the existing legacy network sites onto the new Verizon network and telephony equipment, and services. This will provide business on-site users 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 strengthen our network security posture and proactively identify network bottlenecks leading to greater availability and lower outage times.

The project requires a re-sanction as the initial estimates for project costs and duration were based on assumptions around ease of access to equipment and services that were shared with PSEG. Also the estimation process for the project did not foresee the issues that would be encountered due to the age and complexity of existing equipment and significant investment was required on new equipment.

Resanction Request

2.2 Summary of Projects

Project Number	Project Title	Estimate Amount (\$M)
INVP4289	Network Improvement	1.508
Total		1.508

2.3 Prior Sanctioning History

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

Date	Gover nance Body	Sanctioned Amount	Potential Project Investment	Paper Title	Sanc tion Type	Paper Referenc e Number	Tolerance
June 8, 2016	ISSC	\$0.987M	\$0.987M	Network Improvem ent	Full	USSC- 16-385	+/- 10%

Over / Under Expenditure Analysis

Summary Analysis (\$M)	Capex	Opex	Removal	Total
Resanction Amount	\$1.470M	\$0.038M	\$0.000M	\$1.508M
Latest Approval	\$0.960M	\$0.027M	\$0.000M	\$0.987M
Change*	\$0.510M	\$0.011M	\$0.000M	\$0.521M

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

Resanction Request

2.4 Cost Summary Table

					Current Planning Horizon						
Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total
					2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
INVP4289	Network Improvement	Est Lvl (e.g. +/- 10%)	CapEx	0.778	0.692	0.000	0.000	0.000	0.000	0.000	1.470
			OpEx	0.038	0.000	0.000	0.000	0.000	0.000	0.038	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	0.816	0.692	0.000	0.000	0.000	0.000	1.508	
Total Project Sanction			CapEx	0.778	0.692	0.000	0.000	0.000	0.000	0.000	1.470
			OpEx	0.038	0.000	0.000	0.000	0.000	0.000	0.038	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	0.816	0.692	0.000	0.000	0.000	0.000	1.508	

2.5 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY18 - 22	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> N/A	\$0.692 M

2.6 Drivers

2.6.1 Detailed Analysis Table

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

Detail Analysis	Over/Under Expenditure?	Amount (\$M)
Key variation 1 – purchase vs lease telephony equipment and accessories	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	\$0.169M
Key variation 2 – additional Switching and network equipment	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	\$0.052M
Key variation 3 -- additional contractor resources	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	\$0.177M

Resanction Request

Key variation 4 – additional National Grid and project management net resources/overhead	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	\$0.113M
--	---	----------

2.6.2 Explanation of Key Variations

The Capex technical and structural infrastructure risks and issues, network and telephony modifications at the aged Hicksville, NY site were the primary drivers for increased cost for the project. The following key variations were taken into the consideration:

Driver Type	Driver	Impact	Description
Equipment	Telephone CapEx equipment and licensing purchase, rather than RTB lease	\$ 0.169M	1,035 hard phones and associated equipment Hicksville, NY site
Equipment	Additional high performance equipment	\$ 0.052M	Equipment to meet high performance requirements and expanded users connectivity demands at Hicksville, NY and Malden, MA sites
Contractor Resources	Services to mitigate significant risks and issues at Hicksville, NY site	\$0.177M	Support extended longer duration of project necessary to mitigate risks and issues associated with Hicksville, NY site, for complex aged fiber, cable, equipment, structural, telephony, environmental, and power infrastructure
National Grid Resources	National Grid PMO and Facilities Management	\$0.113M	Additional resources necessary to

Resanction Request

	resources and overhead		support complexity and extended duration of project
--	------------------------	--	---

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

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

2.8 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	March 2016
Begin Requirements and Design	June 2016
Project Sanction	July 2016
Begin Development and Implementation	August 2016
Resanction	January 2018
Move to Production / Last Go Live	March 2018
Project Complete	March 2018
Closure Sanction	June 2018

2.9 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
June 2018	Closure Sanction

3 Statements of Support

3.1 Supporters

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

Resanction Request

Role	Individual's Name
Business Representative	Douglas Page
Head of PDM	Helen Smith
Relationship Manager	Brian Detota
Program Delivery Director	David McCune
IS Finance Management	Michelle Harris
IS Regulatory	Daniel DeMauro
DR&S	Elaine Wilson
Service Delivery	Mark Mirizio
Enterprise Architecture	N/A

3.2 Reviewers

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

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

Resanction Request

4 Decisions

The US Sanctioning Committee (USSC) at a meeting held on January 10, 2018:

- (a) APPROVE this paper and the investment of \$1.508M and a tolerance of +/-10%.
- (b) APPROVE the RTB impact of \$0.576M (per annum) for 5 years.
- (c) NOTE that David McCune is the Portfolio Manager and has the approved financial delegation.

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

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



I Like It

Tags &
Notes

nationalgrid

Investment Request Summary - IS US

FISCAL YEAR 2019

INV ID:	4837	Project Name:	SD-WAN Core, automation, orchestration tools and pilot sites							
Program:	Enterprise Services						IRS Status:	ACTIVE		
Sponsor:	Gilbert, John			Title: Global Head IS Service Delivery, Global IS						
Relationship Manager:	Brian Detota			Title: IS Relationship Manager, Global IS						
Progr Delivery Director:	Helen Smith			Title: Head of Programme Delivery						
Paper Author:				Title:						
		Business Area:	IS - Infrastructure		Portfolio: IS for IS					
<input type="checkbox"/> In-Flight Project?	Invest Classification:	Medium	Category:	Policy Driven	Primary Policy Driver:	Reliability	Region: US			
Strategic Program:	End to End Process (Primary):				Business Priority:	IS Focus Area:	Application Strategy:			
Tech Modernization					High	Future Proof Our Business	Enhance			
		End to End Process (Secondary):								
Project Description: The context for the project with background information This project will build and deploy the SD-WAN core infrastructure and tools in the Network data centers that will be used to support the SD-WAN as it is deployed throughout the branch locations.										
Project Rationale: Highlight business challenge, capability or process the project addresses National Grid will be unable to take advantage of the capabilities and benefits offered by software defined networking such as integrated policy management, application based routing, and use of the Internet for network transport.										
Project Scope: Explain what is in scope and what is not in scope for the project This project is the first piece in a step change for Networking which will result in better management and therefore reduced costs.										
Project Dependencies: Identify any core program or project dependencies, please include INVP numbers if known This must be completed before INVP 4843 Virtualized Branches and INVP 4839 SD LAN.										
Basic Project Assumptions: This investment helps address IS health and capability challenges while enabling National Grid's strategic business objectives.										

Indicative Project Costs by Fiscal Year

(\$M)	Prior Years	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Total
CapEx		1.200	0.300	0.000	0.000	0.000	0.000	0.000	0.000	1.500
OpEx		0.100	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.150
Impact on RTB		0.000	0.100	0.100	0.100	0.100	0.000	0.000	0.000	0.400

Indicative Project Costs by Delivery Phase

(\$M)	Start-up	R & D	D & I	Closure	Total
CapEx		0.100	1.100		1.200

OpEx	0.010	0.015	0.070	.005					
Project Benefits - Type I only									
(\$M)	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Total
Type I - CapEx									0.000
Type I - OpEx									0.000
Revenue Generation									0.000

Key Business Benefits:

Describe benefits, both financial and non-financial, and when those benefits will be delivered. Provide a clear & concise business case stating the investment drivers – why do we need to do something and why now? Explain any Regulatory considerations and how this initiative aligns with the US Business Strategy.

Investment Prioritization

Benefits				Cost			
	Impact	Weight	Score		Impact	Weight	Score
OpEx Annual Savings		10.3%	0	OpEx Cost	0.150	-24.4%	-0.732
CapEx Annual Savings		5.1%	0	CapEx Cost	1.500	-11.2%	-1.122
Revenue Generation (annual)		6.2%	0	RTB Efficiency	46.667	% -22.5%	-2.025
Financial Control	Low	6.2%	0.062	Union/Labor Relations	Low	-9.8%	0
Soft Financial Benefits	Medium	3.8%	0.114	Dependencies	Low	-10.6%	-0.106
Regulatory Impact	Low	11.2%	0.112	Elapse Time Duration	Medium	-6.6%	-0.198
Process & Personal Safety	Low	19.4%	0.194	Change Management Effort	Low	-14.9%	-0.149
Reliability	Medium	10.9%	0.327				
Customer & Community Responsiveness	Medium	5.3%	0.159				
Employee Satisfaction	Medium	4.6%	0.138				
Mitigates a Corporate Risk / Risk of not Doing	Medium=16 to 39	8.9%	0.267				
Jurisdictional Engagement	High	8.2%	1				
Benefit Score: 2.11				Cost Score: -4.32			
Overall Priority Score: -2.205							

Investment Risk and Complexity

Project Risk Score:	41	Risk Score Description: Risk impact = 5 and Risk likelihood = 6
Project Complexity Score::	20	Project Complexity Score Description:

Key Risks Description: Provide detail on project risks & mitigation strategy:

IS Project Dependencies if you don't see a project in the drop-down please contact the Planning & Performance team.

Benefiting Operating Companies: Check all that apply

IS Projects: 4837 - SD-WAN Core, automation, orchestration tools and pilot sites

1. Has a dependency on IS Project;
2. Has a dependency on IS Project;
3. Has a dependency on IS Project;
4. Has a dependency on IS Project;
5. Has a dependency on IS Project;
6. Has a dependency on IS Project;

Business Initiative Dependencies

IS Projects: 4837 - SD-WAN Core, automation, orchestration tools and pilot sites

1. Has a dependency on Biz Initiative,
2. Has a dependency on Biz Initiative,
3. Has a dependency on Biz Initiative,
4. Has a dependency on Biz Initiative,

Project Relationships

☐ Minor Works

Project Relationship:

Related Projects:

- ☐ Select All Companies
- ☐ Clear All Companies
- ☐ Select All Gas
- ☐ Select All Electric
- ☐ Select All Gen
- ☒ National Grid USA Parent
- ☒ KeySpan Energy Development Corporation
- ☒ KeySpan Services Inc.
- ☒ KeySpan Energy Corp
- ☒ KeySpan Energy Delivery New York
- ☒ KeySpan Energy Delivery Long Island
- ☒ KeySpan Generation LLC (PSA)
- ☒ KeySpan Glenwood Energy Center
- ☒ KeySpan Port Jefferson Energy Center
- ☒ KeySpan Energy Trading Svc LLC
- ☒ Niagara Mohawk Power Corp- Electric Distribution
- ☒ Niagara Mohawk Power Corp - Gas
- ☒ Niagara Mohawk Power Corp - Transmission
- ☒ Massachusetts Electric Company
- ☒ Massachusetts Electric Company - Transmission
- ☒ Nantucket Electric Company
- ☒ Boston Gas Company
- ☒ Colonial Gas Company
- ☒ Narragansett Gas Company
- ☒ Narragansett Electric Company
- ☒ Narragansett Electric Company - Transmission
- ☒ New England Power Company - Transmission
- ☒ New England Hydro - Trans Corp
- ☒ New England Electric Trans Corp
- ☐ NE Hydro Trans Electric Co
- ☒ NG LNG LP Regulated Entity

Enabling IS Capabilities check all that apply

- ☐ Enterprise Content Management (ECM)
- ☐ Enterprise Mobility
- ☐ Comprehensive Integration Services (CIS)
- ☐ Reporting and Analytics
- ☐ Hybrid Cloud
- ☐ Networks
- ☐ Next Gen Workplace

Key Milestone Dates: Select the 1st, 15th or last day of the month

Indicative Estimated Duration (Months):

Begin Start-up	Begin Requirements & Deign	Begin Development & Implementation	Begin User Acceptance Testing	Go Live	Project Completion	Project Closure
July, 2018				June, 2019	August, 2019	October, 2019

Business Resource Estimates: # of Full Time Equivalents

Start-up	Requirements & Deign	Develop & Implement	Business Resources UAT	Go Live Readiness	Post Go Live Support
0	0	0	0	0	0

Resourcing Strategy:

Attached Supporting Documents

Recommendation Sign-off

1/22/2018

FY19 - Investment Request Summaries - IRSs - SD-WAN Core, automation, orchestration tools...

Role	Name	Title	Date
Business Project Sponsor	Gilbert, John	Global Head IS Service Delivery, Global IS	
Business Relationship Manager	Brian Detota	IS Business Relationship Manager	
IS Program Delivery Manager	Helen Smith	IS Program Delivery Manager	
nationalgrid			

US Sanction Paper

Title:	Itron Enterprise Edition (IEE) Consolidation-Phase 1 Migration to Standard Meter Platform	Sanction Paper #:	USSC-16-245 V2
Project #:	INVP 3486 Capex: S007554	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	October 11, 2017
Author:	Joseph M. Howard	Sponsor:	John Spink, VP Control Center Operations
Utility Service:	IS	Project Manager:	Jeffrey Dailey

1 Executive Summary

1.1 **Sanctioning Summary**

This paper requests sanction of INVP 3486 in the amount \$1.958M with a tolerance of +/- 10% for the purposes of Development and Implementation for an updated meter reading platform for Commercial and Industrial (C&I) Meters.

This sanction amount is \$1.958M broken down into:

*\$1.678M Capex
\$0.280M Opex
\$0.000M Removal*

1.2 **Project Summary**

This project will deliver a consistent meter reading platform utilizing the Itron Enterprise Edition (IEE) version 8.1 cloud based solution. This solution will support the migration of meter groups in workstreams. Initially targeted are approximately 3,000 MV90 interval collection system New York electric meters that need to be upgraded from 2G to 4G, as the 2G technology is being retired by the communication vendor, and 4G is the current standard wireless communication technology. There are also 400 Massachusetts and 170 Rhode Island meters that are in scope for migration. Currently these 3,600 C&I meters are on the existing MV90 platform with a goal to eventually replace the MV90 with IEE 8.1. This project is necessary as all known carriers are retiring the 2G technology and moving to 4G. This project will accept the new 4G interval meter usage information, reducing any risk of needing to retrieve and process meter data manually which could result in billing delays or recalculation. The funding for the meters is provided via a separate Customer Meter Services (CMS) initiative. This project is required at this time to address the retiring technology and update existing infrastructure. A technology has been selected that will align with the roadmap for any



US Sanction Paper

future AML initiatives that may be implemented and will avoid near-term replacement costs at the time of such implementation.

1.3 Summary of Projects

Project Number	Project Title	Estimate Amount (\$M)
3486	ltron EE Consolidation-Phase 1	1.958
Total		1.958

1.4 Associated Projects

Project Number	Project Title	Estimate Amount (\$M)
4298	NY REV Clifton Park Demo Information Systems Readiness	1.299
Total		1.299

1.5 Prior Sanctioning History

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Paper Title	Sanction Type	Tolerance
Jan 2017	USSC	\$0.933M	\$1.150M	ltron Enterprise Edition (IEE) Consolidation-Phase 1 Migration to Standard Meter Platform	Partial	25%

1.6 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
Sept 2018	Closure

US Sanction Paper

1.7 Category

Category	Reference to Mandate, Policy, NPV, or Other
<input type="radio"/> Mandatory <input checked="" type="radio"/> Policy- Driven <input type="radio"/> Justified NPV <input type="radio"/> Other	This is a policy-driven investment with primary driver of system Reliability required for growth stabilization, and platform standardization.

1.8 Asset Management Risk Score

Asset Management Risk Score: 40

Primary Risk Score Driver: (Policy Driven Projects Only)

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

1.9 Complexity Level

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

Complexity Score: 13

1.10 Process Hazard Assessment

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

☐ Yes
☒ No

US Sanction Paper

1.11 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY18-22	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> NA	\$0.997

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

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

1.13 Current Planning Horizon

		Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
\$M	Prior Yrs	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
CapEx	0.220	1.458	0.000	0.000	0.000	0.000	0.000	1.678
OpEx	0.235	0.045	0.000	0.000	0.000	0.000	0.000	0.280
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	0.455	1.503	0.000	0.000	0.000	0.000	0.000	1.958

1.14 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	May 2016
Partial Sanction	Jan 2017
Begin Requirements and Design	Aug 2016
Project Sanction	Oct 2017
Begin Development and Implementation	Dec 2017
Move to Production / Last Go Live	Feb 2018
Project Complete	Feb 2018
Sanction Closure	Sept 2018

US Sanction Paper

1.15 Resources, Operations and Procurement

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

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

1	New York Public Service Commission (PSC) approval of ITRON 4G meters is needed for the initial target of MV90 NY Electric meters.
2	2G communication retirement before 4G meters are in service could cause billing accuracy issues, associated with manual reading and processing of data.

1.17 Climate Change

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

1.18 List References

N/A



US Sanction Paper

2 Decisions

US Sanctioning Committee (USSC) at a meeting held on October 11, 2017:

- (a) APPROVE this paper and the investment of \$1.958M and a tolerance of +/-10%.
- (b) APPROVE the run-the-business (RTB) impact;
\$0.240M (per annum) for 5 years.
- (c) NOTE that Jeffrey Dailey is the Project Manager and has the approved financial delegation.

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

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

US Sanction Paper

3 Sanction Paper Detail

Title:	Itron Enterprise Edition (IEE) Consolidation-Phase 1 Migration to Standard Meter Platform	Sanction Paper #:	USSC-16-245
Project #:	INVP 3486 Capex: S007554	Sanction Type:	Sanction
Operating Company:	National Grid USA Svc. Co.	Date of Request:	October 11, 2017
Author:	Joseph M. Howard	Sponsor:	John Spink, VP Control Center Operations
Utility Service:	IS	Project Manager:	Jeffrey Dailey

3.1 **Background**

This project will enable Meter Data Services (MDS) to deploy an overall Meter-to-Cash standardization and start the replacement of the current MV90 platform. The project will utilize IEE version 8.1 as a platform for consolidating meter data, and provide consistent, high quality information for billing. This investment will create the foundation for a consolidated National Grid Electric Meter usage environment (Data Repository) for which data is utilized for retail billing, and future settlement transactions. Building to this standard will enable National Grid to easily adapt to future initiatives and endeavors. The partial sanction of this project will also be used to analyze the support model for the IEE platform going forward.

By using the cloud hosted IEE solution, National Grid will move to a Smart Grid program meter standard, which will leverage and automate numerous manual meter management processes (*i.e., meter commissioning, manual estimations and data quality reviews*), as well as eventually reduce the use of the current MV90 platform for C&I meters.

This project will deliver a consistent meter reading platform, allowing for the migration of meter groups in phases. Initially targeted are approximately 3,000 MV90 C&I New York electric meters that need to be upgraded from 2G to 4G, as that technology is being retired by the communication vendor. There are also 400 Massachusetts and 170 Rhode Island C&I meters that are in scope for migration. This project is necessary as all known carriers are retiring the 2G technology and moving to 4G. This project will accept the new 4G interval meter usage information, reducing any risk of needing to retrieve and process meter data manually, which could result in billing delays or recalculation.

US Sanction Paper

3.2 Drivers

The primary driver for this project is system reliability and end of life for the 2G meters in the field. Existing interval data applications are unable to accommodate interval data stream hierarchy and multiple distribution requirements that are, or will be, regulatory mandated by tariffs. This project provides strategic centralization of metering information for customer billing, and a repository ensuring a standard view of meter data which can be leveraged for future integrated applications (*e.g., settlement system, customer “green button” interval data for download*).

3.3 Project Description

This investment will create the foundation for a consolidated National Grid Electric Meter usage environment (Data Repository) for which data is utilized for retail billing and future settlement transactions. Building to this standard will enable National Grid to easily adapt to future initiatives and endeavors.

Project deliverables in scope include:

- Defining immediate and longer term business requirements to support Meter-to-Cash strategies. This includes analyzing the potential to migrate the IEE vendor hosted solution back to an in-house system
- Standardization of the meter end-to-end solution platform leveraging cellular technology
- Standardization of National Grid Electric meter programs (*i.e., business processes and business rules*)
- Adding New York’s Electric Tariff Structures (*e.g., rate plans*) to the IEE platform).
- Building-out New England’s remaining Electric Tariff structures to the IEE version 8.1 platform. The project will not duplicate effort by recreating MA rates already entered as part of the Worcester Smart Grid pilot. The project will use a separate instance of IEE version 8.1 with enhanced functionality, and any MA tariff structures will simply be copied from the Worcester Smart Grid IEE version 7.3 to the new IEE version 8.1 platform
- Automating current manual data extracts and calculations to the CSS billing system
- Leveraging IEE’s version 8.1 standard billing interface functions to feed CSS billing system
- Standardizing ad-hoc reports into IEE version 8.1
- Standardizing business rules within IEE
- Utilizing same communication path via Itron OpenWay collection engine for all meters to IEE version 8.1

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- Ensuring the devices and any supporting architecture complies with National Grid Information Security Policy and Standards, and are properly tested before deployment
- Interface with Energy Profiler Online (EPO)

Items out of project scope:

- Meters required to remain within the legacy system, due to level of manual special handling needs (e.g., *Wholesale meters*)
- Future projects that will deliver the full standardization of Meter-to-Cash legacy applications (i.e., *Wholesale Settlement Application (WSA)*, *RIC/Splitter*, *Pulse*, *Energy Resource System (ERS)*)
- System consolidation of existing meter collection systems and system interfaces
- Gas Meter collection system, data storage and billing determinants that will be covered by other projects (i.e., *INVP4298-NY REV-Clifton Park Demo*)

These out-of-scope items will exist until all meters are moved into the new standard platform.

3.4 Benefits Summary

This investment is strategic for future MDS business process improvements, also in support of the Meter-to-Cash PEX mega process. As a strategic initiative, this investment will be the cornerstone for future projects involving all Meter Data Management (MDM) system consolidations. A value proposition also exists, as Smart Grid and Clifton Park pilots are utilizing the same Itron MDM platform. This initiative will also maintain our automated access to data and not lose functionality with 2G retirement.

3.5 Business and Customer Issues

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

3.6 Alternatives

Alternative 1: Maintain MV-90 platform.

This is not recommended. This approach would still require replacement of the existing 2G meters with 4G meters (which is a Customer Meter Services initiative) using the MV90 system, and keeping the ERS to CSS feed in place.

Additionally, this alternative would:

- Prevent moving toward meter standards
- Not leverage strategic Smart Grid technology
- Likely result in duplicate spend once NY REV and MA Grid MOD programs are determined by regulators, because it is expected that meters would have to be

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changed from MV90 meters to Itron OpenWay cellular meters, which will also require different meter programming

Alternative 2: Defer until MA Grid MOD and NY REV Regulations are finalized. This is not recommended. Business benefits through improvements will not be achieved until several years out, after the regulations are determined and those initiatives implemented. This approach would also still require a project to address the obsolete 2G communications mechanism before that technology is retired.

3.7 Safety, Environmental and Project Planning Issues

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

3.8 Execution Risk Appraisal

Number	Detailed Description of Risk / Opportunity	Probability	Impact		Score		Strategy	Pre-Trigger Mitigation Plan	Residual Risk	Post Trigger Mitigation Plan
			Cost	Schedule	Cost	Schedule				
1	Availability of Itron team for system build and test	3	3	2	9	6	Mitigate	Initiate procurement process as soon as possible and notify Itron of schedule needs.	none	none
2	Availability of qualified CSS and CIS resources	3	3	2	9	6	Mitigate	Work with IBM and Wipro management to obtain qualified resources.	none	none
3	Availability of business resources for requirements definition and testing	3	2	2	6	6	Mitigate	Work with Business client on allocation of business resource time.	none	none
4	Coordination with Clifton Park project	3	2	2	6	6	Mitigate	Establish joint meetings in startup	none	none
5	Meter and data transmission process qualification and acceptance.	3	2	1	6	3	Mitigate	Work with MDS team to move forward during R&D phase.	none	none

3.9 Permitting

N/A

3.10 Investment Recovery

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3.10.1 Investment Recovery and Regulatory Implications

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

3.10.2 Customer Impact

N/A

3.10.3 CIAC / Reimbursement

N/A

3.11 Financial Impact to National Grid

3.11.1 Cost Summary Table

					Current Planning Horizon							
Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total	
3486	Itron EE Consolidation-Phase 1	Est Lvl (e.g. +/- 10%)	CapEx	0.220	1.458	0.000	0.000	0.000	0.000	0.000	0.000	1.678
			OpEx	0.235	0.045	0.000	0.000	0.000	0.000	0.000	0.280	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	0.455	1.503	0.000	0.000	0.000	0.000	0.000	1.958	
Total Project Sanction			CapEx	0.220	1.458	0.000	0.000	0.000	0.000	0.000	1.678	
			OpEx	0.235	0.045	0.000	0.000	0.000	0.000	0.000	0.280	
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
			Total	0.455	1.503	0.000	0.000	0.000	0.000	0.000	1.958	

3.11.2 Project Budget Summary Table

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
CapEx	0.220	0.461	0.000	0.000	0.000	0.000	0.000	0.681
OpEx	0.235	0.045	0.000	0.000	0.000	0.000	0.000	0.280
Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Cost in Bus. Plan	0.455	0.506	0.000	0.000	0.000	0.000	0.000	0.961

Variance (Business Plan-Project Estimate)

\$M	Prior Yrs (Actual)	Current Planning Horizon						Total
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
CapEx	0.000	(0.997)	0.000	0.000	0.000	0.000	0.000	(0.997)
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	(0.997)	0.000	0.000	0.000	0.000	0.000	(0.997)

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3.11.3 Cost Assumptions

This estimate was developed in 2016 using the standard IS estimating methodology and refined for this paper. The accuracy level of estimate for each project is identified in table 3.11.1.

3.11.4 Net Present Value / Cost Benefit Analysis

3.11.4.1 NPV Summary Table

N/A

3.11.4.2 NPV Assumptions and Calculations

N/A

3.11.5 Additional Impacts

N/A

3.12 Statements of Support

3.12.1 Supporters

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

Role	Individual
Business Representative	John Spink
Head of PDM	Deborah Rollins
Relationship Manager	Aman Aneja
Program Delivery Director	Jeff Dailey
IS Finance Management	Chip Benson
IS Regulatory	Dan DeMauro
DR&S	Elaine Wilson
Service Delivery	Brian Detota
Enterprise Architecture	Joe Clinchot

US Sanction Paper

3.12.2 Reviewers

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

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

4 Appendices

4.1 Sanction Request Breakdown by Project

Number	Name	Proj Est. Lvl	Spend	Prior Yrs	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	Total	Total Ex. CIAC
3486	Iron EE Consolidation-Phase 1	Est Lvl (e.g. +/- 10%)	CapEx	0.220	1.458	0.000	0.000	0.000	0.000	0.000	1.678	
			OpEx	0.235	0.045	0.000	0.000	0.000	0.000	0.000	0.280	
			Removal		0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.958
			CIAC/Reimbursement		0.000	0.000	0.000	0.000	0.000	0.000	0.000	

4.2 Other Appendices

4.2.1 Project Cost Breakdown:

Project Cost Breakdown			
Cost Category	sub-category	\$ (millions)	Name of Firm(s) providing
Personnel	NG Resources	0.444	
	SDC Time & Materials	0.679	
	SDC Fixed-Price	-	
	All other personnel	0.598	
	TOTAL Personnel Costs	1.721	
Hardware	Purchase	-	
	Lease	-	
Software		0.120	
Risk Margin		-	
Other		0.116	
TOTAL Costs		1.958	

4.2.2 Benefitting Operating Companies Table:

This project will benefit all US Electric Transmission and Distribution companies.

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Operating Company Name	Business Area	State
Niagara Mohawk Power Corp. - Transmission	Electric Transmission	NY
Niagara Mohawk Power Corp. - Distribution	Electric Distribution	NY
Massachusetts Electric Co. - Transmission	Electric Transmission	MA
Massachusetts Electric Co. - Distribution	Electric Distribution	MA
Nantucket Electric Company	Electric Distribution	MA
New England Power Company - Transmission	Electric Transmission	MA
Narragansett Electric Co. - Transmission	Electric Transmission	RI
Narragansett Electric Co. - Distribution	Electric Distribution	RI

4.2.3 IS Ongoing Operational Costs (RTB):

IS ongoing operations support costs will increase. These are also known as Run the Business (RTB) costs.

Software as a Service (SaaS) cloud costs are represented according to the draft IFRS-based policy, until the US GAAP-based policy is issued. The SaaS cloud costs are treated as prepaid, put on the balance sheet as a short term asset and amortized as Opex to the project over the prepaid period. Post implementation charges are shown as RTB over the prepaid term.

US Sanction Paper

Summary Analysis of RTB Costs							
All figures in \$ millions	Yr. 1 16/17	Yr. 2 17/18	Yr. 3 18/19	Yr. 4 19/20	Yr. 5 20/21	Yr. 6+	Total
<u>Forecast of RTB Impact</u>							
RTB if Status Quo Continues	-	-	-	-	-	-	-
RTB if Project is Implemented	-	-	0.240	0.240	0.240	0.498	1.218
Net change in RTB	-	-	0.240	0.240	0.240	0.498	1.218
<u>RTB Variance Analysis</u> (if Project is Implemented)							
Net Δ RTB funded by Plan(s)	-	-	-	-	-	-	-
Variance to Plan	-	-	0.240	0.240	0.240	0.498	1.218
<u>Total RTB Costs - by Cost Type</u> (if Project is Implemented)							
App.Sup. - SDC 1	-	-	0.012	0.012	0.012	0.025	0.061
App.Sup. - SDC 2	-	-	0.012	0.012	0.012	0.025	0.061
App.Sup. - other	-	-	-	-	-	-	-
SW maintenance	-	-	-	-	-	-	-
SaaS	-	-	-	-	-	-	-
HW support	-	-	-	-	-	-	-
Other: IS	-	-	0.216	0.216	0.216	0.448	1.096
All IS-related RTB (sub-Total)	-	-	0.240	0.240	0.240	0.498	1.218
Business Support (sub-Total)	-	-	-	-	-	-	-
Total RTB Costs	-	-	0.240	0.240	0.240	0.498	1.218

Resanction Request

Title:	Enterprise Mobility Management (EMM) Service	Sanction Paper #:	USSC-17-202
Project #:	INVP 3430 Capex: 90000181476	Sanction Type:	Resanction
Operating Company:	National Grid Electric Svc.	Date of Request:	May 10, 2017
Author / NG Representative:	Aravind Lochan/ Nicola Pennington	Sponsor:	John Gilbert Global Head IS Service Delivery
Utility Service:	IS	Project Manager:	Dave McCune

1 Executive Summary

This paper requests the resanction of INVP 3430 in the amount \$1.225M with a tolerance of +/- 10% for the purposes of full implementation.

This sanction amount is \$1.225M broken down into:

\$1.162M Capex

\$0.063M Opex

\$0.000M Removal

Note the originally requested sanction amount of \$0.401M (Opex).

2 Resanction Details

2.1 Project Summary

This project will implement an Enterprise Mobility Management (EMM) service that will allow National Grid to secure and manage mobile apps and content across a variety of mobile devices.

National Grid has over 4000 corporate owned mobile devices that are used by the workforce to store information and gain access to network applications, such as email. In addition, Time Transformation project (Time entry system) will be integrated between mobile devices and our backend systems (i.e. iphones, ipads, making external and internal apps available to NG via NG site - push and pull) to enable our workforce to work in a more flexible and efficient manner.

Due to the growing use of mobile devices, it is more critical than ever that we have a way to manage these devices so that we can comply with Internal corporate policy, distribute applications, and secure the data on these devices through a central EMM platform.

Resanction Request

This project will establish and deploy a central EMM service capable of on-boarding 4000 mobile devices. Included in this delivery is the implementation of device and security policies, a corporate apps store, mobile device containers and the infrastructure required to support mobile device access to corporate systems and data in a secure fashion.

2.2 Summary of Projects

Project Number	Project Title	Estimate Amount (\$M)
INVP 3430	Enterprise Mobility Management	1.225

2.3 Prior Sanctioning History

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

Date	Governance Body	Sanctioned Amount	Potential Project Investment	Paper Title	Sanction Type	Paper Reference Number	Tolerance
Oct 2016	ISSC	\$0.401M	\$0.401M	Enterprise Mobility Management Service	Full		+/- 10%

Over / Under Expenditure Analysis

Summary Analysis (\$M)	Capex	Opex	Removal	Total
Resanction Amount	\$1.162M	\$0.063M	\$0.000M	\$1.225M
Latest Approval	\$0.000M	\$0.401M	\$0.000M	\$0.401M
Change*	\$1.162M	(-\$0.338M)	\$0.000M	\$0.824M

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

Resanction Request

2.4 Cost Summary Table

Project Number	Project Title	Project Estimate Level (%)	Spend (\$M)	Prior Yrs	Current Planning Horizon						Total
					Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6 +	
INVP 3430	Airwatch - Enterprise Mobility Management - Resanction	Est Lvl (e.g. +/- 10%)	CapEx	0.867	0.295	0.000	0.000	0.000	0.000	0.000	1.162
			OpEx	0.063	0.000	0.000	0.000	0.000	0.000	0.000	0.063
			Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			Total	0.930	0.295	0.000	0.000	0.000	0.000	0.000	1.225

2.5 Business Plan

Business Plan Name & Period	Project included in approved Business Plan?	Over / Under Business Plan	Project Cost relative to approved Business Plan (\$)
IS Investment Plan FY18 – 22	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Over <input type="radio"/> Under <input type="radio"/> N/A	\$0.194M

2.6 Drivers

2.6.1 Detailed Analysis Table

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

Detail Analysis	Over/Under Expenditure?	Amount (\$M)
Purchase of 4000 VMware AirWatch licenses, setup & consulting Services (including support activity for a year)	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	\$0.756M
Professional Services: 1. Verizon 2. CSC 3. Wipro (SharePoint) 4. IBM ICE (Mail Server team)	<input checked="" type="checkbox"/> Over <input type="checkbox"/> Under	\$0.068M

Resanction Request

2.6.2 Explanation of Key Variations

The key driver for the resanction is associated with a scope change of licenses from 2000 to 4000 users, as well as a financial decision to make a one-time purchase of the 4000 perpetual licenses and a dedicated environment to run EMM platform up front rather than pay for a service over time.

- VMware Airwatch – EMM solution licenses were revised from 2000 to 4000. Approximately \$0.480M in additional sanction costs is associated with the increased licenses.
- Despite including 2000 additional licenses, the 5 year RTB of the resanction (\$0.228M annually) is \$0.386M less than the RTB of the original project due to the upfront purchases.
- The additional 2000 licenses plus paying for the services upfront are the primary drivers of the increased sanction amount.
- A dedicated environment to run the EMM platform for 5 years was purchased.
- Additional professional services from CSC, Verizon, IBM & Wipro identified during detailed planning phase.

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

Re-allocations of funds within the US business have been managed to meet jurisdictional budgetary, statutory and regulatory requirements. Future fiscal year forecasts will be addressed in future year business plans.

2.8 Key Milestones

Milestone	Target Date: (Month/Year)
Start Up	Jun 2016
Begin Requirements and Design	Feb 2017
Full Sanction	Oct 2016
Begin Development and Implementation	Apr 2017
Full Resanction	May 2017
Move to Production / Last Go Live	Jul 2017
Project Complete	Jul 2017
Closure Sanction	Aug 2017

2.9 Next Planned Sanction Review

Date (Month/Year)	Purpose of Sanction Review
Aug 2017	Project Closure

Resanction Request

3 Statements of Support

3.1 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 PDM	Tom Cunningham
Relationship Manager	William G Kearns
Program Delivery Manager	David McCune
IS Finance Management	Chip Benson
IS Regulatory	Daniel J DeMauro
DR&S	Elaine Wilson
Service Delivery	Brian Detota
Enterprise Architecture	Joseph Clinchot

3.2 Reviewers

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

Function	Individual	Area
Regulatory	Peter Zschokke	All
Jurisdictional Delegate(s)	Sonny Anand	New England - Electric
	Mark Harbaugh	New York - Electric
	Laurie Brown	Gas - NY
	John Currie	Gas - NE
Procurement	Art Curran	All

Resanction Request

4 Decisions

The US Sanctioning Committee (USSC) at a meeting held on May 10, 2017:

- (a) APPROVED this paper and the investment of \$1.225M and a tolerance of +/-10%.
- (b) APPROVED the total RTB Impact of \$0.228M (per annum) for 5 Years.
- (c) NOTED that David McCune has the approved financial delegation.

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

Christopher Kelly
Senior Vice President, Electric Process & Engineering
US Sanctioning Committee Co – Chair Person

4/9 Steering Team meeting

nationalgrid

FERC on HANA proposal

Strategy

- The Finance team has been working to develop a plan that will allow us to remediate some of our most pressing remaining pain points and leverage our investment in HANA
- HANA Enhancements we have on our roadmap include the FERC module, enhancements to and transition of our reporting solution, and our budgeting and consolidation tool (BPC)
- Ultimately we aim to decommission the Oracle self service universe

Draft timeline

HANA Use cases
for E2E due
June 2015

Replace FERC
module in ECC
with FERC on
HANA

Enhance E2E
solution and
transfer Finance
reporting to
HANA

BPC Upgrade
needed either
BI/BW or HANA

4/9 Steering Team meeting

nationalgrid

Transition FERC module to FERC on HANA

Project Proposal

- The recommended FERC on HANA solution would result in the decommissioning of our existing FERC module within the SAP ECC system and relocate it to a new HANA architecture, allowing for real time FERC reporting abilities.

Issues with our current solution

- Current FERC Processing time is very long and uses significant processing power
- Processing takes place mid month – long after month end close, with no time to make corrections during month
- Processing kick outs requires significant manual interventions
- Ongoing support from a high cost 3rd party is required
- Cannot make entries directly to the FERC accounts

Resolution with FERC on HANA

- New HANA proposal means FERC data created in parallel with all other Financial data
- FERC data in real time during the close process allowing faster correction of issues
- New standard process will allow users to monitor kick outs and reprocess issues
- Ability to use standard AMS support once full transition is achieved
- Can make entries to the FERC accounts, plus this will allow for traceability to original documents
- Expect a simpler enduring solution

4/9 Steering Team meeting

nationalgrid

FERC on HANA Project summary

The team has evaluated the impacts to the business and the program of the FERC on HANA project and recommends proceeding with this 5 month project with a September go-live date (assuming a late April start)

Budget			Resources	Technical Environment
The project is expected to cost \$4.1m in FY16 of which \$0.8M is Opex cost. This will be paid for by the Finance Remediation budget. These figures are before a 10% +/- risk margin. Finance will absorb the FY17 RTB costs of \$0.7m.			<ul style="list-style-type: none"> Finance has the scope to deliver this project. Under USFP BI, the Finance team will be managing 1 project from June forward. SMEs will come from the current FERC technical team (NG) UAT resources from within Finance including Accounting, and Regulatory Accounting teams have been agreed. This will be delivered by a separate SAP team, so no impact on Wipro project resources The USFP PMO has agreed to provide overall support 	<ul style="list-style-type: none"> Fully independent technical environment that will be transitioned to a Productive environment at go-live Run the Business (RTB) costs for the FERC on HANA solution will be absorbed by the Finance organization for FY16 and FY17.
	Opex	Capex		
FY16	\$0.8m	\$3.3m		
FY17 RTB	\$0.7m	\$0m		
Total:	\$1.5m	\$3.3m	\$4.8m	

Other important factors

- Existing HANA reporting solution unchanged
- Oracle FERC module will be decommissioned
- HANA implementations have largely all been delivered on time, cost and quality
- With this solution this we will also implement SAP Master Data Governance (MDG) which will allow us to more efficiently manage master data changes across our systems

<u>Investment Name</u>	<u>Bill Pool</u>	<u>In Service Date</u>	<u>FY18</u>	<u>FY19</u>	<u>FY20</u>	<u>FY21</u>
All Companies Physical Security Replacements - FY18	G020	3/31/2018	3,216,653			
All Companies Physical Security Replacements - FY19	G020	3/31/2019		825,000		
All Companies Physical Security Replacements - FY20	G020	3/31/2020			835,000	
All Companies Physical Security Replacements - FY21	G020	3/31/2021				860,000
<i>Physical security projects allocated to all companies(G020)</i>			3,216,653	825,000	835,000	860,000
New England Companies Physical Security Replacements - FY18	G285	3/31/2018	486,847			
New England Companies Physical Security Replacements - FY19	G285	3/31/2019		234,000		
New England Companies Physical Security Replacements - FY20	G285	3/31/2020			240,000	
New England Companies Physical Security Replacements - FY21	G285	3/31/2021				258,000
<i>Physical security projects allocated to all companies(G285)</i>			486,847	234,000	240,000	258,000
<i>Total of Physical security projects in Rhode Island Rate Case</i>			<u>3,703,500</u>	<u>1,059,000</u>	<u>1,075,000</u>	<u>1,118,000</u>

Description

The types of assets being replaced represent camera systems, intrusion detection systems, security panels and gates/fences at our LNG plants, substations and operating yards. These systems are utilized for the protection of company personnel, assets and the general public. Without these systems, we would be unable to detect an intrusion or pull up video to see what is occurring if an alarm comes in.

The fence detection (intrusion) systems at some facilities are end of life. Also, the analog video infrastructure that supplies the control rooms with 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 time frame and are at, or nearing end of life and are long out of vendor warranties. There have been video recorder upgrades since that time due to the normal life cycle of the server. Those servers were installed between 2010 and 2012 and those warranties have expired as well. Parts are no longer available to repair some of the existing systems lessening our ability to maintain the integrity of the systems, with a direct impact on our role in the protection of company personnel, assets and the general public. The VERINT Video Management platform, which manages all of NG's field deployed video systems must be upgraded. Phase 1 will address all of NG's critical facilities video systems – To be completed in 2019. Phase 2 will address all of NG's non-critical facilities video systems – To be completed in 2020. 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 EOL Operating systems. Also, by not upgrading our software on a regular basis, we are forced to use older Operating Systems for new installations due to compatibility.

Cost Breakdown	FY18	FY19	FY20	FY21	Totals
Labor	437,013	181,000	238,000	214,000	1,070,013
Hardware	2,136,920	565,000	797,000	872,000	4,370,920
Software	1,129,567	313,000	40,000	32,000	1,514,567
Total	3,703,500	1,059,000	1,075,000	1,118,000	6,955,500