

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-7
March 15, 2018
H.O. Pieper
Page 1 of 2

Information Request AG-21-7

Request:

Referring to page 5 of Exhibit NG-GBE-1, where it states: “National Grid estimates that it currently relies on approximately 117 sub-systems, applications, databases, and spreadsheet systems across the U.S. gas business.” For each of the approximately 117 sub-systems, applications, databases, and spreadsheet system, please provide a spreadsheet with the following information (please note that the AGO seeks a more comprehensive response than that filed in response to DPU-NG-1-2, which refers only to some of the current systems or databases detailed in Exhibit NG-GBE-2):

- a. Name;
- b. The date it was placed into service, or the date that it was first implemented by the Company;
- c. Whether it is one of the “55” current “systems, applications, databases, and spreadsheet systems” in Massachusetts;
- d. If applicable, how long it has been in use in Massachusetts;
- e. A description of its intended purpose;
- f. An explanation of its current use;
- g. The core operating capability (or capabilities) supported;
- h. Its designated “Future State” under the GBE Program (e.g. please indicate whether the sub-system, application, database, or spreadsheet system will be eliminated, retained, or transformed under the GBE Program);
- i. Its original cost of the plant including all revisions, upgrades, and updates; and
- j. The net book value of the plant as of December 31, 2016.

Response:

The reference to “approximately 117 sub-systems, applications, databases or spreadsheet systems” is information that has been updated and refined to a total of 102, as shown in Attachment AG 21-7-1. For the specific data points requested, please see the following:

- a. Name of system:
Please see Attachment AG 21-7-1, Column A.
- b. Date placed into service, or the date first implemented by the Company:
Please see Attachment AG 21-7-1, Column B. Because many of the listed systems are very old or were developed as workarounds or job-aids by business personnel, there may be no known in service dates in the Company’s records.

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D.P.U. 17-170
Information Request AG-21-7
March 15, 2018
H.O. Pieper
Page 2 of 2

- c. Whether the system is one of the 55 current systems, applications, databases, and spreadsheet systems used in Massachusetts:

Please see Attachment AG 21-7-1, Column C.

- d. If applicable, how long has the system been in use in Massachusetts;

Please see Attachment AG 21-7-1, Column D. Similar to part (b), many of the listed systems are very old or were developed as workarounds or job-aids by business personnel, so that there are no known in-service dates in the Company's records.

- e. A description of the system's intended purpose;

Please see Attachment AG 21-7-1, Column G.

- f. An explanation of the system's current use:

Please see Attachment AG-21-7-1, Column G.

- g. The core operating capability (or capabilities) supported:

Please see Attachment AG 21-7-1, Column F. Please note that some of the systems from the current state will remain in the future state and do not fall under the core capabilities of Asset Management, Work Management, and Customer Engagement.

- h. The system's designated "Future State" under the GBE Program (e.g. please indicate whether the sub-system, application, database, or spreadsheet system will be eliminated, retained, or transformed under the GBE Program);

Please see Attachment AG 21-7-1, Column E.

Part "a"	Part "b"	Part "c"	Part "d"	Part "h"	Part "g"	Part "e" and "f"
Application Short Name/Acronym	Service Start Date (YYYY)	Is one of the 55?	Service Start Date (YYYY) for MA (Same as Part "b")	Target Application	Core Capability	Application Description
Adobe Pro	N/A	Yes	N/A	IBM Maximo	Work Management	Used for editing the drawings through the use of redline functionalities.
Agent Desktop	2008	No	2008	Salesforce	Customer Engagement	The Agent Desktop used by call center agents
ArcFM Viewer	N/A	Yes	N/A	ESRI	Asset Management	Spatial system
ArcFM GIS-NE	N/A	Yes	N/A	ESRI	Asset Management	Spatial system
Ariba	1995	No	1995	Ariba	N/A	Spend analysis and category management modules
AutoCad	1990	No	1990	Graphic Work Design	Asset Management	Computer Aided Drafting and Design software for design of Substations, Regulator Stations, large gas meter installations, transmission, etc.
AVLS	2005	Yes	2005	Salesforce	Work Management	Automated Vehicle Locator System
Business Objects - Mwork	N/A	Yes	N/A	Data Management Platform	Work Management	Creates reports related to Mwork field orders
Business Objects - STORMS	N/A	No	N/A	Data Management Platform	Work Management	Creates reports related to storm damage
CAD History	2000	Yes	2000	Salesforce	Asset Management	Stores completed Customer Service orders and CAD history
Cascade Gas	N/A	Yes	N/A	IBM Maximo	Asset Management	Management of pipeline safety related, mandated regulatory inspections
CCH	1997	No	1997	IBM Maximo	Asset Management	Repository of construction contracts used to price-out actual construction work\
CHI	N/A	Yes	N/A	IBM Maximo	Asset Management	Tracks regulator station inspections
CIAC	2004	Yes	2004	IBM Maximo	Asset Management	Contribution in Add of Construction, tracks customer contributions
Construction Database	N/A	Yes	N/A	IBM Maximo	Work Management	Tracks the status of construction projects
Cortalk (Corrosion Work)	N/A	Yes	N/A	IBM Maximo	Asset Management	Remote cathodic monitoring
CRIS III	1990	Yes	1990	CRIS III	N/A	Billing and Customer Relationship Management
Crystal Reports	N/A	Yes	N/A	Data Management Platform	N/A	Creates reports for several use cases
CSS	1999	Yes	1999	CSS	N/A	Billing and Customer Relationship Management
CutCap	2007	No	2007	ESRI	Asset Management	Removal of section of main (Gas)
CWQ	2004	No	2004	Salesforce	Work Management	Schedules customer work to field crews
DigSafe-NE	1996	Yes	1996	DigSafe-NE	N/A	Repository of DigSafe tickets
DIS	1990	No	1990	IBM Maximo	Asset Management	Inventory of physical service pipes and a historical repository of associated work
DPMS	1990	No	1990	IBM Maximo	Asset Management	Distribution Project Management System - The application database exists to record gas construction and maintenance work
EDIS Primavera	mid 1990s	No	mid 1990s	IBM Maximo	Asset Management	Project Management for Capital Projects
EGIS	mid 1990s	No	mid 1990s	ESRI	Asset Management	Electric Geographic Information System
ESRI	mid 1990s	No	mid 1990s	ESRI	Asset Management	ESRI Arc Suite of Graphical Information System (GIS) products
Excel	N/A	Yes	N/A	Data Management Platform	Asset Management	Spreadsheets used for Operational monitoring and analysis of Automation Assets
Fade	2006	No	2006	IBM Maximo	Asset Management	Application utilized to report Gas Project status and related information
FCS	2011	No	2011	IBM Maximo	Asset Management	Collects data from multiple meter types and provides meter data to meter data management and customer billing applications.
Field Technology Management System	N/A	No	N/A	Salesforce	Work Management	Reporting System for Field Productivity Measurements for Field Operations
FIS	N/A	No	N/A	IBM Maximo	Asset Management	Facility Information System, used to manage pressure regulating station assets.
Fleet and Fuel	N/A	No	N/A	IBM Maximo	Work Management	Used to request additional state permits from a permitting agency for vehicles to use to cross-state boundaries (e.g. during storms.)

FORTIS	2001	Yes	2001	Open Text	N/A	Repository of scanned gas asset records for the entire territory. This data is available to all clients via a web interface.
FPM	mid 1990s	Yes	mid 1990s	Data Management Platform	Work Management	Reporting System for Field Productivity Measurements for Field Operations
GAMS	N/A	Yes	N/A	IBM Maximo	Work Management	Gas Asset Management System - Leak Tracking system
Gas Leak Tracking	2008	Yes	2008	IBM Maximo	Work Management	Schedule gas leaks for repair, recheck, or surveillance
Gas Valve Inventory	N/A	Yes	N/A	IBM Maximo	Asset Management	Database of all critical Gas valve cards as well as repair and inspection history for each valve
Gas Work Method (GWM)	N/A	Yes	N/A	IBM Maximo	Asset Management	Repository for gas business procedures
GIS Application Suite - SmallWorld	1995	No	1995	ESRI	Asset Management	Applications built on Smallworld GIS product to support Distribution Facility Management, Graphical design and mapping
Google Maps	N/A	Yes	N/A	Salesforce	Work Management	used for directions and views
Gridforce	N/A	Yes	N/A	Gridforce	N/A	Portal for new customers to request service
GRO	N/A	No	N/A	IBM Maximo	Asset Management	Gas repair operations
IEX	N/A	No	N/A	Salesforce	Customer Engagement	Captures historical call volume information from various systems and enables the contact center to develop call volume forecasts and associated schedules to meet demand
IMS	N/A	No	N/A	IMS	N/A	Used by Gas to report incidents and problems with the maintenance crews
iScheduler	2004	Yes	2004	Salesforce	Work Management	iScheduler is a resource management and scheduling application
KoFax	N/A	No	N/A	Salesforce	Customer Engagement	The IVR automatically handles the M-Number enquiry related calls to the Emergency Contact Centres without the need to pass to a call centre Agent.
Leak Survey Database	N/A	Yes	N/A	IBM Maximo	Work Management	Provides tracking and scheduling of mandated leak surveys
LMS(LI)	1992	No	1992	IBM Maximo	Work Management	Records the life cycle of a leak. Functions include work generation, work scheduling, PSC and internal compliance reporting
LMS(NE)	1996	Yes	1996	IBM Maximo	Work Management	This is the repository of all leak records in NE.
LMS(NYC)	mid 1990s	No	mid 1990s	IBM Maximo	Work Management	Records the life cycle of a leak. Functions include work generation, work scheduling, PSC and internal compliance reporting
Lotus	N/A	No	N/A	IBM Maximo	Asset Management	Used to track assets
Mandated Activity DB	N/A	Yes	N/A	IBM Maximo	Asset Management	Database is used to manually track progress on mandated activities. Data is entered as report from each region. Scheduled to be replaced by the GMAS
MapFrame	2004	Yes	2004	ESRI	Asset Management	Provides street level routing for the meter services workers and provides asset (GIS) and facilities data to the operations workers and supervisors
Maximo-Generation	2001	No	2001	IBM Maximo	Asset Management	System used to track substation equipment.
Maximo-NE	2000	Yes	2000	IBM Maximo	Work Management	Work Management system for New England Gas.
Maximo-T&D	2000	No	2000	IBM Maximo	Work Management	Work Management system for Gas LI, Gas NYC, and Electric LI.
MDSI-Advantex	2001	Yes	2001	Salesforce	Work Management	Field Data Capture System (FDC)
MDSI-GAS	2001	Yes	2001	Salesforce	Work Management	Field Data Capture System (FDC)
MDSI-Digipen	N/A	Yes	N/A	Salesforce	Work Management	Field Data Capture System (FDC)
MDSI-NE (Gas)	2001	Yes	2001	Salesforce	Work Management	Field Data Capture System (FDC)
Microsoft Project	N/A	No	N/A	Copperleaf	N/A	Used to plan complex construction projects
Microstation	2008	No	2008	AutoCAD	N/A	Computer Aided Drafting and Design software for design of Substations, Regulator Stations, large gas meter installations, transmission, etc.
Microstrategy	2002	Yes	2002	Data Management Platform	N/A	This is the front end tool used by developers and clients to create, run and distribute data warehouse reports.
Minimo / Access	N/A	No	N/A	IBM Maximo	Asset Management	Databases used for Operational monitoring and analysis of Automation Assets

MIT5	2006	Yes	2006	IBM Maximo	Asset Management	Meter Inventory Tracking System
Mwork (FFE)	2005	Yes	2005	Salesforce	Work Management	Delivers orders (work) to the field workers
NE Primary Valve	N/A	No	N/A	IBM Maximo	Asset Management	Manages attributes for primary valves that require annual inspection
NRG	2006	No	2006	ESRI	Asset Management	Mapping utility
NYC STREETS	N/A	No	N/A	ESRI	Asset Management	Mapping utility
Onyx	2003	No	2003	Salesforce	Customer Engagement	CRM software package used by Gas Sales & Marketing in support of Marketing and Sales GAS efforts throughout the Company's service territories
Operation Data Mart	2002	No	2002	Data Management Platform	N/A	Creates reports
Palm Pilot System	N/A	Yes	N/A	Salesforce	Work Management	Hand held device and software for field crews
Paving	1990	Yes	1990	IBM Maximo	Asset Management	Tracks and records the paving requests that are associated to gas construction and maintenance work.
Paving Db, Pave Seed, Restoration Db	1990	Yes	1990	Salesforce	Work Management	Database used to track necessary restoration work by Contractors
Pipeline Compliance System (PCS)	N/A	Yes	N/A	IBM Maximo	Asset Management	Tracks hisotry of corrosion testing
Permits (E-Permits)	1990	Yes	1990	IBM Maximo	Asset Management	Records municipal permit applications that have been requested but not yet received back
Pictometry	N/A	Yes	N/A	ESRI	Asset Management	Stores aerial imagery
Pipes	N/A	No	N/A	Integrity Mangement	Asset Management	A risk assessment program for measuring societal risk from underground pipes, giving indications as to how hazardous the pipe is.
Plastic Fusion Database	2015	No	2015	IBM Maximo	Asset Management	Repository of plastic fusion (asset repository)
PowerPlan	2014	Yes	2014	PowerPlan	N/A	Used for Accounting, Tax Calculations, and Capital Asset Tracking.
PPM	mid 1990s	No	mid 1990s	IBM Maximo	Asset Management	Used for estimation of construction projects
Primavera P6	N/A	Yes	N/A	Salesforce	Work Management	Planning for Complex Construction Projects
ProCommon	N/A	No	N/A	Salesforce	Work Management	Online reference support for relating to CRIS
ProGas	N/A	No	N/A	Salesforce	Work Management	Online reference support for relating to CSS
Public Building DB/Fixed Factor DB	2007	Yes	2007	Salesforce	Work Management	Schedule and track the work done with regard to Public building and Fixed Factor inspections. This work is currently performed by the Service Department.
RMDS	N/A	No	N/A	Data Management Platform	Work Management	Report Management Distribution System relating to work order reports
SAP	2012	Yes	2012	SAP	N/A	Financial and ERP System
SEAL	2001	No	2001	SEAL	Work Management	Maintains employee information regarding storm emergency assignments
Smallworld	2005	No	2005	ESRI	Asset Management	Support the management of transmission rights-of-way and property corridors.
Sobo/Robo	2012	No	2012	SAP	N/A	Shop on behalf of/Receive on behalf of (SAP)
SOP	2009	Yes	2009	SOP	Work Management	Standard Operating Procedures
SPIPE-NE	2000	Yes	2000	IBM Maximo	Asset Management	This system is the repository for Service Pipe information in NE
SynerGEE/Stoner	N/A	No	N/A	ESRI	Asset Management	Hydraulic Modeling (pressure and flow) and analysis application for distribution, transmission and pressure regulating assets.
STORMS	2004	Yes	2004	IBM Maximo	Work Management	Work Management System for Niagara Mohawk Power Corporation
ToolWatch	N/A	Yes	N/A	IBM Maximo	Asset Management	Materials Management system
Ubisense	N/A	No	N/A	ESRI	Asset Management	Third party add on software to legacy geospatial system (Smallworld)
VMS	N/A	No	N/A	IBM Maximo	Asset Management	Valve Management System, repository for major gas valves and maintenance records
WGA	N/A	No	N/A	Salesforce	Work Management	Used for scheduling to understand field crew capacity for a given area
Witness	N/A	Yes	N/A	Witness	Customer Engagement	Used with telephone customer service as recording software

Information Request AG-21-8

Request:

Referring to page 5 of Exhibit NG-GBE-1, where it states: “this number will be reduced by over 75% to less than 30 systems, sub-systems and/or applications across six gas companies operating in three jurisdictions.” For each of the “less than 30 systems, sub-systems and/or applications,” please provide a spreadsheet with the following information (please note that the AGO seeks a more comprehensive response than that filed in response to DPU-NG-1-2, which refers only to some of the future state systems or databases detailed in Exhibit NG-GBE-2):

- a. Name;
- b. The date it will be placed into service, or the date that it will be first implemented by the Company;
- c. Whether it is one of the “26” systems that National Grid estimates will be implemented in Massachusetts;
- d. A description of its intended purpose;
- e. The core operating capability (or capabilities) supported;
- f. The current sub-systems, applications, databases, or spreadsheet systems that it is intended to replace, alter, and/or update; and
- g. Its current estimated cost.

Response:

- a – f. Please see Attachment AG 21-8-1.
- g. The GBE Program is viewed as a consolidated solution across the gas business. The costs associated with each of the system components are impossible to isolate, since they include, but are not limited to, software, hardware, and implementation and integration services provided by contractors, consultants, and employees.

For this reason, we have determined the costs of the GBE Program by the various work streams. The work streams each include the aforementioned cost elements. The work streams are listed below.

- Asset Management (AM)
- Change Leadership & Development (CLD)
- Change Management Office (CMO)
- Customer Engagement (CE)
- Data Management (DM)
- Geographic Information Systems (GIS)
- Information Services (IS)

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D.P.U. 17-170
Information Request AG-21-8
March 15, 2018
H.O. Pieper
Page 2 of 2

- Portfolio Office (PO)
- Supply Chain (SC)
- Work Management - Maximo (WM(M))
- Work Management - Scheduling, Dispatch & Mobility (WM-SDM)

The total cost anticipated by work stream is outlined below:

<u>Work Stream</u>	<u>Amounts in 000's</u>
Asset Management (AM)	\$ 19,786
Change Leadership & Development (CLD)	13,557
Change Management Office (CMO)	66,109
Customer Engagement (CE)	29,719
Data Management (DM)	23,493
Geographic Information Systems (GIS)	31,129
Information Services (IS)	113,064
Portfolio Office (PO)	60,024
Supply Chain (SC)	14,282
Work Management - Maximo (WM(M))	48,475
Work Management - Scheduling, Dispatch & Mobility (WM-SDM)	38,505
Total	\$ 458,142

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D.P.U. 17-170
Information Request AG-21-9
March 15, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-9

Request:

Referring to pages 5 and 6 of Exhibit NG-GBE-1, please list each and every regulatory requirement with which the GBE program “is . . . designed to improve the Company’s . . . compliance” and provide a complete and detailed explanation of which specific programs, applications, systems, and other tools will provide any such improvements.

Response:

Many of the systems to be replaced and modernized as part of Gas Business Enablement are critical to support the safe delivery of service to customers and continuously improve the Company’s gas pipeline safety and compliance. Gas safety and compliance benefits will be driven by having modern, reliable enterprise asset management and work management systems that will enable the management, tracking and reporting of required work on the Company’s assets, as well as enhanced decision making and prioritization for investments and resource allocation. The modern systems will also make it easier for field employees to access safety critical information including relevant work procedures and maps. It is important to note that the Gas Business Enablement solution has been designed as a holistic, integrated, modern solution to meet a broad range of requirements rather than individual applications or systems to address single requirements. The Gas Business Enablement solution will be developed to support all relevant federal and state regulatory requirements referenced in Attachment AG 21-9.

The Company is also in the process of implementing a Pipeline Safety Management System (PSMS), a process safety model based on employing and strengthening the ten essential elements of American Petroleum Institute’s recommended pipeline safety standards (Recommended Practice 1173) (API RP 1173). Gas Business Enablement Program initiatives have been mapped to the ten elements of API RP 1173 for strong alignment to enhance safety and compliance upon implementation.

Further, the solutions planned for implementation will be deployed on modern platforms able to be updated to manage future changes to keep pace with regulatory changes and new requirements.

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Specific Regulatory Code, Statute or Standard	Cites	Gas Business Enablement Program (GBE) Compliance Improvement
Code of Federal Regulations (CFR), Title 49 – Transportation, Subtitle B – Other Regulations Relating to Transportation, Chapter I – Pipeline and Hazardous Materials Safety Administration (PHMSA), Department of Transportation (DOT), Subchapter D – Pipeline Safety, Part 192 - Transportation of Natural and Other Gas By Pipeline: Minimum Federal Safety Standards		
Subpart A - General (§§ 192.1 - 192.16)	192.13 Company Procedures	Pipeline operators are required to create/maintain Company standards and avail them to individuals performing gas operations (CFR 192.13). GBE systems will provide a "Live-Link" to Company gas work methods, standards and procedures documents accessible on the field mobile device. Currently, access to gas work methods, standards and policies have been achieved through a combination of hardcopy materials made available to field employees creating challenges to ensure materials are updated in a timely manner and through the current field computers that experience frequent disruptions due to the age of the hardware and technology platform. National Grid's Gas Work Methods website is the electronic repository for all information (Codes, Standards, Work Methods, Procedures, Materials Management, Bulletins and Advisories). At the time of the first GBE solution release, "Live-Link" functionality will enable field employees to access online company work methods, standards and procedures utilizing the mobile device (iPad) that will be used to perform and complete the field work order. Similarly for supervisors and other management functions in the office, GBE solutions will have the capability to display combinations of task-specific standards, procedures and bulletins with a simple "click" of a button. GBE systems will be expanded to provide task customization based on the specific needs. Updates of the Company's codes and standards will be "pushed" system-wide to all users rather than the current method of either replacing hardcopy pages or manually performed individual electronic file replacement.
Subpart B - Materials (§§ 192.51 - 192.65)	192.51 Scope 192.53 General 192.55 Steel pipe 192.59 Plastic pipe 192.63 Marking of materials 192.65 Transportation of pipe	The GBE solution will use the supply chain management aspects of the enterprise asset and work management system for materials management, inventory control and shipping/receiving of piping and distribution system components. Bar-code scanning of plastic pipe and pipe fittings and the inclusion/documentation of detailed steel "mill-specifications" has become an important attribute of evolving pipeline safety compliance. Similarly, managing the inventory-levels of emergency stock has become an increasing important aspect of utility storm hardening and readiness. The GBE solution will deliver a higher level of accountability associated with the parts and components used in the completion of a field inspection, periodic maintenance task and customer and distribution system facility replacement or installation work orders.
Subpart C - Pipe Design (§§ 192.101 - 192.125)		N/A
Subpart D - Design of Pipeline Components (§§ 192.141 - 192.203)		N/A
Subpart E - Welding of Steel in Pipelines (§§ 192.221 - 192.245)	192.221 Scope 192.225 Welding procedures 192.227 Qualification of welders and welding operators 192.229 Limitations on welders and welding operators 192.231 Protection from weather 192.233 Miter joints 192.235 Preparation for welding 192.241 Inspection and test of welds 192.243 Nondestructive testing 192.245 Repair or removal of defects	The GBE solution will improve compliance with steel welding and plastic pipe joining tasks through the use of field mobility applications that link the personnel performing the task with the time, location, specific part or fitting, OQ Covered Task and the Company procedure. This represents and improvement in tracking and accountability from existing manual, hardcopy maps and records and work order record systems. Field technicians will be able to better document activities real-time in the field using the field mobility applications which will be integrated with the enterprise asset management platform. The GBE solution will deliver a more seamless method of documenting the details of field activities into a permanent asset record. The systems are being developed with a focus on accountability of plastic fusions and welds which improves compliance.
Subpart F - Joining of Materials Other Than by Welding (§§ 192.271 - 192.287)	192.281 Plastic pipe 192.283 Plastic pipe: Qualifying joining procedures 192.285 Plastic pipe: Qualifying persons to make joints 192.287 Plastic pipe: Inspection of joints.	
Subpart G - General Construction Requirements for Transmission Lines and Mains (§§ 192.301 - 192.328)		N/A
Subpart H - Customer Meters, Service Regulators, and Service Lines (§§ 192.351 - 192.385)	192.351 Scope 192.353 Meters & Regulators Location 192.357 Customer Meter Installation 192.359 Meter Operating Pressure	The existing Customer Information System systems (CIS) have relied on a combination of field and dispatch personnel to record time sensitive data fields such as arrival time, work started time, made-safe time and work completed time. The new Gas Business Enablement solutions such as Salesforce Field Service Lightning and Maximo have imbedded functionality that records and documents (i.e.: "time-stamping") for all field activities. No information technology (IT) system can completely resolve challenges associated with issues such as inclement weather and traffic which historically have been the root cause of multiple instances of non-compliance with response times. The imbedded functionality of both of new systems (Salesforce and Maximo) will deliver considerable improvements from the process utilizing existing systems in the areas of dispatching, field routing visualization, driving directions, "time-stamping", formulating and prioritizing the required completion dates for remediation work orders. In the area of leak investigation and reporting the new GBE solution will administer the end to end leak process which will improve compliance by way of an integrated solution.
Subpart I - Requirements for Corrosion Control (§§ 192.451 - 192.491)	192.451 Scope 192.453 General 192.455-7 External Corrosion Control 192.459 External corrosion control: Examination of buried pipeline when exposed 192.463 Cathodic Protection (192.465 Monitoring 192.467 Electrical Isolation	The GBE solution will deliver capabilities to allow corrosion field technicians performing cathodic protection inspections to input pipe-to-soil potential and CP-current readings directly into the field mobile application. The transformation of current day, hardcopy work orders and periodic maintenance records into an all-electronic format system represents a significant step in process efficiency. GBE Corrosion systems will have functionality that incorporates pass/fail identification criteria of cathodic protection electronic survey that will trigger remediation work order creation and automated re-testing. GBE system logic will incorporate the compliance scheduling required to schedule and implement monthly, annual and 10-year periodic testing required for compliance. Corrosion control field inspections of buried piping using mobile device will have the capability to link directly with the enterprise asset management system through GIS providing a more direct relationship to the specific asset record for use in the Company's integrity management system evaluation. The field mobile device facilitates electronic data capture and will allow attachment of photographs of piping which can be more effectively integrated with electronic work orders and asset records.

Subpart J - Test Requirements (§§ 192.501 - 192.517)	192.509 Test requirements for pipelines to operate below 100 p.s.i. 192.511 Test requirements for service lines. 192.513 Test requirements for plastic pipelines. 192.515 Environmental protection and safety requirements. 192.517 Records.	The GBE solution will generate work orders through the enterprise asset management system for the installation of new assets (i.e. mains, services and meters). Based on the type installation, a testing procedure will be included in the work plan of the installation work order. Similar to the details and specifications of the installation; the results of the pressure test will be electronically documented utilizing the field mobile application so that the test results will be linked to the facility asset record. New systems that are linked to the work order will provide improved traceability and field user accountability from existing hardcopy forms.
Subpart K - Uprating (§§ 192.551 - 192.557)	192.557 Uprating: Steel pipelines to a pressure that will produce a hoop stress less than 30 percent of SMYS: plastic, cast iron, and ductile iron pipelines.	
Subpart L - Operations (§§ 192.601 - 192.631)	192.601 Scope 192.603 General provisions 192.605 Procedural manual for operations maintenance, and emergencies 192.609 Change in class location: Required study 192.611 Change in class location: Confirmation or revision of maximum allowable operating pressure 192.613 Continuing surveillance 192.614 Damage prevention program 192.615 Emergency plans 192.616 Public awareness 192.617 Investigation of failures 192.619 Maximum allowable operating pressure: Steel or plastic pipelines 192.620 Alternative maximum allowable operating pressure for certain steel pipelines 192.621 Maximum allowable operating pressure: High-pressure distribution systems 192.623 Maximum and minimum allowable operating pressure; Low-pressure distribution systems 192.625 Odorization of gas 192.627 Tapping pipelines under pressure 192.629 Purging of pipelines 192.631 Control room management	A number of GBE solutions are universal to a majority of gas operations tasks applicable to CFR Subpart L: Operations. Field personnel performing a new installation, field inspection or periodic maintenance will execute various tasks using the field mobile application enabled on a mobile device. In each case an electronic work order will guide the execution tasks of field personnel through the particular process steps conducted in the field. The process steps in a work order, referred to as the "Work Plan" in the enterprise asset and work management platform can be tailored to support different circumstances and uses. This functional flexibility is valuable and will be applied to a variety of different gas operational tasks (examples: leak patrol, tapping and stop-off, purging, abandonment, valve operation, inspection and repair). GBE solutions will deliver value and process improvement to any situation where a pre-planned operational protocol supports field activities. The detailed work plan will be integrated to the enterprise asset and work management work order. In the field, the results of each step of a work procedure will be recorded and documented electronically and linked to the permanent records of the specific distribution system asset. GBE solutions will provide a "Live-Link" to the most updated version of the Company's gas work methods, standards and procedures documents accessible on the field mobile device (Standards, Work Methods, Procedures, Materials Management, Bulletins and Advisories – 192.605 compliance).
Subpart M - Maintenance (§§ 192.701 - 192.755)	192.739 Pressure limiting and regulating stations: Inspection and testing. 192.741 Pressure limiting and regulating stations: Telemetering or recording gauges. 192.743 Pressure limiting and regulating stations: Capacity of relief devices, 192.747 Valve maintenance: Distribution systems	The GBE solution will deliver field mobility capabilities in 2018 to the instrumentation and regulation (I&R) field technicians performing field inspections on district regulating stations and gate stations. Inspection data will be captured electronically in the field mobile application using a mobile device transforming what is currently a manual, paper-based process requiring manual processing of the field inspection information and data entry into various legacy systems. The new process represents a significant step in operational efficiency and data accuracy linked to the asset in the enterprise asset management system. GBE I&R sub-systems will have functionality that incorporates pass/fail identification criteria based on the compliance criteria (I&R for example, §192.739 Pressure limiting and regulating stations: Inspection and testing, §192.741 Pressure limiting and regulating stations: Telemetering or recording gauges, §192.743 Pressure limiting and regulating stations: Capacity of relief devices, §192.747 Valve maintenance: Distribution systems). The GBE solution will generate work orders through the enterprise asset management system for annual inspections, assets requiring remediation will auto-generate follow-up work orders based on the disposition of the inspection order along with automated re-testing as required. The asset management system will be configured to initiate work orders to schedule annual station overhaul, over-pressure protection testing and boot replacement required for compliance. I&R field technicians performing inspection and overhaul work on district regulator stations and gate stations using field mobile application will be integrated with the asset management system through GIS providing a more direct relationship to the specific asset record for use in the Company's integrity management system evaluation. The field mobile device facilitates electronic data capture and will allow attachment of photographs of piping which can be more effectively integrated with electronic work orders and asset records.
Subpart N - Qualification of Pipeline Personnel (§§ 192.801 - 192.809)	192.801 Scope 192.803 Definitions 192.805 Qualification Program 192.807 Recordkeeping 192.809 General	The Operator Qualification rule was adopted into the Code of Federal Regulations under Subpart N in 49 CFR Part 192 and Subpart G in 49 CFR Part 195. Under the rule, each pipeline operator is responsible for developing an OQ program, following their written OQ plan, establishing a covered task list applicable to their system, and defining the training and qualification requirements for personnel performing covered tasks on their pipeline facility. It is the operator's responsibility to ensure their contractors and vendors comply with their program requirements. The Gas Business Enablement solution will incorporate OQ compliance when dispatching work orders and required maintenance tasks. The following examples of GBE OQ functionality illustrate plans for both "Hard" and "Soft" logic built-in to dispatching logic: 1. "Hard" Dispatching Rule: Before dispatching a 2-person fitting crew to a leak investigation or meter-set Work Order the system functionality checks/verifies that each fitter processes the required OQ covered task certification otherwise dispatching is blocked to those personnel. 2. "Soft" Warning Message: When a 3-person construction crew is assigned to install a new plastic service a GBE system assignment rule verifies the targeted crew has the required qualified plastic pipe joining tasks otherwise a warning message alerts the Supervisor. The Salesforce, Field Service Scheduling and Dispatch application will be the GBE system used for scheduling and dispatching work orders and will be developed with improved OQ compliance from the existing practices.
Subpart O - Gas Transmission Pipeline Integrity Management (§§ 192.901 - 192.951)		GBE compliance similar to Distribution Integrity Management (below)

Subpart P - Gas Distribution Pipeline Integrity Management (IM) (§§ 192.1001-192.1015)	192.1001 Subpart Definitions 192.1003 Subpart scope 192.1005 What must a gas distribution operator do to implement this subpart 192.1007 Required elements of an integrity management plan 192.1009 Failure reporting 192.1011 Record keeping 192.1013 Operator deviations	There has been an increase in requirements and expectations within the regulated natural gas distribution and transmission industry since the 2010 San Bruno incident in the San Francisco area and events in Allentown, PA and East Harlem, NY. PHMSA's methodology for compliance inspections of pipeline operator's integrity management programs has evolved considerably as a result of major incidents during the last decade. State of art integrity management systems that are now available for pipeline operators' use in the industry employs analytic based risk-modeling that builds upon the asset management datum input of a natural gas distribution system. The Gas Business Enablement solution will deliver an enterprise asset management system that will be utilized to track the operation, maintenance and disposal of assets. The new asset management system enables a geographic information system (GIS) for gas operations. The GBE Program will migrate asset data from multiple existing dis-similar legacy systems that currently warehouse this information and unify it into an enterprise-wide new Maximo-based enterprise asset management system. This type of asset management platform facilitates the use of analytic based risk-modeling that provides more rigorous and meaningful pipeline system repair vs. replace decision and system planning strategies.
Appendix A to Part 192 [Reserved]		N/A
Appendix B to Part 192 - Qualification of Pipe		N/A
Appendix C to Part 192 - Qualification of Welders for Low Stress Level Pipe		N/A
Appendix D to Part 192 - Criteria for Cathodic Protection and Determination of Measurements	Criteria A 1-5 for steel structures	The GBE solution will have functionality that incorporates each of the five criteria for field evaluation of cathodic protection for steel structures. GBE mobile devices will be able to record instant-off readings and other testing protocols necessary for diagnostics when conventional electronic survey falls less than minimum CP levels. Identification criteria of cathodic protection electronic survey that will trigger remediation work order creation and automated re-testing. GBE system logic will incorporate the compliance scheduling required to schedule and implement monthly, annual and 10-year periodic testing required for compliance.
Appendix E to Part 192 - Guidance on Determining High Consequence Areas and on Carrying out Requirements in the Integrity Management Rule	192.903 High Consequence Area - Methods	The GBE solution will deliver an enterprise asset management system. The new asset management system enables a geographic information system (GIS) for gas operations. The GBE Program will migrate asset data from multiple existing dis-similar legacy systems that currently warehouse information and unify it into an enterprise-wide, new, Maximo-based asset management system. This type of asset management platform facilitates the use of analytic based risk-modeling that provides more rigorous and meaningful pipeline system replacement strategies.
220 Code of Massachusetts Regulations (CMR) 101.00 through 113.00		
220 CMR 100.00: Massachusetts gas distribution code		Similar to compliance of federal regulations, the GBE solution will combine asset and work management, field mobility, GIS capabilities in the area of inspection and maintenance of assets, construction of new assets including testing, leak management and repair, instrumentation and regulation and customer meter service (CMS) activities. Where CMS regulations require specific testing requirements or leak report records the GBE solution will be configured to that specific compliance achievement. Field technicians performing inspections or periodic maintenance will do so using the field mobile application on a mobile device. The transformation of current day operations that includes significant reliance on aging, disparate systems supported by manual, paper-based processes is necessary to drive operational efficiency and data accuracy linked to the asset in the enterprise asset management system. New systems that are linked to the work order will provide improved traceability and field user accountability from existing processes used today.
220 CMR 101.00: Massachusetts natural gas pipeline safety code	220 CMR 101.06(21)(a) and (b) Leak Survey Records 220 CMR 101.06(22) Test Requirements	
220 CMR 104.00: Petroleum gas plants		
220 CMR 107.00: Abandonment of gas service lines and leakage survey procedures		
220 CMR 108.00: Control of drug use		
220 CMR 109.00: Design, construction, operation & maintenance of intrastate pipelines operating in excess of 200 psig 13		
220 CMR 111.00: Construction of streets, places and ways, except residential driveways, over, along or across high pressure gas mains operating at pressures in excess of 200 psig		
220 CMR 112.00: Design, operation, maintenance and safety of liquefied natural gas (LNG) plants and facilities		
220 CMR 113.00: Operation, maintenance, replacement, and abandonment of cast-iron pipelines		
Codes, Standards and Other Documents Incorporated by Reference (IBR) to State and Federal Regulations		
Pipeline Research Council International (PRCI): (1) AGA Pipeline Research Committee, Project PR-3-805, "A Modified Criterion for Evaluating the Remaining Strength of Corroded Pipe," (December 22, 1989). The RSTRENG program may be used for calculating remaining strength	192.485(c); 192.933(a)(1); 192.933(d)(1)(i).	Expectation to utilize more advanced corrosion, pipe rehabilitation diagnostic tools with the development of analytic based risk-modeling in later stages of GBE systems.
American Petroleum Institute (API): (1) ANSI/API Specification 5L-ISO 3183 "Specification for Line Pipe" (44th edition, 2007), includes errata (January 2009) and addendum (February 2009)	192.55(e); 192.112; 192.113; Item I, Appendix B to Part 192.	GBE Supply Chain Management systems will use the supply chain management aspects of Maximo for materials management, inventory control and shipping/receiving of piping and distribution system components. Bar-code scanning of plastic pipe and pipe fittings and the inclusion/documentation of detailed steel "mill-specifications" has become an important attribute of evolving pipeline safety compliance.
(2) API Recommended Practice 5L1 "Recommended Practice for Railroad Transportation of Line Pipe," (6th Edition, July 2002)	192.65(a)(1).	
(3) API Recommended Practice 5LW, "Transportation of Line Pipe on Barges and Marine Vessels" (2nd edition, December 1996, effective March 1, 1997)	192.65(b).	
(4) ANSI/API Specification 6D, "Specification for Pipeline Valves" (23rd edition (April 2008, effective October 1, 2008) and errata 3 (includes 1 and 2, February 2009))	192.145(a).	
(5) API Recommended Practice 80, "Guidelines for the Definition of Onshore Gas Gathering Lines," (1st edition, April 2000)	192.8(a); 192.8(a)(1); 192.8(a)(2); 192.8(a)(3); 192.8(a)(4).	
(6) API Standard 1104, "Welding of Pipelines and Related Facilities" (20th edition, October 2005, errata/addendum, July 2007) and errata 2 (2008)	192.225; 192.227(a); 192.229(c)(1); 192.241(c); Item II, Appendix B.	
(7) API Recommended Practice 1162, "Public Awareness Programs for Pipeline Operators," (1st edition, December 2003)	192.616(a); 192.616(b); 192.616(c).	
(8) API Recommended Practice 1165 "Recommended Practice 1165 "Recommended Practice for Pipeline SCADA Displays," (API RP 1165) (First edition (January 2007))	192.631(c)(1).	

American Society for Testing and Materials (ASTM): (1) ASTM A53/A53M-07, "Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless" (September 1, 2007)	192.113; Item I, Appendix B to Part 192.	
(2) ASTM A106/A106M-08, "Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service" (July 15, 2008)	192.113; Item I, Appendix B to Part 192.	
(3) ASTM A333/A333M-05 (2005) "Standard Specification for Seamless and Welded Steel Pipe for Low-Temperature Service"	192.113; Item I, Appendix B to Part 192.	
(4) ASTM A372/A372M-03 (reapproved 2008), "Standard Specification for Carbon and Alloy Steel Forgings for Thin-Walled Pressure Vessels" (March 1, 2008)	192.177(b)(1).	
(5) ASTM A381-96 (reapproved 2005), "Standard Specification for Metal-Arc Welded Steel Pipe for Use With High-Pressure Transmission Systems" (October 1, 2005)	192.113; Item I, Appendix B to Part 192.	
(6) ASTM A578/A578M-96 (re-approved 2001) "Standard Specification for Straight-Beam Ultrasonic Examination of Plain and Clad Steel Plates for Special Applications."	192.112(c)(2)(iii).	
(7) ASTM A671-06, "Standard Specification for Electric-Fusion-Welded Steel Pipe for Atmospheric and Lower Temperatures" (May 1, 2006)	192.113; Item I, Appendix B to Part 192.	
(8) ASTM A672-08, "Standard Specification for Electric-Fusion-Welded Steel Pipe for High-Pressure Service at Moderate Temperatures" (May 1, 2008)	192.113; Item I, Appendix B to Part 192.	
(9) ASTM A691-98 (reapproved 2007), "Standard Specification for Carbon and Alloy Steel Pipe, Electric-Fusion-Welded for High-Pressure Service at High Temperatures" (November 1, 2007)	192.113; Item I, Appendix B to Part 192.	
(10) ASTM D638-03 "Standard Test Method for Tensile Properties of Plastics."	192.283(a)(3); 192.283(b)(1).	
(11) ASTM D2513-87 "Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings."	192.63(a)(1).	
(12) ASTM D2513-99 "Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings."	192.123(e)(2); 192.191(b); 192.281(b)(2); 192.283(a)(1)(i); Item I, Appendix B to Part 192.	
(13) ASTM D2517-00 "Standard Specification for Reinforced Epoxy Resin Gas Pressure Pipe and Fittings."	192.191(a); 192.281(d)(1); 192.283(a)(1)(ii); Item I, Appendix B to Part 192.	
(14) ASTM F1055-1998, "Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controller Polyethylene Pipe and Tubing."	192.283(a)(1)(iii).	
ASME International (ASME): (1) ASME/ANSI B16.1-2005, "Gray Iron Pipe Flanges and Flanged Fittings: (Classes 25, 125, and 250)" (August 31, 2006)	192.147(c).	
(2) ASME/ANSI B16.5-2003, "Pipe Flanges and Flanged Fittings." (October 2004)	192.147(a); 192.279.	
(3) ASME/ANSI B31G-1991 (Reaffirmed, 2004), "Manual for Determining the Remaining Strength of Corroded Pipelines."	192.485(c); 192.933(a).	
(4) ASME/ANSI B31.8-2007, "Gas Transmission and Distribution Piping Systems" (November 30, 2007)	192.619(a)(1)(i).	
(5) ASME/ANSI B31.8S-2004, "Supplement to B31.8 on Managing System Integrity of Gas Pipelines."	192.903(c); 192.907(b); 192.911 Introductory text; 192.911(i); 192.911(k); 192.911(l); 192.911(m); 192.913(a) Introductory text; 192.913(b)(1); 192.917(a) Introductory text; 192.917(b); 192.917(c); 192.917(e)(1); 192.917(e)(4); 192.921(a)(1); 192.923(b)(1); 192.923(b)(2); 192.923(b)(3); 192.925(b) Introductory text; 192.925(b)(1); 192.925(b)(2); 192.925(b)(3); 192.925(b)(4); 192.927(b); 192.927(c)(1)(i); 192.929(b)(1); 192.929(b)(2); 192.933(a); 192.933(d)(1); 192.933(d)(1)(i); 192.935(a); 192.935(b)(1)(iv); 192.937(c)(1); 192.939(a)(1)(i); 192.939(a)(1)(ii); 192.939(a)(3); 192.945(a).	
Code of Federal Regulations / Title 49 - Transportation / Vol. 3 / 2011-10-01407		
(6) 2007 ASME Boiler & Pressure Vessel Code, Section I, "Rules for Construction of Power Boilers 2007" (2007 edition, July 1, 2007)	192.153(b).	
(7) 2007 ASME Boiler & Pressure Vessel Code, Section VIII, Division 1, "Rules for Construction of Pressure Vessels 2" (2007 edition, July 1, 2007)	192.153(a); 192.153(b); 192.153(d); 192.165(b)(3).	
(8) 2007 ASME Boiler & Pressure Vessel Code, Section VIII, Division 2, "Alternative Rules, Rules for Construction of Pressure Vessels" (2007 edition, July 1, 2007)	192.153(b); 192.165(b)(3).	
(9) 2007 ASME Boiler & Pressure Vessel Code, Section IX, "Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators" (2007 edition, July 1, 2007)	192.227(a); Item II, Appendix B to Part 192.	
Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS): (1) MSS SP-44-2006, Standard Practice, "Steel Pipeline Flanges" (2006 edition)	192.147(a).	
National Fire Protection Association (NFPA): (1) NFPA 30 (2008 edition, August 15, 2007), "Flammable and Combustible Liquids Code" (2008 edition; approved August 15, 2007)	192.735(b).	

National Fire Protection Association (NFPA) 54/ANSI Z2231		This code provides minimum safety requirements for the design and installation of fuel gas piping systems in homes and other buildings. At this time it is not incorporated by reference (IBR) in Federal CFR but it is in varying degrees incorporated in State Building Code, Fire Code and Life Safety Regulations. This code has the most impact with the Customer Service Group specifically as it relates to customer-owned piping. Gas utilities turn-off gas supply when unsafe conditions exist or during periods when remedial repairs are made. This practice is known as "red-tagging" and typically occurs at a customer site involving customer-owned piping, appliances or equipment. Today's digital culture and the current state of technology motivate a reworking of the traditional hard-copy format of red tags. Customers, contractors and plumbers have suggested that employing new forms of communication such as email, texting would add value to the process. The GBE solution will deliver capabilities to communicate directly with customers via text, email or phone.
(2) NFPA 58 (2004), "Liquefied Petroleum Gas Code (LP-Gas Code)."	192.11(a); 192.11(b); 192.11(c).	
(3) NFPA 59 (2004), "Utility LP-Gas Plant Code."	192.11(a); 192.11(b); 192.11(c).	
(4) NFPA 70 (2008), "National Electrical Code" (NEC 2008) (Approved August 15, 2007)	192.163(e); 192.189(c).	
Plastics Pipe Institute, Inc. (PPI): (1) PPI TR-3/2008 HDB/HDS/PDB/SDB/MRS Policies (2008), "Policies and Procedures for Developing Hydrostatic Design Basis (HDB), Pressure Design Basis (PDB), Strength Design Basis (SDB), and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe" (May 2008)	192.121.	
NACE International (NACE): (1) NACE Standard SP0502-2008, Standard Practice, "Pipeline External Corrosion Direct Assessment Methodology" (reaffirmed March 20, 2008)	192.923(b)(1); 192.925(b) Introductory text; 192.925(b)(1); 192.925(b)(1)(ii); 192.925(b)(2) Introductory text; 192.925(b)(3) Introductory text; 192.925(b)(3)(ii); 192.925(b)(3)(iv); 192.925(b)(4) Introductory text; 192.925(b)(4)(ii); 192.931(d); 192.935(b)(1)(iv); 192.939(a)(2).	Expectation to utilize more advanced corrosion, pipe rehabilitation diagnostic tools with the development of analytic based risk-modeling in later delivery of the GBE roadmap.
Gas Technology Institute (GTI): (1) GRI 02/0057 (2002) "Internal Corrosion Direct Assessment of Gas Transmission Pipelines Methodology."	192.927(c)(2).	

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-10
March 12, 2018
H.O. Pieper
Page 1 of 2

Information Request AG-21-10

Request:

Referring to page 6 of Exhibit NG-GBE-1, where it states “However, at its heart, the GBE program is aimed at improving the customer experience...” Please provide a detailed explanation as to what specific aspects of the customer experience will be improved by the GBE program.

Response:

Today, our customers have limited ability to initiate or manage existing work requests. For example, National Grid must send letters via mail to customers notifying them of a required meter change or inspection at the premise. A customer is then required to call the call center to schedule the appointments. The available appointment windows often require a customer to wait for long periods of time for the technician to arrive and complete the work necessitating the customer take the day off from work to be available. This causes frustration and can result in poor customer satisfaction. National Grid’s customers have no ability to monitor the status of work or receive updates and notifications via their preferred communication channel (i.e. text, e-mail or phone) of which could alleviate some of that frustration of not knowing when a technician will arrive. Call center representatives have limited or no visibility to the locations of field crews to efficiently respond to customer inquiries. The customer call often results in a number of hand-offs within the business to address the question. This causes customer frustration and can result in multiple phone calls to the call center to resolve a request or inquiry.

Gas Business Enablement has put a focus on defining the desired future state customer experience and the Program is building the business processes and solutions around this future vision. To support customer requests and inquiries, the call center representative utilizing the new customer relationship management application will be able to view the location of field employees, provide information on the activities being performed and provide the status of the work. A history of customer interactions will be available, and the call center representative will have the ability to proactively communicate information, such as mandated inspections or meter changes, that would interest and/or concern customers. The call center representative will also have the ability to bundle multiple work requests together which will minimize the inconvenience we ask of customers for access to their premise to complete work. This all includes a greater ability to book appointments for work, as appointment availability is linked directly to resource capacity and a scheduling engine compared to the manual process used today.

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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-10
March 12, 2018
H.O. Pieper
Page 2 of 2

Gas Business Enablement will also be delivering our customers self-service capabilities that will provide them with the ability via web and mobile to find more information without the need to call the call centers. This will allow customers to manage work requests with the ability to view, schedule and/or change their appointments and receive confirmations, reminders and status updates via their preferred channel. Customers will also have the ability to manage the frequency and manner in which we communicate with them about field activities such as customer-driven work requests and maintenance work via their preferred channel. This will help customers understand the status of work and be aware of unforeseen delays but will also provide them with enhanced security as they will be provided with the name(s) of the technician(s) attending to the work.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-11
March 12, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-11

Request:

Referring to page 6 of Exhibit NG-GBE-1, please define “relatively high customer expectations” and provide a list of the products and services that customers expect and that “today’s operating processes” are unable to provide.

Response:

Today’s customers want easy access to information with the ability to initiate, schedule and manage requests and interact with National Grid via their preferred communication channel (i.e. text, email or phone). The advance of technology and mobile platforms in other customer focused businesses have established a minimum threshold for customer expectations or ease in which the customer interacts with a business. Businesses such as Amazon have delivered successfully in this space and in many ways, have set the bar for how customer facing businesses need to adapt to customer needs.

As the Gas Business Enablement solution is developed, National Grid will deliver an enhanced customer experience through the deployment of new capabilities that customers do not currently have available today. This includes:

- Self-service ability through web or mobile application to find more information about field activities without the need to call the call centers.
- Flexibility to manage work requests with the ability to schedule and/or change their appointments through the call center or directly through the web or mobile applications.
- Self-service capability through web or mobile application to see status of gas construction and/or maintenance work in their area and receive updates on the status of the work.
- Deployment of the enterprise asset and work management system will allow the ability to bundle work together at a premise and avoid multiple visits to the same property to complete different tasks.
- Deployment of the customer relationship management system will allow the ability to communicate status of work and receive appointment reminders/confirmation via the customer’s preferred channels (i.e. email, text, or phone).
- The potential for more appointment windows through the enhanced scheduling platform, saving customer’s time waiting for National Grid.

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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-12
March 15, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-12

Request:

Referring to page 6 of Exhibit NG-GBE-1, please provide a complete and detailed explanation of how the GBE Program will make the Companies' distribution service to its customers more "cost-effective." Please provide a complete and detailed explanation of your answer to this request, along with the workpapers, calculations, formulas, assumptions, and other documents that support the answer.

Response:

The primary driver for the GBE Program is the need to eliminate the unsustainable level of operational risk associated with continued reliance on existing systems and the manual paper-based processes in place today where the system does not fully support the current business processes (i.e. manual data validation, work order tracking and status reporting). There is a strong likelihood that more frequent system failures will occur while in service and even worse the system failure is unrecoverable. The result of which the Company would then need to manage critical gas safety functions and work activities through business continuity plans thereby running on additional manual processes that will require additional resources to support. The result of which, the processes will be more prone to human error, will reduce reporting visibility and present challenges to manage safety, business performance, regulatory compliance and data requests ultimately driving higher cost to customers.

The GBE Program will be built on a modern platform that enables improvements in gas safety and compliance, customer satisfaction and will drive operational effectiveness. The benefits of seamlessly integrated systems, a reduced reliance on paper-based operations, and the use of mobile devices as a primary tool for front-line employees will help enhance the effectiveness and efficiency of the Company's operations. Translated to the customer, this means that customers benefit from easier interactions with National Grid. Expanded and enhanced self-service capabilities will allow customers to book their own appointments and receive confirmations and updates via their preferred channel. This minimizes the time a customer will need to wait for an appointment and will allow the business to optimize the appointment scheduling windows to better serve the customer. The GBE Business Case supports the delivery of these benefits.

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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-13
March 15, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-13

Request:

Referring to page 7 of Exhibit NG-GBE-1, please provide a complete and detailed explanation (including itemization of each and every incurred and anticipated cost for the GBE Program) of how National Grid calculated the anticipated cost of the GBE Program to be \$478.3 million dollars. Please provide a complete and detailed explanation of your answer to this request, along with the workpapers, calculations, formulas, assumptions, and other documents that support that calculation.

Response:

Please see Attachment AG-21-13-1 CONFIDENTIAL page one, for the total projected expenditures by fiscal year for FY17-23 by work stream and cost type. The section under the heading "TOTEX by Work Stream (Roll Up)" presents a fiscal year total by work stream. The section under the heading "TOTEX by Work Stream by Cost Type (Roll Up)" presents a further work stream breakdown by cost type.

Page two of the attachment reflects the same information for forecasted capital expenditures by fiscal year for FY17-23.

Page three of the attachment reflects the same information for forecasted operation and maintenance expenditures by fiscal year for FY17-23.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-14
March 15, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-14

Request:

Please refer to page 7 of Exh. NG-GBE-1. Please also refer to the New York Public Service Commission, Case 17-G-0239 – Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Niagara Mohawk Power Corporation d/b/a National Grid for Gas Service. The Company and a number of other parties filed a Joint Proposal on January 19, 2018 to resolve, or establish a framework for resolving, all issues raised in the electric and gas rate cases filed by the Company. Page 45 of the Joint Proposal states that the GBE Program will cost \$458.1 million. Please explain the discrepancy between the \$458.1 million number provided in the NY PSC matter with the \$478.3 million number provided on page 7 of Exh. NG-GBE-1 and the Company’s response to DPU-NG-1-10.

Response:

The difference between the figure of \$458.1 million referenced in the Joint Proposal, at page 45, and the figure of \$478.3 million shown in Exhibit NG-GBE-1, at 7 is a total of \$20.2 million representing the FY 2017 actual operating and maintenance expense. The amount of \$20.2 million was expended on preparation of the project roadmap, high-level design and development of the business justification and benefits analysis for project implementation.

The settlement entered into by Niagara Mohawk would resolve its pending rate case and provides recovery of the full amount of Gas Business Enablement program costs that were requested, including non-recurring expense and capital cost, subject to a timing adjustment in the rate plan period due to the spending profile in New York. The settlement also includes recovery of incremental annual, “run-the-business costs” for each of the three future rate years FY19, FY20 and FY21.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-15
March 15, 2018
H.O. Pieper
Page 1 of 2

Information Request AG-21-15

Request:

Referring to page 7 of Exhibit NG-GBE-1, please provide a complete and detailed explanation of how National Grid calculated or otherwise determined that the “incremental annual cost” of the GBE Program “will be commensurate with the value gained by customers in relation to gas safety, reliability and efficiency.” Please provide a complete and detailed explanation of your answer to this request, along with the workpapers, calculations, formulas, assumptions, and other documents that support that calculation or determination.

Response:

Many of the systems to be replaced and modernized as part of Gas Business Enablement are critical to support the safe delivery of service to customers and continuously improve the Company’s gas pipeline safety and compliance. The Program addresses the current operational risk in the business with aged, unsupported systems that the Company relies on to manage our operations today. The program justification was based on a combination of the need for asset replacement and risk reduction along with a range of anticipated benefits that will be realized with the implementation of a modern, supported technology solution that will drive continuous improvement in gas safety performance, deliver an expanding and increasingly complex capital investment program with greater efficiency, and meet evolving customer expectations, including the increased demand for new customer connections.

Gas Safety & Compliance benefits will be driven by having enterprise asset management and work management systems that will enable enhanced decision making and prioritization for investments and resource allocation. The modern systems will also make it easier for field employees to access safety critical information including relevant work procedures and maps.

Customer benefits will include the call center having greater visibility of work in the field to address customer concerns, providing customers with digital channels to book and amend appointments and greater visibility of the work that National Grid is completing for them, giving customers more choice and saving them time.

The \$127 million Massachusetts component of the Gas Business Enablement estimated expenditures are allocated using three allocators under the guidelines of the National Grid USA Cost Allocation Manual, a copy of which was provided as Attachment PUC 1-76-2 with the Company’s response to PUC 1-76. The costs associated with the majority of the Gas Business Enablement Program workstreams will be allocated based on allocator C-210 (see Attachment PUC 1-76-2, Page 20 of 282), which allocates to All US Gas Distribution

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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-15
March 15, 2018
H.O. Pieper
Page 2 of 2

Companies based on the number of customers, because only gas companies will benefit from these work streams.

The costs associated with the Scheduling, Dispatch, Mobility, and Customer Engagement work streams are allocated based on allocator C-175, which allocates to All US Electric and Gas Distribution Companies based on the number of customers (see Attachment PUC 1-76-2, Page 18 of 282), because both gas and electric distribution companies will benefit from these work streams.

The PowerPlan Enhancement work stream is allocated based on allocator G-012 (see Attachment PUC 1-76-2, Pages 41-42 of 282), which allocates to All Companies based on a 3-point allocator for Net Margins, Net Plant, and Net O&M Expenses. This is consistent with previous PowerPlan projects.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-16
March 12, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-16

Request:

Referring to page 8 of Exhibit NG-GBE-1, please resubmit the incremental annual expense chart to include fiscal years 2022 and 2023. Please provide a complete and detailed explanation of your answer to this request, along with the workpapers, calculations, formulas, assumptions, and other documents that support the answer.

Response:

Please refer to the table below for updated incremental annual expense chart which includes fiscal years 2022 and 2023. For detailed support to the numbers provided please refer to Attachments DPU-NG-1-12-1, and DPU-NG-1-13-1.

Fiscal Period	Capital Costs	O&M	Total
FY 2017		5,123,646	5,123,646
FY 2018	8,245	3,502,494	3,510,739
FY 2019	2,324,709	12,687,048	15,011,757
FY 2020	8,600,442	6,926,310	15,526,752
FY 2021	9,965,549	2,942,636	12,908,185
FY 2022	10,865,272	824,245	11,689,517
FY 2023	10,193,794	864,408	11,058,202
Total	41,958,011	32,870,787	74,828,798

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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-17
March 12, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-17

Request:

Referring to page 9 of Exhibit NG-GBE-1, please list each and every “direct and tangible benefit to customers” that the GBE Program provides. To the extent any of these benefits involve calculated values, please provide a complete and detailed explanation of your answer to this request, along with the workpapers, calculations, formulas, assumptions, and other documents that support those calculations.

Response:

The GBE Program will deliver a number of direct and tangible benefits to customers, which are not susceptible to quantification, but that will provide value to customers, including:

- increased information available to customers from the call centers, as call center representatives have more information on field activities available to them such as the status of customer-driven work requests or the locations of field crews;
- ability to find more information without the need to call the call centers through self-service routes, which enable quick and convenient provision of information, as the website and customer applications have enhanced functionality linked through to the delivery of work;
- a greater ability to book appointments for work, as appointment availability is linked directly to resource capacity and a scheduling engine compared to the manual process today;
- the flexibility to manage those appointments either through the call center or directly through self-service channels, and as the appointments are linked to actual availability, it will be much easier to re-schedule appointments real-time;
- improved notifications from National Grid on work that is being completed, including providing the name(s) of the technician(s) attending to the work. This will help customers understand the status of work, especially if there is an unforeseen delay, but will also provide them with enhanced security as they will know who to be expecting from National Grid; and
- potential for more appointment windows and over time, reduced appointment windows through the enhanced scheduling platform, saving customers time waiting for National Grid.

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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-18
March 15, 2018
H.O. Pieper
Page 1 of 2

Information Request AG-21-18

Request:

Referring to the response to DPU-NG-1-3, please identify which specific current systems, sub-systems, and applications are “difficult for employees to navigate,” and provide a unique explanation for each system, sub-system, or application as to why it is “difficult for employees to navigate.”

Response:

As described in response to Information Request DPU-NG-1-13, the systems listed in the table below are currently utilized, but have little or no vendor support and/or are difficult for system users to navigate *in relation to the end-to-end business process*. The age of the systems, which were implemented at different times, and the lack of integration among the systems, causes users to need to access multiple systems to accomplish a single end-to-end process. This causes frustration for system users and is prone to data inaccuracies.

Work Management Systems

Name	Disposition
AVLS BO MWork CAD History Construction DB Crystal Reports CWQ DigiPen Excel iScheduler Leak Survey DB Maximo MDSI Advantex Microstrategy MWork Palm Pilot System	<ul style="list-style-type: none"> • Lack of intuitive user interface and no guided workflow requiring users to memorize or refer to their procedures to find specific information locations. • Lack of integration across Work Management systems necessitating the need for business processes that rely heavily on customized spreadsheets and databases to fill a functional gap in the system. Users are required to complete data entry manually, sometimes across multiple systems. • Additional data management, including manual scrubbing and validation of data to ensure accuracy in reporting. • Systems based on older technology platforms without intuitive user interface requiring additional effort to learn the systems. • Limited data validation in systems requiring manual verification of information. • Limited built-in reporting functionality requiring need for data extracts and use of reporting tools to compile data and develop reports requiring significant manual intervention with the data. • Repetitive, manual data entry across multiple systems.

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Asset Management Systems

Name	Disposition
Adobe Pro CHI CorTalk FORTIS LMS NE MapFrame MITS PCS Pictometry SPIPE	<ul style="list-style-type: none"> • Mainframe system (SPIPE) lacking modern user interface. • Lack of intuitive user interface and no guided workflow so users need to memorize or refer to their procedures to find specific information locations. • Inconsistent data quality requiring manual scrubbing to ensure reporting accuracy. • Lack of controls and validation for data inputs. • Repetitive, manual data entry across multiple systems.

Customer Systems

Name	Disposition
CRIS CSS WGA	<ul style="list-style-type: none"> • Mainframe systems (CRIS & CSS) lacking modern user interface. • Lack of intuitive user interface and no guided workflow so users need to memorize or refer to their procedures to find specific information locations. • Navigation required by user through multiple screens to enter and confirm information. • Repetitive, manual data entry across multiple systems. • Information is located in multiple places requiring users to leverage multiple screens and toggle to many locations. • Due to the age of the systems, most information is updated in nightly batch uploads from other systems, resulting in users being unsure of the information requiring validation of what the systems are telling them. • WGA is not part of an interface to resource capacity/availability to correctly show how much work can be done on a specific day. In order to keep that updated it would require multiple daily, manual updates.

Information Request AG-21-19

Request:

Referring to the response to DPU-NG-1-3, please identify which specific current systems, sub-systems, and applications are “no longer supported by vendors,” and provide a unique explanation for each system, sub-system, and application as to why it is “no longer supported.” (For example, explain whether the vendor no longer exists, whether the vendor does not provide customer support when issues arise, whether the vendor no longer updates the system, sub-system, or applications such that the system, sub-system, or application is or will imminently be incompatible with other software, etc.)

Response:

Name	Disposition
AVLS BO MWork CGI Calibration CHI CorTalk CRIS Crystal Reports CSS DigiPen FORTIS iScheduler MapFrame Maximo MDSI Microstrategy MITS MWork Palm Pilot System Pictometry WGA	Version of software used by National Grid is no longer supported and no longer receiving functional or cyber security updates.
Adobe Pro Excel	National Grid created business processes that rely heavily on customized spreadsheets and application extensions, often to fill a functional gap that exists elsewhere in an unsupported system. Upon replacement of the primary unsupported system, a logical step is to replace these homegrown processes.

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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-19
March 15, 2018
H.O. Pieper
Page 2 of 2

CAD History Construction DB CWQ Leak Survey DB LMS NE PCS SPIPE	National Grid created application running on unsupported software
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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-20
March 15, 2018
H.O. Pieper
Page 1 of 2

Information Request AG-21-20

Request:

Referring to page 10 of Exhibit NG-GBE-1, please identify which specific current systems, sub-systems, and applications are “unsuitable to support gas operations into the future,” and provide a unique explanation for each system, sub-system, and application as to why it is “unsuitable to support gas operations into the future.”

Response:

There are multiple dimensions to this question.

At a “per system” level, please refer to the response to Information Request AG 21-19, which provides the disposition of each system used by the Massachusetts gas business having no vendor support. Systems that have no vendor support do not receive updates or upgrades. This can create a functional gap, such as not supporting updates to business facing capabilities or technical capabilities that enable the system’s use within a business process. Also, out-of-support applications do not receive updates to fix cyber security vulnerabilities, which is a major concern.

However, systems are rarely used in isolation. To gauge suitability for a system to support gas operations, one has to look at the end-to-end business processes used to conduct operations. End-to-end business processes span multiple systems from the start to completion of the business process.

Consider the following end-to-end business process:

- An Asset Management capability is used to define job plans for maintenance work on an asset.
- An Asset Management capability requests a work order for a particular asset based on scheduling rules, creating a work order.
- A Work Management capability schedules the work order to a crew who has capacity and qualifications to do the work.
- The crew performs the work, capturing required data into a Work Management capability.
- An Asset Management capability records the captured work order data as part of the asset history.
- The work order is closed.

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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-20
March 15, 2018
H.O. Pieper
Page 2 of 2

- A Data Management capability leverages the asset history for regulatory compliance reporting.

Please refer to the response to Information Request AG 21-7 (systems used by gas operations across all jurisdictions) and Information Request AG 21-8 (systems used by gas operations within MA). Since current gas operations relies on several different combinations of systems performing equivalent functions, the routing of the data and business process can take several different paths through the list of systems provided in responses to Information Requests AG 21-7 and 21-8, based on where the work is taking place and the work type. This means that the gas operations work force must navigate a complex web of several combinations of legacy systems, depending on the task at hand, creating opportunity for user error, data error, and process compliance variances. Additionally, the variation of systems within the portfolio creates an elevated cyber security risk because each system requires maintenance, upgrades, security monitoring, and creates a larger “attack surface” for cyber security attack.

As a result, the current bundle of systems, which are used together in the context of end-to-end business processes, are unsuitable to conduct future business operations.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-21
March 15, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-21

Request:

Referring to page 12 of Exhibit NG-GBE-1, please identify which specific current programs, applications, systems, processes, and other tools are “inefficient,” and provide a complete and detailed explanation of how any such inefficiencies will be remediated by the GBE Program.

Response:

Please see the response to Information Request AG 21-20 for a detailed explanation.

The original testimony refers to “core capabilities” of Asset Management, Work Management, and Customer Engagement. In the current state of systems, there are redundant and/or disconnected systems filling portions of each core capability. However, depending on work type and location of work type, the combination of systems to achieve an end-to-end process will vary. For the end user in gas operations, this creates a confusing and error prone mix of processes and systems that are difficult to maintain let alone enhance to meet evolving business, regulatory, and security needs. It is in this sense that the current portfolio of systems is inefficient.

With the delivery of the Gas Business Enablement Program, the portfolio will be vastly simplified:

- All Asset Management data and business process will reside in IBM Maximo, with integration to Esri for spatial functions.
- All Work Management / Work Planning data and business processes will reside in IBM Maximo.
- All Work Management / Schedule, Dispatch, and Mobility data and business process will reside in Salesforce.
- All Customer Engagement data and business process will also reside in Salesforce, with synergies for customer experience when the field crews have access to customer data and customer engagement functionality within the shared Salesforce platform.

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Boston Gas Company and Colonial Gas Company
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D.P.U. 17-170
Information Request AG-21-22
March 22, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-22

Request:

Referring to page 12 of Exhibit NG-GBE-1, please provide the following data for each month of the years 2013, 2014, 2015, 2016, and 2017 regarding the Companies' compliance with the four-hour appointment window mandate:

- a. the number of appointments for which each Company succeeded in meeting the four-hour appointment window;
- b. the number of appointments for which each Company failed to meet the four-hour appointment window; and,
- c. the average amount of time outside of the four-hour appointment window it took for the Company to make the customer appointment, when the Company failed to meet the four-hour appointment window.

Response:

Please see Attachment AG-21-22-1. Prior to mid-2015, the Company did not typically offer 4-hour appointment windows. In total for both 2013 and 2014, there were less than thirty four hour appointments and therefore this data has been excluded for this information request. The Company began offering 4-hour appointment windows in 2015 in anticipation of the Department's order to standardize to a four hour appointment window for National Grid's customers.

Please note that in lieu of a 4-hour appointment window, the customer may choose an all-day appointment window. All-day appointment windows are not included in the data for items a, b, and c.

If a missed appointment is cancelled and rescheduled as a different job order at a later date agreed to with the customer, the data for that missed appointment is not included in the average time data for item c. Variability in the average time data for item c, particularly when only a few missed appointments existed for that timeframe and affiliate, are driven by those appointments that were not cancelled and replaced, but were instead completed on the original job order at a later date.

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The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-65
Page 1 of 1

Boston Gas Company
and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-22-1
Page 1 of 1

2015

4 hour window KEPT	4 hour window MISSED	Business Unit (Owning)	Order Completed Month	Average Minutes to Complete After Missed Window
6775	501	Boston	Dec-2015	180
1887	92	Colonial	Dec-2015	285
1032	135	Boston	Nov-2015	143
131	9	Colonial	Nov-2015	540
254	29	Boston	Oct-2015	566
1	0	Colonial	Oct-2015	0
163	17	Boston	Sep-2015	432
0	1	Colonial	Sep-2015	0
468	39	Boston	Aug-2015	5860
1	0	Colonial	Aug-2015	0
331	33	Boston	Jul-2015	1326
9	0	Colonial	Jul-2015	0
11	2	Boston	Jun-2015	14
4	0	Colonial	Jun-2015	0
0	0	Boston	May-2015	0
0	0	Colonial	May-2015	0
0	0	Boston	Apr-2015	0
1	0	Colonial	Apr-2015	0
0	0	Boston	Mar-2015	0
0	0	Colonial	Mar-2015	0
0	0	Boston	Feb-2015	0
0	0	Colonial	Feb-2015	0
0	0	Boston	Jan-2015	0
0	0	Colonial	Jan-2015	0
9034	756	Boston	Total 2015	236
2034	102	Colonial	Total 2015	264

2016

4 hour window KEPT	4 hour window MISSED	Business Unit (Owning)	Order Completed Month	Average Minutes to Complete After Missed Window
9181	738	Boston	Dec-2016	828
2466	132	Colonial	Dec-2016	140
7698	571	Boston	Nov-2016	148
3127	87	Colonial	Nov-2016	73
6668	877	Boston	Oct-2016	272
2841	137	Colonial	Oct-2016	2231
7298	413	Boston	Sep-2016	490
2694	97	Colonial	Sep-2016	76
7880	441	Boston	Aug-2016	517
3260	160	Colonial	Aug-2016	251
6073	301	Boston	Jul-2016	152
1965	67	Colonial	Jul-2016	67
10396	557	Boston	Jun-2016	360
3057	126	Colonial	Jun-2016	186
10322	604	Boston	May-2016	271
2811	175	Colonial	May-2016	390
10847	584	Boston	Apr-2016	133
2684	140	Colonial	Apr-2016	438
8535	380	Boston	Mar-2016	264
2940	64	Colonial	Mar-2016	96
7128	490	Boston	Feb-2016	237
1829	91	Colonial	Feb-2016	106
7558	468	Boston	Jan-2016	232
2040	80	Colonial	Jan-2016	94
99584	6424	Boston	Total 2016	314
31714	1356	Colonial	Total 2016	337

2017

4 hour window KEPT	4 hour window MISSED	Business Unit (Owning)	Order Completed Month	Average Minutes to Complete After Missed Window
12503	374	Boston	Dec-2017	184
2619	35	Colonial	Dec-2017	3613
11181	226	Boston	Nov-2017	85
2595	34	Colonial	Nov-2017	56
2338	84	Boston	Oct-2017	119
609	8	Colonial	Oct-2017	128
6347	343	Boston	Sep-2017	531
1477	36	Colonial	Sep-2017	542
9824	591	Boston	Aug-2017	156
2889	78	Colonial	Aug-2017	80
8226	610	Boston	Jul-2017	2278
2702	87	Colonial	Jul-2017	83
8765	509	Boston	Jun-2017	115
3158	127	Colonial	Jun-2017	80
8740	512	Boston	May-2017	160
3269	116	Colonial	May-2017	465
9211	594	Boston	Apr-2017	329
2983	97	Colonial	Apr-2017	260
11360	507	Boston	Mar-2017	224
2863	46	Colonial	Mar-2017	414
9251	487	Boston	Feb-2017	140
2627	54	Colonial	Feb-2017	99
9961	525	Boston	Jan-2017	135
3144	64	Colonial	Jan-2017	122
107707	5362	Boston	Total 2017	419
30935	782	Colonial	Total 2017	348

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-23
March 15, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-23

Request:

Referring to pages 12 and 13 of Exhibit NG-GBE-1, please identify, describe, and explain the “risk” that National Grid claims is “involved in continuing to rely on the current processes and sub-systems to support safe and reliable operations while meeting customer expectations.”

Response:

The primary risk for National Grid is that if the current processes and subsystems are not replaced they will ultimately fail while in service. Vendor support is non-existent and there is limited knowledge within the business or externally in the industry to diagnose and repair the underlying code on which these systems were developed. This will then require National Grid to manage critical gas safety functions and work activities through business continuity plans, thereby running on manual processes that will require additional resources to support. The result of that will be that the processes will be more prone to human error, will reduce reporting visibility and present challenges to manage safety, business performance, regulatory compliance and data requests. The failed systems will need to be replaced with urgency, which will result in less planning and forethought in relation to solutions, meaning that the opportunity to develop an integrated platform that supports a broader range of business and customer benefits would be lost. This outcome will likely be delivered at a higher cost.

The consequential risk is that due to systems being unavailable, there is a risk that critical asset information will not be available to an employee, which could result in that employee not taking action to reduce risk of a gas safety incident. For example, the field employee is unable to access maps or asset as built records to locate a main, service or a valve to make a situation safe.

National Grid’s ability to continue to successfully deliver the growing capital program may be compromised and meeting demand for new customer connections will be at risk. Planning and scheduling resources, managing internal and external construction resources and meeting customer commitment dates will be challenging.

Additionally, National Grid’s customers may further be impacted due to system unavailability making it much more difficult, if not impossible, to support customer appointments and provide customers with relevant information when they contact the call center.

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Information Request AG-21-24

Request:

Referring to pages 13 and 14 of Exhibit NG-GBE-1, please identify and provide copies of any studies, surveys, or other research on which the GBE Panel relies in representing to the Department the following:

- a. “The electric and gas distribution industries are experiencing pressure to meet customer expectations that are being formed by customer experiences with other goods and services vendors increasingly supported by digital technology allowing for quick and easy customer-service interfaces, among other advancements.”
- b. “[M]any of the Company’s customers transact business with other vendors that offer customer-service features such as the ability for customers to choose their communication preference with the vendor[.]”
- c. “Customers frequently have the option with other vendors to make and/or reschedule service appointments by taking a few moments to log in online through a mobile device and choose another time for the appointment, without ever having to interact on a personal basis with the vendor’s customer-service department.”
- d. “Customers expect to have the same level of ease and convenience with their gas or electric utility as they do with other household vendors.”

Response:

National Grid has emphasized the importance of delivering benefits to the customer through the Gas Business Enablement (“GBE”) Program and other programs and initiatives the Company is pursuing. National Grid will be delivering new and enhanced capabilities to customers through mobile and web channels. These enhanced capabilities are consistent with experiences customers are now accustomed to in other markets and industries and expect as a customer of National Grid. The Company has partnered with leading industry experts to develop the scope of the GBE solution to deliver customer capabilities based on feedback and customer preferences. Please refer below and to the attached studies, surveys and publications that have been leveraged as a framework for the delivery of customer interactions and capabilities.

1. Attachment AG 21-24-1: Accenture’s New Energy Consumer research annual publication. <https://www.accenture.com/us-en/insight-utilities-new-energy-consumer-2017>.

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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-24
March 15, 2018
H.O. Pieper
Page 2 of 2

2. Attachment AG 21-24-2: Harvard Business Review January - February 2017, Kick-Ass Customer Service, Authored by Matthew Dixon, Lara Ponomareff, Scott Turner and Rick DeLisi. <https://hbr.org/2017/01/kick-ass-customer-service>
3. Attachment AG 21-24-3: Forrester's Top Trends for Customer Service in 2016, Authored By Kate Leggett. https://go.forrester.com/blogs/16-01-06-forresters_top_trends_for_customer_service_in_2016/
4. Attachment AG 21-24-4: Harvard Business Review, July – August 2010, Stop Trying to Delight Your Customers, Authored by Matthew Dixon, Karen Freeman and Nicholas Toman. <https://hbr.org/2010/07/stop-trying-to-delight-your-customers>
5. Attachment AG 21-24-5: 2017 Field Service USA Report, How Connecting Satisfaction with Next Generation Field Service Technologies.
6. Attachment AG 21-24-6: Gas Business Enablement Customer Engagement Current State Assessment, Authored by Accenture and National Grid

accentureconsulting



NEW ENERGY CONSUMER

NEW PATHS TO
OPERATING AGILITY

CONTENTS

INTRODUCTION	3
PEOPLE AT THE WHEEL	7
PUTTING DIGITAL TO WORK	19
TALENT TRANSFORMED	20
DIGITAL DECONSTRUCTED	24
FIND FRIENDS	28
TRACKING TRANSFORMATION	32
MOVE AHEAD WITH NO REGRETS	37
THE NEW ENERGY CONSUMER RESEARCH	39

VOLATILE MARKETS, CHANGING REGULATORY FRAMEWORKS AND GREATER CONSUMER ENGAGEMENT ARE SHAPING AN INCREASINGLY COMPLEX ENERGY ECOSYSTEM.

The terrain is challenging. But it's also full of opportunities for growth through new markets, new ventures and new value creation. These shifts are nothing new—Accenture has said all this before. But what has changed now is that the utilities industry is reaching a point of no return.

Long-standing business models are being actively disrupted. Solar, storage, microgrids and other distributed energy resources (DERs) are combining with the rapidly falling costs of disruptive technology, the proliferation of automation and artificial intelligence, and the increased adoption of energy-efficiency products and services. At the same time, consumer expectations are now liquid, flowing from one experience to the next and challenging energy providers to keep pace with standards set in other industries. In this era of the digitalization of everything, and of hyper-relevant personalization, a relentless obsession with customers is no longer an option. It's a must.

In the face of these game-changing shifts, successful energy providers are pivoting to a new decentralized,

decarbonized and digital world. They are developing future-forward strategies and building new capabilities that enable them to seize opportunities and scale quickly. In the previous report, *New Energy Consumer: Thriving in the Energy Ecosystem*, Accenture identified four consumer trends: instant everything, hyper relevant, meaningful experiences and collective consumption. Through our research program, we have continued to track these trends under the ongoing influence of disruptive digital technologies and the market realities of the new energy ecosystem. To offer a forward-looking view of the implications for customer operating models, the trends focus on the latest customer attitudes and behaviors. Our "May the bots be with you" report captures, for example, the way robotic process automation and artificial intelligence are facilitating new consumer insights, customer engagement personalization and are taking "instant everything" to a new level (see Figure 1).

Over the past eight years, Accenture has collected energy consumer insights from questionnaire-led interviews with more than 80,000 consumers around the world. Our goal: to help energy providers understand emerging needs and preferences, identify new challenges and opportunities, and bring focus to the competencies essential for success in the changing energy marketplace.

FIGURE 1. CHANGING CONSUMER BEHAVIORS AND PREFERENCES ARE IMPACTING ENERGY PROVIDERS AND DRIVING THEIR DIGITAL OPERATING MODELS FORWARD.



TOTALLY DIGITAL? MAYBE NOT

When it comes to digital, there is a wide spectrum of possible engagements, with digital active users at one end and the unengaged status quo at the other. To date, most energy providers have led with a technology approach to digital, leading to disappointed customers and providers. It's time to rethink that approach.



THIS TIME IT GETS PERSONAL

The way to keep consumers engaged, loyal and satisfied is through relationships that are meaningful and individualized – moving from touchpoints to trustpoints. Successful energy providers are offering personalized experiences and relevant products and services, where and when customers want them.



MAY THE BOTS BE WITH YOU

Providers are no longer on their own in the quest to keep pace with consumers' "instant everything" expectations. Artificial intelligence is quickly changing the customer service paradigm. Now is the time to make investments and use bots to delight customers—and deliver against key goals.



PARTNER OR PERISH

Energy providers are on the edge of a major shift from commodity provider to orchestrator of an innovative, fluid ecosystem. The winners will form diverse partnerships, collaborations and alliances to spur innovation, drive product and service development, accelerate culture change and capture new opportunities.

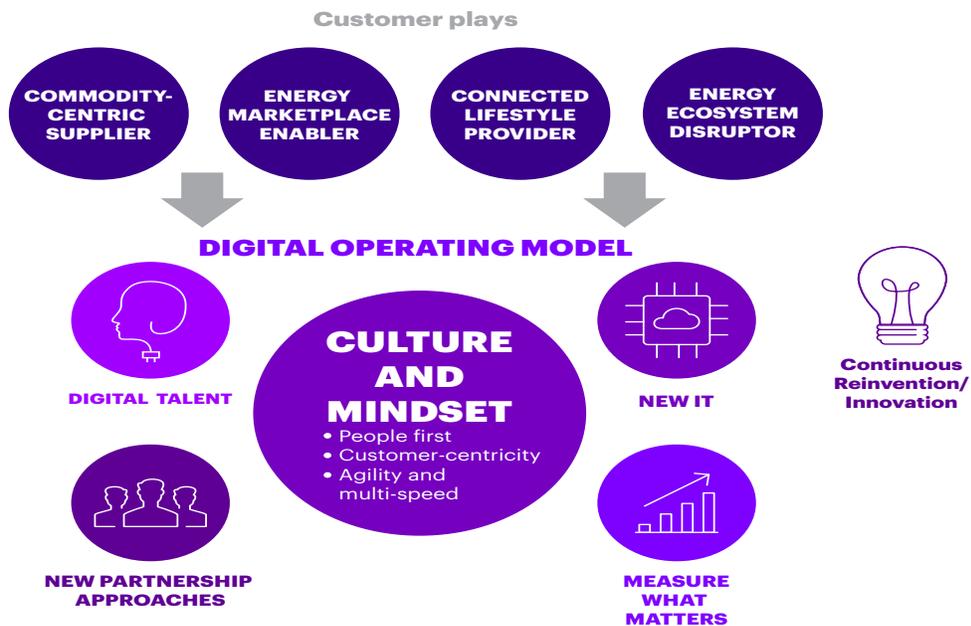


SWITCH THE SWITCHERS

Transient consumers are nothing new. But their dynamics are accelerating due to market shifts, disruptive technologies and regulatory changes. More than ever, providers need deeper insights so they can understand, act on—and profit from—individual consumer preferences and behaviors. Switchers matter.

The spectrum of customer plays for energy providers also continues to be a relevant consideration (see Figure 2). Accenture believes that, regardless of which play or combination of plays an energy provider chooses, it must keep a close eye on changing customer expectations, and strive to become a lean digital customer experience leader.

FIGURE 2. CUSTOMER PLAYS AND THE NEW DIGITAL OPERATING MODEL.



Source: Accenture analysis.

The first step for energy providers: Decide where and how to differentiate in a disruptive energy marketplace by choosing a strategic direction and customer play(s). Then ask: What does it take to operationalize the strategy—and how can we get there? These questions are at the heart of our latest report. We show that the answers lie in building a customer-centric operating model that is agile, adaptive, digital and flexible. Energy providers must start by strengthening the core: Creating a culture that empowers people to move forward with pace and adapt to drive ongoing change and innovation. Without this strong core, digital initiatives will inevitably be short-lived.

NOW IS THE TIME TO TAKE ACTION:

- Implement a new, more integrated approach to transformation strategy, planning and execution—one that can address new digital business models and new technologies, as well as market demands that further increase organizational complexity.
- Embrace continuous innovation—shift from decades of long planning cycles, rigid processes and certainty to a willingness to move quickly, “fail fast, win big” and iterate with agility.
- Create an agile culture aligned to digital strategy—promoting a people-first approach, speed and experimentation, and introducing new styles of digital leadership to innovate and navigate an organization through infinite disruption.
- Invest in the workforce of the future, including new talent strategies and technologies to support the digitally-enabled workforce.
- Implement the New IT, characterized by agility and scalability through open, cloud-based and multi-speed technology architecture and agile ways of working.
- Leverage new partnership approaches to support operations and acquire new capabilities fast.
- Build new ways of measuring progress and tracking the return on digital investments, with forward-looking metrics for customer affinity and digital transformation key performance indicators (KPIs) to steer the transition.

Our latest New Energy Consumer findings suggest a stronger consumer push toward advanced digital capabilities, next-generation services, and intelligent and integrated energy offers. Our 2017 research program, The New Energy Consumer: New Paths to Operating Agility, explores the latest consumer trends driving digital transformation.

To thrive in the rapidly evolving energy ecosystem, providers must move boldly and decisively: build a digital operating model, drive fundamental culture change and advance next-generation customer capabilities.



PEOPLE AT THE WHEEL: **DIGITAL TRANSFORMATION DOES NOT DRIVE ITSELF**

Digital transformation is about more than technology. It requires cultural change—shifting workers, contractors and partners to focus on customer-centricity, speed and a new human-machine relationship. At the same time, it demands a new leadership approach for navigating an organization through infinite disruption and continuous innovation and reinvention.

Many energy providers have been working hard to embrace digital. Yet Accenture's 2017 New Energy Consumer research shows that a third of consumers still struggle with their digital experiences. This finding suggests providers are not yet achieving desired returns on their digital investments. In some cases, digital might even be causing a disjointed customer experience.

What's at the root of digital disappointment? Accenture believes much of it stems from a technology-first approach to digital transformation. When digitizing core customer-facing touchpoints (such as move in/move

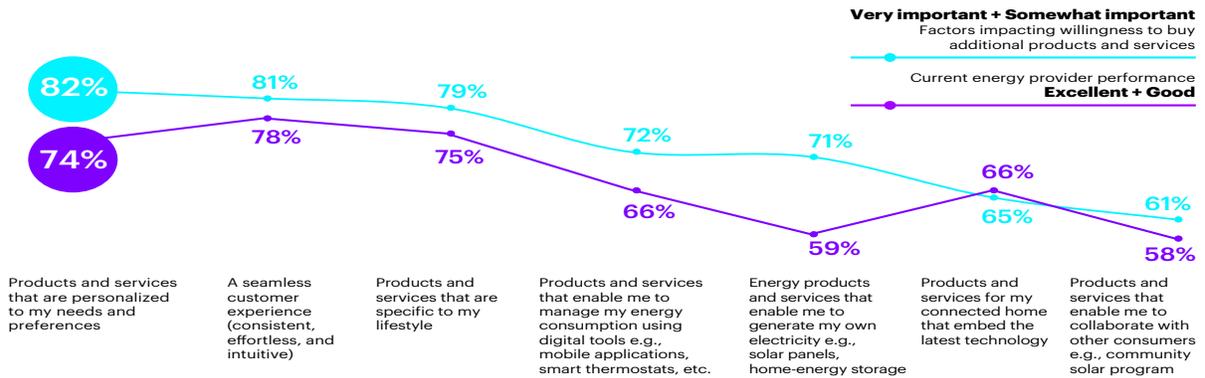
out processes) providers have often focused on automation. Working diligently to replicate traditional business processes on new digital interaction platforms, they've placed little to no emphasis on shaping customer experience and simplifying processes to minimize customer effort and dissatisfiers. When adopting robotic process automation in customer operations, for example, some providers seem to spend more time selecting and purchasing technology than determining which processes would benefit from digital solutions, and why.

Energy providers' long-time commitment to continuous process development

and compliance with industry and regulatory standards is another root cause. Operational excellence and Lean Six Sigma approaches have become the industry norm. While important, these are often insufficient to keep a provider competitive and relevant amid growing asymmetric competition in the dynamic energy marketplace. Accenture's New Energy Consumer research suggests that delivering a personalized, seamless customer experience may be an equally important use of resources (see Figure 3). Energy consumers in deregulated markets indicate they would even switch providers to receive that kind of experience.

FIGURE 3. PERSONALIZATION GAP.

WHAT WOULD MAKE YOU WILLING TO BUY ADDITIONAL PRODUCTS AND SERVICES FROM YOUR ENERGY PROVIDER? BASED ON YOUR EXPERIENCE OVER THE PAST 12 MONTHS, HOW WOULD YOU RATE YOUR ENERGY PROVIDER'S PERFORMANCE ON PROVIDING YOU EACH OF THE FOLLOWING?



Base: All respondents.

Source: The New Energy Consumer research program, 2017 consumer survey.

PUTTING PEOPLE **AT THE CORE**

To succeed in the digital age, energy providers need to become “experience architects.” Through human-centered service design providers can solve problems more effectively both today and in the future. Energy providers can apply a design-led approach across the board—from strategy to delivery and from marketing, sales, customer service and other core business functions to enterprise functions such as HR, IT and finance. Leading energy providers are implementing design-led approaches that place people—customers, workers and partners—at the core. For example, a

leading European utility is reinventing its customer operations with a people-first approach, identifying new ways to engage customers and enhance market leadership. Their goal: to increase customer satisfaction, agility, operational efficiency and optimize cost to serve by delivering a seamless omnichannel customer journey—all while engaging workers as full actors at each step.

A people-first approach to digital transformation requires an energy provider to apply the principles of design thinking every day (see

sidebar: principles of design thinking). It’s about delivering more relevant solutions to energy consumers. And improving the manner and speed with which energy providers can reinvent processes to meet changing needs. It encourages rapid experimentation, prototyping and constant reinvention. And it connects important elements of design—elegance, sensitivity, continuous and rapid iteration, and an appreciation for how people engage with the world—within the context of a business. That context enables leaders to quickly understand the feasibility and implications of their decisions.

PRINCIPLES OF DESIGN THINKING

Design thinking refers to the adoption of human-centered design methods to solve problems, frame opportunities and achieve innovation.¹



HUMAN-CENTERED

Start with empathy and work to understand people through direct observation and research.



CREATIVE AND PLAYFUL

Reframe the problem and view it from different perspectives, considering many solutions.



ITERATIVE

Refine the problem definition and potential solutions based on feedback and testing. Learn from early failures.



PROTOTYPE-DRIVEN

Rely on tangible representations of potential solutions to get early user feedback.



COLLABORATIVE

Involve all disciplines throughout the process—and employ co-creation methods as appropriate during the process.

Design-led approaches must be rooted in an industry context. Electricity and gas have traditionally been low-engagement products—necessities invisible to many consumers. So, when building meaningful energy consumer relationships beyond the energy bill, energy providers may find inspiration in cross-industry examples. But deep industry expertise will remain

essential in addressing unique energy consumer needs, such as preventing “bill shock” through proactive alerts, offering proactive property move support and personalized recommendations for energy savings plans. Energy providers can tap into the power of diversity by blending industry specialists with the new skills and perspectives of designers,

data scientists, digital technologists and scrum masters. Working together, these teams can create and implement sustainable innovations—whether incremental or breakthrough—that delight consumers. In short, energy providers must pivot from simply viable products to lovable products and services for the new energy consumer.

¹ “Fjord Trends 2017”, FJORD/Accenture Digital, 2017, <https://trends.fjordnet.com/trends>.



MINIMUM LOVABLE PRODUCTS (AND SERVICES)

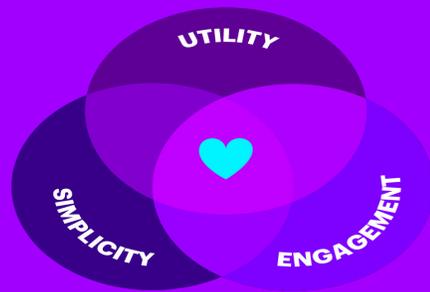
Digital leaders are obsessed with minimum viable products (MVPs). That is, using technology to rapidly build and deliver something with just enough features to satisfy early adopters. At their core, MVPs represent a technology-driven approach. They ask “what is it possible to build?” and “how fast can we build it?”

Accenture believes MVPs are not enough to serve the new energy consumers. Providers must instead aim for minimum lovable products (MLPs). An MLP brings everything into the mix—business, technology and, most importantly, human value.²

What makes a product or service lovable? It must be something that creates human value—and delight—by combining functional value (addressing unmet or latent needs) and emotional value (tapping deeper emotions and providing an engaging experience). In other words, a lovable product brings together utility, engagement and simplicity for the energy consumer.

For more information, see Fjord Trends 2017.

²Fjord Trends 2017, FJORD/Accenture Digital, 2017, <https://trends.fjordnet.com/trends>.



Functional value ←

→ Emotional value



DIGITIZING A MINDSET

TO ADOPT A PEOPLE-FIRST APPROACH TO DIGITAL TRANSFORMATION, ENERGY PROVIDERS NEED TO ESTABLISH A DIGITAL MINDSET THAT INCLUDES:

“WE ARE AGILE.”

People embrace new ways of planning. Defining a vision remains important, but there’s no expectation of a detailed, set-in-stone, three-year digitalization roadmap.

“WE ARE EMPOWERED.”

People are inspired to come up with new ideas for digital initiatives based on the strategic vision, and have the accountability and responsibility to execute them.

“WE ARE INSIGHT DRIVEN.”

Knowing the customer and making informed decisions is part of the DNA of the business. Deep analytics capabilities are embedded within the organization. These capabilities are vital to capturing insights from behavioral and user preference data throughout the entire user journey, and then applying them to drive decision-making at all levels.

“WE ARE A 90-DAY BUSINESS.”

People aim to deliver tangible results in 90-day cycles through:



FOCUS

Not trying to imagine every small detail of the service, but focusing on the minimum lovable product.



SPEED

Working in agile iterations to rapidly review progress and pivot quickly from minimum lovable product (prototype) to minimum marketable product (full product) to minimum release product (go live).



POSITIVE FAILURE

Setting clear targets for each sprint. If a sprint fails, that’s good. What did we learn? How does it advance the idea? Just as important, the team is empowered to kill any idea that doesn’t meet targets.

To build a digital mindset, energy providers are creating “design studio” conditions. That’s where business and IT partner to develop potential concepts, and then work in multidisciplinary scrum teams to refine and test ideas with light governance. The result: nimble, cost-effective collaboration based on design-thinking principles. Leading energy providers are also breaking down traditional hierarchical structures. They’re empowering

people to devise innovative solutions and create the conditions to implement them at speed and scale. For example, in just 20 weeks, an Australian energy provider launched a customer portal to empower engaging digital self-service. The key to its success was a collaborative, engaged team committed to consistently meeting and exceeding sprint goals with a digital mindset.

SPOTLIGHT ON KINGFISHER: A 90-DAY CHALLENGE

Operating more than 1,200 retail stores in Asia and Europe, Kingfisher has succeeded in nurturing a digital mindset and practicing a people-first approach. Every six months, 160 people involved in digital transformation projects gather for a two-day workshop. Working with C-suite representatives—and based on the company's strategic vision—the team builds the roadmap for the coming three-month sprints. Participants are invited to present ideas they want to realize in line with the larger strategy. By the end of the workshop, people commit to their three-month workplans, with accountability and responsibility for the results. From there, the working teams have the autonomy to build their own project plans. Using this approach, Kingfisher launched its first MLP on the market—an integrated home improvement platform to simplify the customer journey.³

³ Driving Our Digital Capability, Kingfisher, www.kingfisher.com.

DIGITAL MINDSET **IN ACTION**

In successfully navigating digital disruption, one of the biggest hurdles for energy providers will be transforming their cultures to become truly customer-centric. That means putting customers at the heart of all operations. In other industries, successful organizations have adopted design thinking to build customer-centric cultures and increase their capacity for innovation. Indeed, the Design Management Institute and Motiv Strategies found that design-led companies have outperformed companies in the S&P 500 by 219 percent over the past 10 years.⁴

Leading energy providers are making design thinking integral to all aspects of their organizations and leadership approaches. They are embedding the principles of living services to create a new culture and operating model (see sidebar: becoming a "living business"). Providers can use design thinking to identify value leakage and process inefficiencies. Leveraging robotic process automation cannot only drive efficiency but also enhance employee engagement by taking away

repetitive tasks and enabling workers to focus on higher-value activities. Many energy leaders are employing design thinking beyond customer experience and product and rate design. They are using design principles in areas like marketing campaigns, operational planning and talent management.

Adopting a design-led approach—from strategy to execution and across all functions—fosters a culture of constant experimentation, improvement and continuous learning. It puts customers and workers at the core. And it requires energy providers to create a workplace where people willingly embrace change. Workers should enthusiastically engage in the development process to identify trailblazing ideas and determine which have potential and which will fail. In a design-led culture, people must be empowered. Teams need to view the new as positive and rewarding rather than something to be feared. The result? A business that's constantly ready to pivot in response to the shifting sands.

⁴ "Good Design Drives Shareholder Value," Design Management Institute, May 2015, <http://www.dmi.org>.

BECOMING A "LIVING BUSINESS"

Businesses are not people. But can they benefit from a focus on some very human characteristics? Accenture says yes. And we believe becoming a Living Business can bring out the very best in the people and culture that create a business.⁵

THESE CHARACTERISTICS ARE WHAT BRINGS A BUSINESS TO "LIFE":



PERSONALITY

This expresses an organization's purpose through its brand. Workers are both affiliated with and empowered by this personality.



INSTINCT

This is the way an organization reacts to change. It is how it gathers people across structures and hierarchies to make effective decisions and take new directions.



RELATIONSHIPS

This describes how the company likes to work. It's how it builds a bridge to customers and puts the needs of those customers at the heart of what the business does. It's also how it builds new collaborations and partnerships internally and externally.



CRAFT

This is all about valuing people's input across the organization and focusing on ongoing workforce skill development. It's also about embracing diversity in the truest sense to confirm the business can differentiate in a world of liquid customer expectations.

⁵ "Culture and Digital Transformation: How to Build a "Living Business";" Fjord/Accenture Interactive, March 3, 2017, www.fjordnet.com.

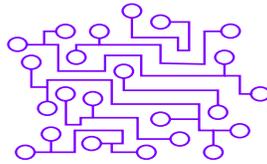
WHO SHOULD "OWN" DIGITAL TRANSFORMATION?

Without doubt, a people-led approach to digital transformation starts at the top. It needs clear, explicit and official support from the CEO. From there, the rest of the C-suite should step up and assume responsibility for executing the digital strategy and transformation. Digital transformation requires a holistic approach. That means starting with digital strategy and defining the approach for digitizing core business processes and customer interactions (Digital Customer), transforming the corporate functions for efficiency and productivity through technology (Digital Enterprise) and digitizing the workforce, enabled by a new culture and new ways of working (Digital Employee). The CCO, COO, CTO, CIO, CPO (Chief People Officer), and CDO all have important roles in setting and implementing the digital strategy. For example:

- The Chief Customer Officer takes responsibility for developing digital customer experiences and interaction channels.
- The Chief Operating Officer is responsible for developing digital processes and the digital value chain.
- The Chief Technology Officer manages the digital operational technology and innovation capabilities to develop operational technologies further.
- The Chief Information Officer confirms that IT services utilize the latest digital technologies and that IT brings value to the business with digital technologies.
- The Chief People Officer is responsible for digital talent and culture priorities.
- The Chief Digital Officer develops new digital business models and verifies that the company becomes a truly digital business.

Specific accountabilities need to be clear, as responsibilities depend on each energy provider and its digital maturity and current capabilities. CEOs can either extend the role of an in-place C-suite executive to spearhead the digital transformation. Or they can establish a new role, Chief Digital Officer (CDO), whose primary focus is leading the organization's digital priorities. The path an organization takes very much depends on the size of the energy provider, its digital maturity, its level of ambition and the personal capabilities of its existing leadership team. No matter what, the leader of digital transformation should report directly to the CEO, as that person will play an important role in this fundamental, enterprise-wide transformation.





LEADING **THE DIGITAL AGE**

Guiding an organization through digital transformation requires new leadership styles. New business leaders exhibit some or all the following characteristics:⁶

Adventurer

This type of leader exploits digital despite uncertainty. They start outside, using customer-centricity as a compass, and define a digital vision of what's possible that inspires others to move forward and take calculated risks.

Ambassador

These leaders employ an ambassador's art of persuasion, anchored in a loyalty to the enterprise's ultimate purpose, to bring others along on the journey.

Clarifier

As industry disruption increases, it becomes ever more critical that digital leaders clarify what matters most. That includes both digital threats and opportunities.

Educator

As an educator, a digital leader encourages the new mindsets and skills needed to lead in this persistently uncertain, high-velocity and innovation-driven era.

Attractor

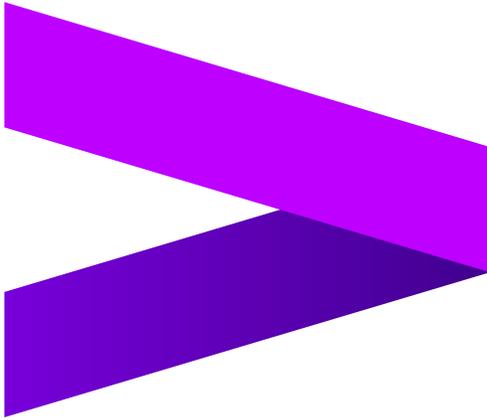
This entails radiating a compelling digital business purpose that enables others to contribute to something bigger than themselves. Attractors create, or reset, an optimal work environment and use it to attract and unleash the power of top talent.

Cartographer

This trait is as much about visualizing new paths of opportunity as it is about showing the business where and how to outmaneuver the competition and master the natural contours of the digital terrain.

To lead through digital transformation, forward-thinking energy providers are building balanced, cohesive teams that offer these behavioral traits. These organizations understand that leadership's first imperative is nurturing appropriate behaviors. That can, in turn, enable the autonomy necessary to build a new culture and mindset.

⁶"Remake Yourself With Six Digital Leadership Personas," Gartner, February 9, 2016, www.gartner.com.



DIGITAL HUBS **MAKE IT HAPPEN**

Many energy providers have started implementing digital initiatives in different parts of the organization—often with limited coordination and reuse of leading practices. These kinds of initiatives tend to get stuck in pilot phase, making it impossible to have a direct impact on the business or its profitability. Accenture has observed that a scattered approach to transformation often minimizes return on digital investments. To facilitate a people-led approach and accelerate cultural transformation, Accenture recommends setting up a digital hub outside of existing operations. This independent team becomes the focal point for leading the digital transformation and managing change. It helps drive and scale digital across local business units by blending business, technical and digital skills into creative, fast and agile solutions that create new customer experiences, new digital operations and new business models.

DIGITAL COCKPIT

This part of the hub monitors, controls and steers digital transformation initiatives and value cases across business units. The digital cockpit identifies and contributes thought leadership. It also drives leading practices, methods and tooling to spread innovation throughout the organization. It verifies that the business uses budget and scarce digital skills in alignment with the business strategy. And, when pursuing a digitalization roadmap, the digital cockpit distinguishes between business and growth initiatives and the enabling capabilities required to realize business outcomes. Strategy and road-mapping, governance and control, digital value tracking and digital portfolio management: these are the core competencies of the digital cockpit.

DIGITAL STUDIO

This part of the hub applies design-thinking principles to conduct fast, cheap and iterative experiments. In a digital studio, failure is treated as an opportunity to learn and improve. Core competences include market and customer research, ideation, customer journey development, service design, rapid prototyping and incubation to bring an experience to life and test it with the market. Typical roles within the studio include product owner, scrum master, researcher, business analyst, user experience designer, data scientist, architect, builder, tester, together with an API team and local subject-matter experts.

PARTNER ECOSYSTEM

The digital hub works to position the business within a broader ecosystem. It engages a network of partners that deliver services and technology to develop, build, test and host solutions. A strong ecosystem helps confirm flexibility—enabling an energy provider to acquire specialized capabilities quickly.

DIGITAL HUBS: **GUIDING PRINCIPLES**

1 **START FRESH**

Aim for a flat structure staffed with new, digitally-savvy talent. While the hub should be independent from operations—creating space for people to work in a completely new way—teams should collaborate closely. Between 60 and 70 percent of the people in the hub should be new hires, working with opinion leaders and business representatives from local organizations.⁷

2 **FOSTER INSPIRATION**

The physical location and space for the digital hub is crucial to driving cultural change, promoting innovation and new behaviors. It is fundamental to running the hub like a startup. Aim to emulate a creative studio environment and establish a sense of belonging and pride for the team. The hub should be attractive, not only to new talent but also to existing customers and workers. Make it a place people want to visit—bringing together elements of business and leisure (“bleisure”) so workers go home fully revitalized. In most cases, that means locating the studio in city centers or other vibrant parts of a city that attract large numbers of creative people.

3 **DON'T SKIMP ON SIZE**

Hundreds of potential ideas—and countless hours of research—will precede any successful new product or service. To establish a pipeline of top-line ideas, concepts and prototypes, a critical mass of people in the hub will be needed. That increases the likelihood of creating the products and services that consumers will love—and that generate sustainable business profit.

4 **BUILD FOR AGILITY**

Everything about the hub should be primed for agile ways of thinking, designing and delivering. Embrace the need to fail fast and cheap, and iterate based on those experiences. Empower the team with the latest technology and prototyping tools to enable those experiments. And confirm 30 percent “spare” capacity to handle any spikes in demand—whether due to a heavy backlog or extra innovation sprints.⁸

5 **MAKE IT A “BRIDGE”**

A digital hub helps reduce siloes and build bridges—fostering close collaboration among business, IT and ecosystem partners and enabling multiple partners and stakeholders to work together. A digital hub can collaborate with partners in an as-a-service model to acquire specialized capabilities quickly and facilitate the scaled acceleration of digital lighthouse initiatives across different markets.

6 **PUT PROCEDURES ASIDE**

Yes, the hub needs to operate with clear agreements on funding principles and budget ownership. But to rotate to the new, it's important to move away from typical approval processes and allow shortcuts. In other words, make it easy to buy from startups and test their products—without following usual corporate procurement policies.

⁷ Accenture analysis based on leading practices.

⁸ Ibid.



ENGIE'S DIGITAL TRANSFORMATION: **FROM TOP TO BOTTOM**

ENGIE (previously GDF Suez) is a global energy player with the ambition to be the leader of energy transition by concentrating its activities in low-carbon energy production, including natural gas and renewable energy, infrastructure and global solutions for its customers. Facing significant market transformation, ENGIE sought to review its retail operations and transform the digital experience for its business and residential customers. Its transformation includes reimagining the delivery of traditional commodity services, such as selling gas and electricity. It also includes designing new services to disrupt the market, challenge competitors and new entrants and, ultimately, position ENGIE to move into new markets and regions. Among the possibilities: servicing the new era of electric and self-driving vehicles, connecting the coming wave of home solutions in ways that delight customers, and helping customers in their energy transition projects. "As part of our ambitious three-year transformation plan to become a forerunner of the future energy world, we are making a big investment to digitize our company, redefine the customer experience and set new rules of engagement in the industry," said Isabelle Kocher, Chief Executive Officer of ENGIE.

⁹ "ENGIE Selects Fjord to Transform Its Retail Business by Reimagining the Digital Customer Experience and Designing Disruptive New Services," Accenture press release, May 4, 2016, <https://newsroom.accenture.com>.



PUTTING DIGITAL TO WORK: **RETHINK THE FOUNDATION**

Traditional waterfall-based approaches to developing people, processes and technology have been well-suited to the conservative, cautious utility culture. In today's energy ecosystem, those approaches are a liability—hindering a provider's ability to deliver constant agility, immediate scalability, short-cycle flexibility and speed at the pace of change.

To evolve and thrive in the new energy ecosystem, energy providers need to rethink the people, process and technology blocks that form their foundation. That includes investing in the workforce of the future; enabling IT agility and scalability through open, cloud-based and multi-speed technology architecture; and leveraging partners to support non-core operations and acquire new capabilities—fast.

TALENT TRANSFORMED: SHAPE THE DIGITAL WORKFORCE

Digital is here to stay. Energy providers must begin to transition their workforce—incorporating new technologies and understanding new talent strategies as part of the shift to the new digital operating model.

LET'S GET **DIGITAL**

Our latest research found only 27 percent of energy consumers are active digital users. And a third of energy consumers are still struggling with their experiences on their energy provider's digital channels. In other words, many customer interactions with energy providers still take place through traditional channels. Consequently, many energy providers still have "old-school" customer operations—along with a commoditized approach to workforce management that is reactive and focused on economies of scale. Even so, 88 percent of energy consumers say they are ready to use a digital agent (a computer program that simulates human conversation using

artificial intelligence via phone or chat to resolve simple queries) if their energy provider offered one. Getting there will require a tectonic shift in how providers approach workforce management and incorporate new technology.

Over the next five years, most utilities' customer operations activity will be undertaken by a combination of robots and humans working in close collaboration.¹¹ Cloud-based bots will perform most transactional tasks, while human experts focus on new ways of delivering value to energy consumers—shifting from simple, short interactions to value-added advisory services. Under this new

digital customer operations model, Accenture expects up to half of calls to be deflected to digital assistants and up to 80 percent of queries to be resolved by virtual assistants. That will support up to 25 percent optimization of average handling time and up to 60 percent staffing optimization benefits.¹² These significant operational shifts will drive new talent needs—demanding more business and process experts alongside tech-savvy, outcome-oriented management. Accenture believes this move from a commodity-based workforce to one that leverages automation to achieve operational efficiencies will free up resources for value-added activities.

¹¹ "Technology Vision 2017," Accenture, 2017, www.accenture.com.

¹² Accenture analysis based on leading practices.

What will emerge is a new organizational pyramid with up to 40 percent fewer full-time employees (FTEs) due to a blended workforce combined with new sourcing approaches. Accenture is already observing leading energy providers implement robotic process automation at scale in their back offices. These providers are realizing headcount savings of 25 to 40 percent while reaching meter-to-cash process efficiencies of one FTE per 90,000 contracts.¹³

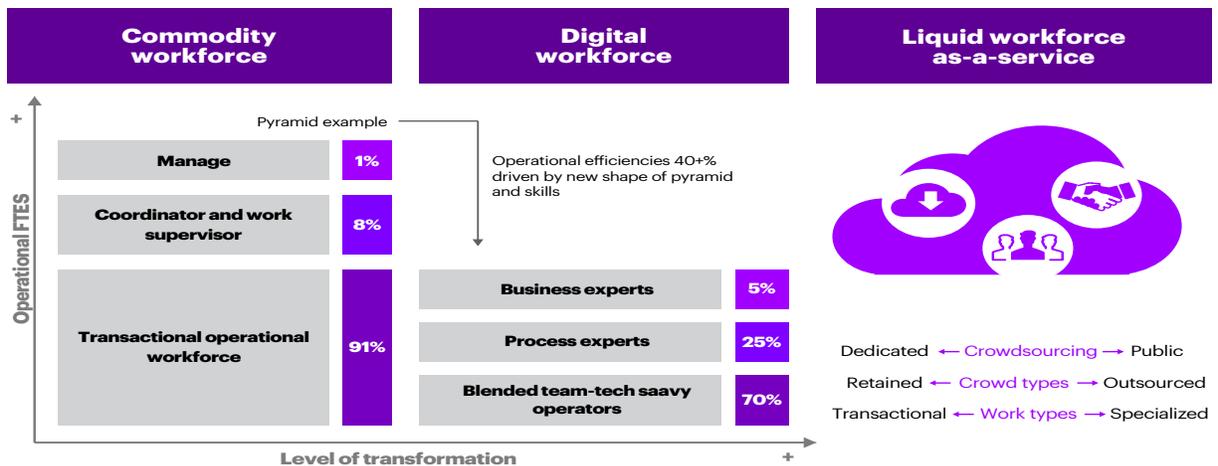
In the 2017 Accenture Technology Vision survey, more than three-quarters of IT and business executives agreed

their organizations are under extreme competitive pressure to extend innovation into their workforces and corporate structures. Moreover, 85 percent indicate they plan to increase their organization's use of independent freelance workers over the next year. And 73 percent report that corporate bureaucracies are stifling productivity and innovation.¹⁴

Blurring lines between employees and contractors are fundamentally changing the ways people will deliver their jobs in the future. An increasing number of tasks will be crowdsourced. Driven by a surge in on-demand labor platforms and online work

management solutions, legacy models and hierarchies are being dissolved and replaced with talent marketplaces. Call it the liquid workforce—with talent marketplaces augmenting and accelerating the inherent strengths of the digital workforce pyramid (see Figure 4 for an example in an energy provider's customer operations). Meanwhile, leading energy providers are embracing talent marketplaces to accelerate their digital operating model transformations.

FIGURE 4. TRANSFORMING TO A DIGITAL WORKFORCE IN AN ENERGY PROVIDER'S CUSTOMER OPERATIONS.



Source: Accenture analysis.

¹³ Accenture analysis based on leading practices.

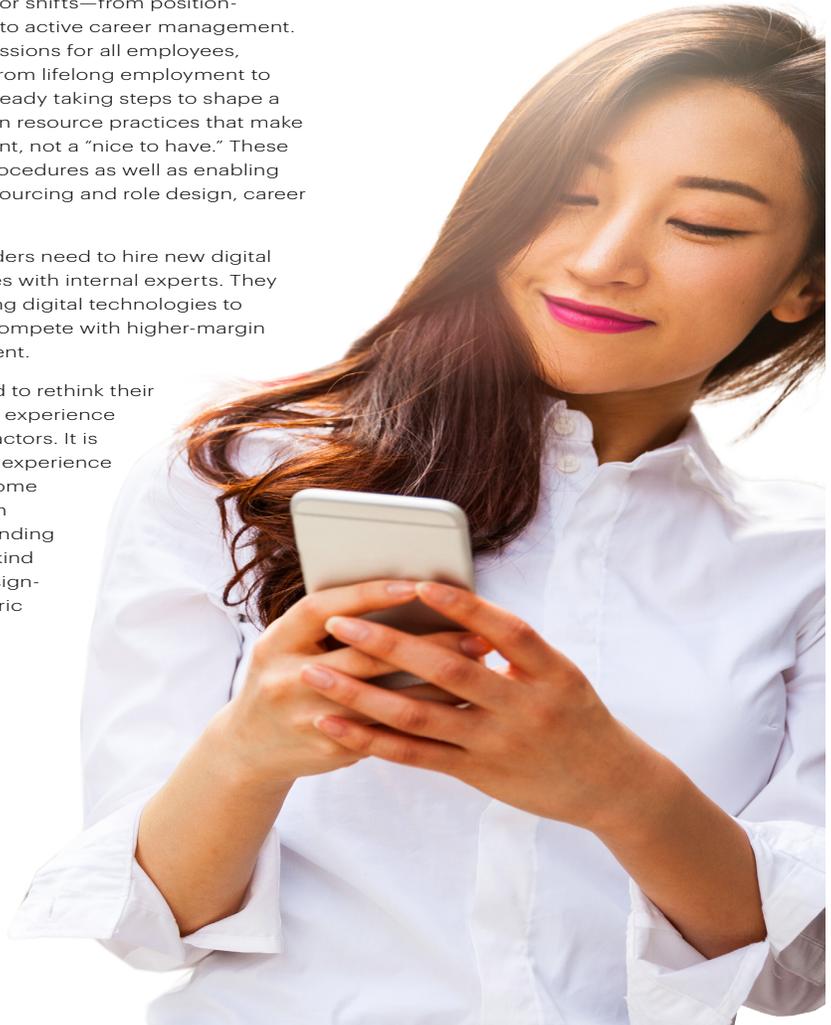
¹⁴ "Technology Vision 2017," Accenture, 2017, www.accenture.com.

JUMPSTART DIGITAL TALENT PLANNING

Energy providers will need to fundamentally rethink human capital and career management processes. Most will face some major shifts—from position-based to role-based career paths and from static to active career management. These changes necessitate frequent career discussions for all employees, along with a change in employer brand promise from lifelong employment to lifelong learning. Leading energy providers are already taking steps to shape a digital workforce of the future through new human resource practices that make regular employee career discussions a requirement, not a “nice to have.” These industry leaders are rethinking HR policies and procedures as well as enabling the liquid workforce—through new global talent sourcing and role design, career management and incentive mechanisms.

To nurture a people-centric culture, energy providers need to hire new digital talent and create teams that blend those new hires with internal experts. They also need to reskill people for new roles, leveraging digital technologies to increase time to proficiency. Their challenge: to compete with higher-margin companies and industries for the same digital talent.

To overcome this obstacle, energy providers need to rethink their employer brand promise, reinvent their employee experience and tap into new sources of talent, such as contractors. It is crucial to build symmetry between the employee experience and the customer experience, as employees become ambassadors of change and of the brand. Only an engaged, motivated workforce can deliver outstanding customer experiences. To attract and retain that kind of workforce, energy providers need to take a design-thinking approach to create tailored, people-centric employee journeys, incorporating both cultural and physical experiences.



TOOLS OF THE **(DIGITAL) TRADE**

To develop a digital workforce and attract new talent, energy providers need to rethink collaboration and work management tools and upgrade them where needed. New digital collaboration platforms and the online management of work will help build the workforce of the future. These approaches will offer employees greater flexibility as to where, when and how they perform their work. They will also break down organizational silos, supporting customer-centricity goals.

A digital workforce needs access to collaboration tools, wearables and social media channels to facilitate cross-functional teamwork. An example: collaboration between the front and back offices on billing web care through co-browsing, with more than one agent simultaneously navigating the energy provider's web portal with a customer. Collaborative platforms should also facilitate conferencing between remote locations via chat, voice or video. Immersive reality opens new opportunities for training and customer support (for example, remote product installation support), which in turn will appeal to and attract millennials. Tools for the online management of work, such as real-time dashboards, should enable employees to make insight-driven decisions quickly.

These capabilities can help avoid situations where, for instance, a field technician is late to an appointment. If customer care has no visibility of the issue, the representative will be caught by surprise when the customer calls upset about the no-show technician. Embedding operational analytics and real-time performance monitoring tools into day-to-day customer operations will help energy providers continuously improve both customer experiences and operational effectiveness.

FINDING PIECES **OF THE PUZZLE**

While it is obvious that the digital workforce of the future will make extensive use of technology to perform old and new tasks, many enterprises have yet to balance the use of digital technology with a range of emerging workforce complexities. To plan for the future, energy providers need to be ready to understand and act quickly on the combined answers to these questions:

- Who delivers the job (examples: self-serve, crowd serve, bots, artificially intelligent assistants, people)? For instance, artificial intelligence can augment existing jobs and free up people to do more judgment-based, creative tasks.
- How will people deliver the job (examples: full time, part time, partner, network, crowd sourced, private, public)? What tools will they use (examples: analytics, mobile, bots, speech recognition, next best action)?

Building the digital workforce of the future is a daunting task. Energy providers can start today by embracing digital technologies to reshape how work gets done, establishing a new employee value proposition and challenging traditional people management methods.

DIGITAL DECONSTRUCTED: GET AGILE AT SCALE

Delivering a customer-centric operating model requires energy providers to rethink their approach to IT. The challenge: to implement decoupled multi-speed IT architecture and cloud-based solutions and adopt design-led approaches to deployment and integration. As its name suggests, multi-speed IT architecture makes it possible to run at more than one pace: accelerating design and deployment of new customer-oriented concepts, products and services while maintaining a reliable cadence with core operations.

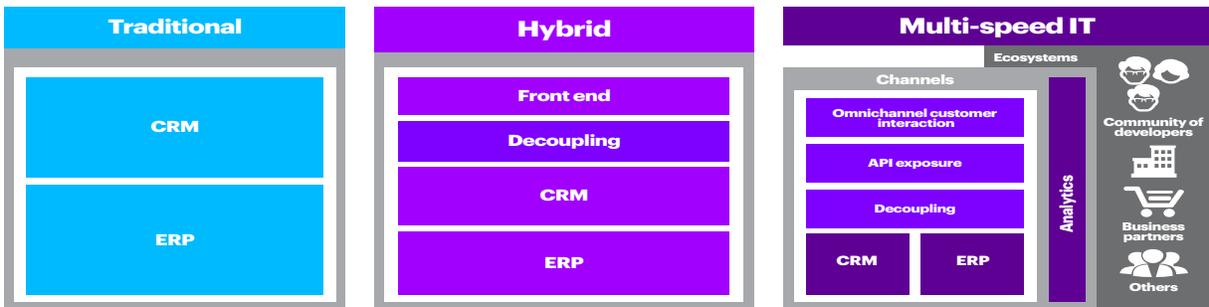
MOVING TO MULTI-SPEED

Delivering customer-oriented concepts requires fast, iterative development of prototypes and projects. At the same time, core systems that support meter-to-cash operations must remain stable and highly available. Multi-speed architecture decouples critical core systems from supporting systems, business applications and channels. It also enables easy collaboration with partners, and supports a highly integrated open ecosystem model that facilitates new business models.

Beyond its ability to deliver content, products and services faster across multiple customer channels, a multi-speed approach supports a people-centric approach to transformation. For example, employee engagement rises because experimentation is encouraged, helping identify optimal user experiences for customers and employees. In addition, multi-speed IT supports insight-driven operations. It can accelerate the collection of data both internally and throughout a provider's ecosystem—making it possible to create a central data platform and develop new analytics capabilities.



FIGURE 5. EVOLUTION OF ARCHITECTURAL ARCHETYPES.



Source: Accenture analysis.



A key enabler of multi-speed operations is the use of cloud-based solutions and API-enabled architecture. These investments enable an energy provider to benefit from greater flexibility and scalability. They also offer greater access to broad-based IoT capabilities. To take one example, connected home devices for demand response can easily communicate through APIs without disrupting core systems. Further, given the rise of IoT devices and integration, energy providers can easily give partners access to business functions and data, or even expand access to a community of developers through public APIs.

Across multiple industries, highly performing digital organizations are evolving away from traditional landscapes supported by a few monolithic systems. To support their digital transformations, they are decoupling back-end and front-end systems using web services. Accenture believes that multifaceted, API-enabled architecture is critical to leveraging the value of a broader ecosystem beyond traditional organizational and IT boundaries—and to establishing a customer-centric operating model (see Figure 5).

Multi-speed IT architecture is characterized by:

- **APIs and micro-services, making it easy to plug and play desired functionalities across customer touchpoints and connect with ecosystems.**

API exposure enables easy collaboration with external parties and supports a highly integrated, open ecosystem that facilitates new business models. In addition, it allows for a broader scope of analytics and the atomization of interfaces so third parties can easily interact with systems without significant IT changes. An API exposure module also enables energy providers to prototype apps and insights quickly and inexpensively. Those looking to develop value through connected home services and distributed energy resources need to recognize the current vendor ecosystem is becoming increasingly unbundled, complex and disruptive. Energy providers aiming to serve as a market enabler will need extensive API exposure to facilitate transactions, transfer value and coordinate customer offers.

- **Full decoupling of core back-end systems from business applications and touchpoints.**

This decoupling enables a lean system of record that focuses on core capabilities, reliability and control. It also verifies critical back-end systems are shielded from front-end and external applications—for instance, by using APIs to expose billing information in front-end channels.

- **The ability to enable omnichannel customer interactions, facilitating a seamless customer experience across all channels.**

This requires decoupling back-end services from the app layer through the API manager—while verifying that access is controlled and a multitude of different applications across different channels can be created on the same data. Meanwhile, content to be displayed across different channels is centralized in a content management system, which can be tailored to specific channels. The same touchpoint features leverage the same APIs to complete the same tasks on different channels. Apps are thus built for touchpoints and can encompass multiple channels. Responsive design for web and hybrid apps helps provide a consistent, cross-platform experience on a single code base. Energy providers can build a user interface in modern web patterns using enhanced responsive design techniques, fluid components and progressive enhancements. They can easily integrate emerging user interfaces such as voice and motion in customer journeys.

- **Cloud adoption and software/infrastructure-as-a-service models to gain agility and reduce hardware costs.**

Cloud technologies enable innovation at pace, with on-demand compute and storage capabilities that can greatly increase speed to market and enable new digital capabilities. Cloud and SaaS/laaS also drive a shift from capital to operating expense and reduce hardware costs.

FIGURE 6. IMPLEMENTING A DECOUPLED ARCHITECTURE.



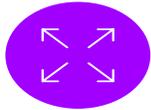
RECOGNIZE MULTIPLE SPEEDS

Facilitate multispeed IT (velocity) through differentiation in the way solutions are delivered, maintained and supported.



DECOUPLE YOUR CAPABILITIES

IT components should be loosely coupled. Aim to deliver the same functionality by a single IT component and avoid duplication of your capabilities.



BE SCALABLE

IT components should scale in a flexible, dynamic way independent from each other.



SINGLE SOURCE OF THE TRUTH

Data should have a "single source of the truth" and can be exposed to other applications via services or APIs. Data duplication should be avoided at all costs.



STICK TO THE STANDARD

Use standard (best-in-class) software components over customizing or developing from scratch.



BUILD FOR MULTIPLE CHANNELS

Enable all front-end solutions to be used "any place," "any device," "any time," by re-using components and using APIs.



ADOPT CLOUD COMPUTING

Where available, use SaaS solutions. Use IaaS solutions if applications require customization.



ENSURE BUSINESS CONTINUITY

Consider a central hosting solution if applications are classified as having a major risk to business continuity.

Source: Accenture analysis.

SPOTLIGHT ON NEXT-GENERATION DIGITAL PLATFORMS

In Europe, new entrants and incumbents are seeking next-generation digital platforms that accelerate customer engagement, value creation and facilitate robust sales and marketing capabilities. The ability to offer differentiated customer service and sales support with speed and agility is critical for sustainable growth. As a result, an increasing number of retailers are turning to an integrated Salesforce service, sales and marketing cloud solution as a scalable platform.

For example, a leading energy provider is stepping up its innovation activities, focusing its strategy on the implementation of digital capabilities through the development of new products and services, energy efficiency and e-mobility. This company selected Salesforce as the platform to digitize its service workforce and equip them with mobile selling capabilities, while also addressing the lack of visibility across contractors fulfilling non-commodity services, such as maintenance of home energy appliances. The rapid implementation included:

- Optimizing and automating process and sub-process performance.
- A cloud-based platform consistent with the latest industry trends.
- Delivering a customer-focused approach, including providing a personalized, relevant and engaging experience.

An end-to-end, customer oriented, 100 percent mobile digital solution that combines multiple capabilities and eliminates manual paperwork.

The adoption of leading platforms helps energy providers to advance digital sales operations, facilitates new customer service business model based on digital experiences and simplifies core business processes.

RUNNING AT MULTI-SPEED

Multi-speed, API- and cloud-enabled architectures give energy providers the blueprint for change. Yet only agile delivery methods for IT will empower a truly people-centric approach (see Figure 6). Agile delivery not only helps break down silos between business and IT but also introduces a user-led approach to application development. To deliver agility at scale, energy providers must change their traditional IT culture and approach, using design thinking to lead application development. Agile delivery approaches (also known as DevOps) are focused on driving lean, creative, iterative and automated delivery processes. The goal: to quickly produce high-quality features for the customer, thereby reducing cycle time and making feedback cycles more efficient. By transforming to agile and DevOps enterprise-wide, a major Dutch telco shortened its time to market from six months to just four weeks.

The secret to agile is that accountability is split evenly between business and IT. It bids farewell to the days of throwing business issues and requirements “over the fence” to IT. It demands ongoing cross-functional engagement and collaboration, with business and IT partnering throughout design and delivery sprints, focusing on rapid innovation and bringing a customer-centric mindset into the application development process. To develop scale and agility in the new energy ecosystem, energy providers are using centers of excellence and design labs as a platform for living innovation. For example, a large utility set out to rewire its whole business for living innovation. It developed design labs in various operating jurisdictions, with agile development supported in nearshore centers. The goal is to create scalable capabilities for design and agile development for digital solutions in the energy provider’s core markets.

Developing the appropriate technological and information architecture and adopting agile ways of working with close collaboration between business and IT are key to energy providers’ capacity to bring forward new digital products and services at speed and at scale.

FIND FRIENDS: PARTNER OR PERISH



Across industries, as more companies join the platform revolution, the way leaders choose to build their portfolio of digital partners is more important than ever. To provide increasingly innovative services and better outcomes for both their business and their customers, enterprises are integrating mission-critical activities with various digital platforms. As a result, core functions—from marketing and sales to customer service—now reach far beyond the walls of a single organization. These functions don't just include a complex network of digital partners, they heavily rely on them—pointing to the need for utilities to embrace a more holistic partnering strategy. The goal: to balance tactical decision making with investments in the digital ecosystems that will enable long-term growth.

ENGIE is one of the leading energy providers that have announced partnerships with global leaders to boost digital transformations. ENGIE's ecosystem is diverse and innovative:¹⁵

1

To accelerate a move to an insight-driven culture, ENGIE uses C3 IoT's platform, which is designed to manage data from smart objects and can deal with high-volume and high-performance requirements.

2

To increase time to market for digital channels, ENGIE has partnered with Kony, a global leader in the field of mobile apps for smartphones and tablets.

3

To secure ENGIE's move to a new IT ecosystem, it has engaged Thales to oversee its information system 24/7 for a period of five years. Through its global partnership with Thales, ENGIE can better anticipate the evolution of cyber threats, providing the energy provider with an optimally secure environment, particularly in industrial field assets.

4

To enable a design-led approach, ENGIE engaged Fjord, Accenture's design and innovation agency, to co-create digital services for business and residential markets. This collaboration spans reimagining the delivery of traditional commodity services as well as designing new services to disrupt the market.

Another example is a UK energy provider that was focused on growing sales of profitable non-commodity services, such as energy efficiency to business customers. This energy provider partnered with FirstFuel to leverage its analytics platform. Together they redesigned the non-commodity sales processes to drive more productive sales-lead generation and conversion outcomes that target high potential customers, and create personalized recommendations and savings estimates. Through more targeted, personalized customer interactions, the energy provider is reducing its sales cycle and increasing conversion rates while creating better customer experiences.

¹⁵ "ENGIE creates its Digital Factory and announces two global partnerships with C3 IoT and Kony," ENGIE press release, June 23, 2017, www.engie.com; "Thales to Ensure the Security of ENGIE's Digital Transformation Plan" ENGIE press release June 23, 2017, www.engie.com.

AS-A-SERVICE: **ON THE RISE**

More than a quarter (27 percent) of executives surveyed for Accenture Technology Vision 2017 report that digital ecosystems are already transforming the way their organizations deliver value.¹⁶ Energy providers must decide which ecosystem to join and what role to play. Tomorrow's competitive advantage will not be determined by one company alone, but by the strength of the ecosystems chosen and a company's plans to help those ecosystems grow.

As-a-service (aaS) models—including software-as-a-service (SaaS), platform-as-a-service (PaaS) and infrastructure-as-a-service (IaaS)—are gaining momentum with energy providers thanks to the ease of their plug-in, scalable and consumption-based business services. To take an example, Portugal's leading integrated energy player, GALP, has entered into an outcome-based

as-a-service collaboration with Accenture to deliver an end-to-end digital transformation of its customer operations and IT systems.¹⁷ Over the next seven years, Accenture's commitment is to reduce cost to serve and cost to acquire for the GALP Gas & Power Retail business to best-in-class levels while assuring an outstanding customer experience. Amazon is also tapping into the as-a-service partnering trend through Amazon Connect—a self-service, cloud-based contact center service that makes it easy for any business to deliver better customer service at lower cost.¹⁸

¹⁶ "Technology Vision 2017," Accenture, 2017, www.accenture.com.
¹⁷ Accenture e GALP Energia, Accenture, www.accenture.com/pt-pt/galp-energia.
¹⁸ Amazon Connect, Amazon, <https://aws.amazon.com/connect>.



PUTTING SKIN **IN THE GAME**



As the energy ecosystem takes shape and disrupts the traditional model for utilities, several large players are entering emerging segments through strategic investments, ventures and acquisitions. Energy providers in North America and Europe have invested more than \$2.9 billion in 130 individual distributed energy companies since 2010. And \$1 billion was invested in 2016 alone. Though most investments have resulted in minority equity stakes, 37 distributed energy companies have been acquired by energy providers. North American utilities have focused on distributed solar, while European utilities have invested more in combined heat and power.¹⁹ Accenture is observing a global trend toward greater innovation investments, the development of startup hubs and direct investment.

Eneco is following a similar approach with its Eneco investment fund, allocating more than €100 million for energy and sustainability-related ideas and startups.²⁰ ENGIE launched in 2014 a Corporate Venture Capital investment fund, ENGIE New Ventures, with a €115 million budget, using it to acquire stakes in startups in the development phase. To date, ENGIE New Ventures has made 14 investments in startups.

ENGIE launched recently ENGIE Fab, a global platform dedicated to stimulating technological, commercial and managerial innovation in its five priority domains. In March 2017, ENGIE Fab made

its first investment in EV-Box, a leader in charging solutions for electric vehicles.²¹

Although many energy providers are investing in companies and technologies that directly or indirectly enable customers to save, modify, generate and store their own energy in new ways, most are yet to invent radically new business models. Companies such as Tesla, REstore and Sonnen are now starting to write new rules of engagement. Tesla is expanding its energy storage research into products for the home that upend traditional utility and building approaches (see Spotlight on Tesla).²²

REstore offers “Virtual Power Plants” to grid operators and balance-responsible parties, with higher reliability, faster delivery and cheaper cost than traditional combined-cycle gas turbine power plants, aggregated from industrial flexible power.²³ Sonnen has created an aggregation-type energy community with centralized coordination of distributed energy resources (solar and storage).²⁴

New partnering approaches—whether through as-a-service models, partnerships and innovative alliances or joint ventures—are key enablers of flexibility and speed to market in the new energy ecosystem. To succeed at digital transformation, energy providers must apply a proactive and multifaceted strategic partnering approach.

¹⁹ “Utility Investments in Distributed Energy,” GTM Research, March 2017, www.greentechmedia.com.

²⁰ “New business unit of Eneco Group accelerates energy transition through innovation,” Eneco Group press release, July 8, 2015, <https://news.enecogroup.com>.

²¹ ENGIE New Ventures, ENGIE, innovation.engie.com.

²² Energy, Tesla, www.tesla.com/energy.

²³ Restore, www.restore.eu/en/homepage.

²⁴ Sonnen, www.sonnen-batterie.com.

SPOTLIGHT ON TESLA

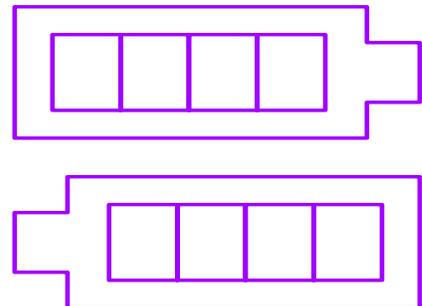
The Tesla-SolarCity merger serves as a strong indication of where connected energy—the future of the new energy ecosystem—is headed. The merger essentially creates a vertically integrated energy, technology and automotive company, unlocking a variety of interconnected energy value pools and new customer offers under one leading clean-energy brand.

In addition to offering customers integrated, disruptive products, the company employs a progressive business model. Rather than manufacturing solar cells, it acquires them from different suppliers to hedge silicon supply risk. In addition, the firm is focused on innovative leasing structures, which it can now extend to additional products and services, such as the Powerwall 2 battery. Through these lease agreements, customers are charged a monthly fee priced well below their current monthly utility rates. This method of price undercutting has allowed the companies to achieve a high market penetration rate. And, because consumers are not required to cover upfront installation costs, it's easy to switch over.

Another primary competitive strength of this business model lies in the length of the contract. Customers who sign the lease agreement are locked into 20-year purchase agreements that create high-quality recurring customer payments, while reducing the volatility of top-line performance year over year. Coupled with a Tesla EV and Powerwall and connected home IoT services, Tesla is not only appealing to the needs and preferences of the new energy consumer, it's also on the verge of offering a seamlessly integrated solution for demand response, aggregation and distributed energy interconnectivity through one platform.

While many pilots and programs have sought to test the value of such systems, Tesla is pushing the boundaries of what a single provider can offer in the new energy ecosystem.²⁵

²⁵ Tesla and SolarCity, Tesla, November 1, 2016, www.tesla.com.



TRACKING TRANSFORMATION: MEASURE ONLY WHAT MATTERS

Energy providers require a new set of performance metrics, digital indicators and people measures to effectively evaluate their investments in customer-centric capabilities and the digital operating model.

Embracing a people-first approach to digital transformation is a game-changer for energy providers—and for the metrics they use to measure and manage performance. Adopting design thinking and nurturing a customer-centric culture. And implementing key enablers, such as agile IT solutions and digital hubs. These are game changers for energy providers—and for the metrics they use to measure and manage performance. In rotating to the new, providers need to re-

envision their scorecards and update their metrics, measuring what matters in the journey toward a digital customer operating model.

Successful energy providers are establishing a new digital baseline, gathering competitive cross-industry benchmarks and conducting ongoing assessments of digital experiences to set a foundation for systematic improvement.

ACROSS INDUSTRIES, ACCENTURE IS OBSERVING A SIGNIFICANT SHIFT IN TWO KEY CATEGORIES OF METRICS ESSENTIAL TO MEASURING THE TRANSITION TO LEAN DIGITAL CUSTOMER LEADER:



A move from measuring satisfaction and engagement to consumer affinity measures that assess a brand all the way down to individual moments of engagement.



A move from measuring program success to include digital traction measures as well as agility, culture and consumer measures.



FROM EXPERIENCE TO AFFINITY

For many energy providers, traditional customer satisfaction (CSAT) scoring has been, and remains, the core customer experience metric. Some energy providers, especially those in liberalized markets, are moving towards using more sophisticated customer experience measures. Among them: net promoter score (NPS), customer effort score and customer experience indices. While these measures have proved useful in the past, digitally enabled interactions, products and services have created complexities that require a holistic and end-to-end approach to measuring customer experience.

To become a customer-experience-driven organization, and drive customer retention and loyalty, energy providers need to adopt forward-looking customer experience KPIs in their scorecards. In the era of liquid expectations, consumers are benchmarking their experience with energy providers against those with other service providers like their retail bank or Uber car service. Energy providers are competing against customer experience leaders across all service industries. It's no longer enough to create something that people like—energy providers need to craft experiences that people love.

To understand consumer experience—from brand to customer journeys to individual moments of interaction—Accenture developed a formula for measuring it: The Love Index. This index offers a fresh, forward-looking approach to measuring affinity to physical and digital brand experiences. It can also be correlated to business objectives.

THE LOVE INDEX: A FRESH APPROACH TO DIGITAL AFFINITY



What makes people love a product or brand? What sustains that love? These are the questions Accenture Interactive and Fjord set out to answer when embarking on The Love Index study—a survey-based research tool to give clients new visibility into why consumers love (or don't love) digital experiences.

The Love Index introduces an unprecedented, multidimensional approach that allows companies to measure how their customers feel about digital and physical experiences. The Love Index not only measures people's engagement with services, it also identifies the highs and lows of a person's relationship with a service and highlights actionable opportunities for brands to make improvements. It can be used to examine the most important service moments at both the brand and the customer journey level.

Through its unique focus on the importance of love at the center of the customer experience,

The Love Index anchors the entire design and innovation process, enabling brands to reach new heights in an era of changing consumer expectations. The research revealed five dimensions for measuring customers' feelings toward a brand experience. These five fresh dimensions systematically explain why people love specific experiences:

- Fun—holds people's attention in an entertaining way
- Relevant—makes it easy to find clear and customized information
- Engaging—identifies with people's needs and adapts to their expectations
- Social—helps people connect with each other
- Helpful—is efficient and easy, and adapts over time

The Love Index is an example of a wider movement toward next-generation customer engagement and net promoter-type measurements. These new digitally relevant metrics are not only holistic in nature but also paramount to design-oriented transformation. They are powerful tools as inputs into design scrums. They serve as a very effective means of tracking implementation steps. And they can aid in measuring the level of financial impact.

ORGANIZATIONAL TRANSFORMATION: **ROTATE. MEASURE. REPEAT.**

As energy providers continue rotating to a digital operating model, it is important to measure the speed at which this transformation is happening—both internally and externally with consumers. Those metrics can be both hard and soft. And, since transformation is inherently temporary, and because digital business eventually becomes business as usual, digital rotation metrics are timebound.

Across industries, organizations frequently use a mix of hard metrics to measure the progress of the digitalization of their business. From a consumer perspective, we see companies using metrics such as the proportion of interactions that are digital and/or bot assisted. Given the important role that the digital shift plays

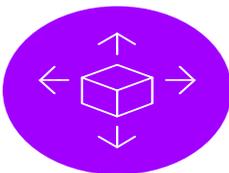
on operating model rotation, digital traction metrics have become the new norm for many consumer- and service-based organizations (see sidebar: digital traction metrics).

Similarly, given the rising importance of managing an ecosystem, digital leaders are using metrics around ecosystem density to measure the consumption and supplier relationships an enterprise has with other businesses (through APIs). They can thus quantify how connected the enterprise is, how integral a part it plays in its ecosystem and how robust the complex partnership models are.

From an internal perspective, depending on the scope and scale of transformation, organizations are actively tracking the

percentage of spend on digital across marketing, sales and other capabilities. From a workforce perspective, industry leaders are actively tracking talent diversity in new ways, such as number of designers, data scientists and artificial intelligence experts and number of scrum teams. Alongside the hard metrics, soft metrics are imperative to measuring organizational change. These include time to impact, organizational agility and internal NPS.

Energy providers can use innovation and agility metrics to measure progress in launching new digital products and services in a world of rapid prototyping. To gauge effectiveness in embracing a startup mentality, leading organizations are carefully watching:



VOLUME METRICS

how many concepts and prototypes have been generated and how many went to market commercially



SPEED METRICS

time to market from Minimum Lovable Product (“prototype”) to Minimum Marketable Product (“full product”)



FINANCIAL METRICS

share of revenue/margin from new digital products and services

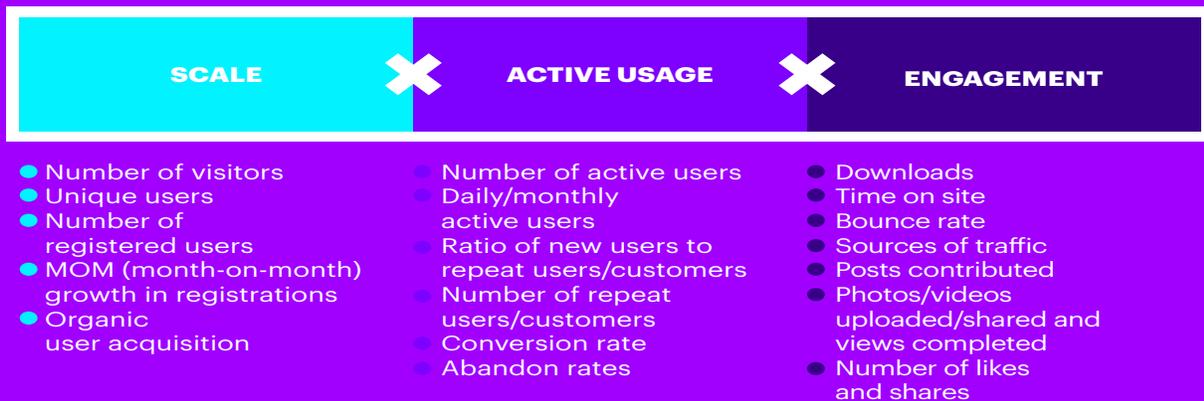
REWRITING SCORECARDS? **NO—CHANGING THE GAME.**

A shift to a customer-centric operating model represents a fundamental rotation of a business. To succeed, energy providers will be challenged to maintain focus and drive unless a completely new set of measures is put in place. Truly, a new facet of the insight-driven organization is the ability to look back, ahead and in all directions—all at once. Accenture believes that next-generation metrics tracking will become a core competency of the leading digital energy providers.

DIGITAL TRACTION METRICS

Designed to measure customer engagement in digital channels, digital traction metrics help in understanding both the popularity and market adoption of a product or service in digital channels. With a wide array of digital traction metrics available, Accenture recommends a combination of behavioral metrics, including frequency of use, degree of active usage and customer engagement.

DIGITAL TRACTION METRICS



MOVE AHEAD WITH NO REGRETS: SEVEN STEPS TO ACCELERATE DIGITAL TRANSFORMATION

Differing market structures, economic realities, cultures, urgency and cash flows mean that each energy provider must develop its own roadmap for advancing toward the digital operating model. And yet, acting too slowly could mean obsolescence for an energy provider—overtaken or disintermediated by faster, more agile competitors and peers.

While there is no one-path-fits-all journey, there are some moves that any energy provider can make to accelerate its rotation to a digital operating model. These no-regrets steps can enable a provider to organize and scale at speed—helping reduce cost to serve while delivering a consistent customer experience across all touchpoints:

1. Set up the appropriate organization and KPIs.

Consider appointing a Chief Digital Officer to set digital strategy and lead digital transformation.

Set up a digital hub to steer the transformation at scale and speed.

Define a digital governance and collaboration model across the organization.

Update key performance metrics to include The Love Index and digital rotation metrics.



2. Build a digital workforce and foster digital leadership.

Establish digital studios and hubs to accelerate the adoption of a people-centric culture and digital mindset. That will facilitate more collaborative, nimble ways of working between business and IT as they apply design-thinking and agile methods.

Implement new digital organizational models, design-friendly workspaces, interfaces and tools. For example, reward new behaviors and empower workers to be innovative and creative.

Develop a digital-learning curriculum and platforms to rapidly push digital knowledge to workers. Leading providers have already deployed design-led training programs to hone the skills of high-potential workers and build new leaders.

3. Digitize customer journeys.

Create and/or review all customer journeys. Then build a plan to have them fully available in digital channels within one year. Adopting an end-to-end approach to digitization of customer journeys—across channels and business functions—will support an omnichannel customer experience.

4. Become relentlessly customer obsessed.

Put the customer at the heart of all operations. Exceed customer expectations by delivering seamless and relevant consumer experiences across all touchpoints—all day, every day.

A critical prerequisite is the ability to work horizontally across silos, including sales, marketing and service. Set up a customer engagement control tower to continuously improve

customer experience and operational effectiveness in day-to-day operations and have an end-to-end integrated customer view across marketing, sales and customer service.

Embed deep analytics capabilities to capture and analyze consumers' behavioral and user preference data throughout the entire customer journey—and then apply these insights to drive decision making at all levels.

Manage sales and service in an integrated way to confirm digital tuning across multiple channels as part of an omnichannel customer experience.

5. Automate customer operations and bring new insights by deploying robotic process automation (RPA) and artificial intelligence (AI) in operations at scale.

Leading energy providers are already doing so—leveraging robotics, cognitive computing and AI to automate routine tasks in front-office, back-office and enterprise functions, and gain new insights and apply that intelligence to offer new services. Many energy providers have, at minimum, reoriented their customer operations capabilities around RPA and AI technologies. They've moved beyond isolated projects to the scalable adoption of multiple digital tools to achieve outcomes from automation.

6. Enable agility at scale.

Enable hyper-personalization, decouple legacy systems from front-end interaction channels and add an intelligence layer on top of CRM systems. Identify as-a-service-friendly capabilities, such as customer analytics and engagement platforms. And reassess the vendor landscape.

Launch digital technology capabilities (mobile, analytics, cloud, blockchain, security, RPA and AI) that will shape and benefit virtually every function in the organization.

Embrace AI and scale robotics programs for operational efficiencies. Start piloting chatbots for customer-facing capabilities.

7. Create new business and ecosystem management capabilities.

These capabilities will help keep options open for the future. Make strategic choices on the role and scope of services in the market. Choose a single play or a combination of strategic customer plays of the future.

Define an ecosystem strategy and advance partnerships and alliances to help make your strategy a reality.

Proactively shape a new regulatory strategy and model (for example, industrial standards, utility commission standards, security standards and ISO standards).

Selectively invest in strategic assets, such as distributed energy resources, the connected home, and electric vehicles grid automation. Investment in strategic assets should start small, with a focus on incremental improvements.

Constantly innovate and reinvent based on market opportunities and changing consumer behaviors.

Accenture believes that to create a truly sustainable advantage, successful energy providers will embrace disruption beyond technology. Above all, they will create a culture that puts people—customers, workers and partners—at the center of change as they fundamentally rethink their operating models.

THE NEW ENERGY CONSUMER RESEARCH

Accenture undertook the multiyear New Energy Consumer research program to help gas, electricity and water utilities understand emerging consumer needs and preferences, to identify new challenges and opportunities and to bring focus to the critical competencies required to succeed in the evolving energy marketplace.

Collecting eight years of consumer insights from interviews with 80,000 end consumers around the world, the initiative has explored a range of topics:

2010

Understanding Consumer Preferences in Energy Efficiency offers a consumer view to support the increasing industry focus on smart metering and demand management. This first study produced valuable insights into consumer preferences in energy efficiency, awareness, readiness and willingness to take action.

2011

Revealing the Values of the New Energy Consumer explores the emergence of a new energy marketplace through a worldwide end-consumer survey looking at preferences, opinions and priorities in beyond-the-meter products and services offered by utilities or other providers.

2012

Actionable Insights for the New Energy Consumer focuses on developing actionable insights and tactical implications for the emerging energy marketplace. This study explores consumer choice, connection and loyalty, and provides a fresh view of how consumers want to interact with their energy providers, the products they value and what drives their purchasing and loyalty behavior.

2013

The New Energy Consumer Handbook looks to the path ahead for energy providers addressing key consumer "dissatisfiers" and offers views to help deliver on the diverse expectations and needs of residential consumers and small and medium businesses (SMBs).

2014

The New Energy Consumer: Architecting for the Future explores new opportunities in virtual customer interaction, the connected consumer, distributed energy and new products and services. It also offers Accenture's view of the energy consumer of the future.

2015

The New Energy Consumer: Unleashing Business Value in a Digital World explores the ways in which energy providers can capture digital value. It discusses opportunities for energy providers to extend the value proposition through innovative offerings and new ways of engaging energy prosumers. The research explores the growing potential of platform-based models in the digital energy ecosystem.

2016

The New Energy Consumer: Thriving in the Energy Ecosystem looks at the manner in which energy providers can reorient their business around fluctuating levels of consumer engagement. The research explores the rise of the millennial consumer, the continuing influence of digital technologies, and the rise of the new energy experience. The point of view provides a perspective on market forces and the latest consumer trends, how energy providers can move forward via strategic customer plays, and the next wave of disruptive customer innovations.

2017

The New Energy Consumer: New Paths to Operating Agility consolidates the key transformational imperatives that energy providers should consider as they implement a digital customer operating model. The research explores differing approaches to digital channel shift, advanced personalization, the changing influences of the new energy ecosystem as well as customer expectations around automation and artificial intelligence. The research continues to explore customer sentiment toward distributed energy resources, emerging offers in collaborative energy, and disruptive interaction technology.

The New Energy Consumer 2017 research methodology and sample

Accenture’s global research surveys are based on questionnaire-led interviews with end consumers. Surveys were conducted online in native languages for Accenture by Harris Interactive. The selected countries represent a range of regulated and competitive markets. For residential consumers, the survey sample was statistically representative of the general population in each country, with the exceptions of Brazil, China, Malaysia, and the Philippines where the sample was representative of the urban populations. For countries with large and/or diverse populations, participants were selected from a broad spectrum of locations. The surveys included attitudinal, behavioral and demographic questions.

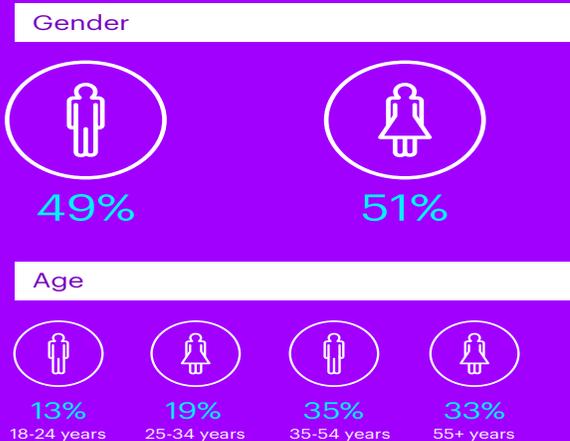
A total of 9,719 interviews in 18 countries



Regulated markets:
Brazil, Canada (some provinces), China, Malaysia, Singapore, United States (some states)

Competitive markets:
Australia, Canada (some provinces), France, Germany, Ireland, Italy, Japan, Netherlands, Philippines, Portugal, Spain, Sweden, United Kingdom, United States (some states)

Breakdown by gender and age



Notes: * Sample representative of the urban population.
The maximum margin of error is of +/- 1 point on the total sample and +/- 4.5 points at the country level.

Trend data: countries have been added/removed from the scope compared with previous years; however, this change does not impact trends.

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Accenture Energy Retail and Customer Services delivers energy provider customer solutions for both competitive and regulated markets globally. We help our clients achieve four key business imperatives: cost effectiveness, revenue assurance and extension, customer satisfaction and demand optimization. Guided by New Energy Consumer research program insights, our electricity, gas and water clients can realize higher value through industry specific strategy, digital, technology and operations capabilities and world-class expertise, assets, tools and accelerators.

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What People Really Want from Customer Service

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All this creates a new challenge: As customers handle more of the simple issues themselves, frontline service reps get increasingly tough ones—the issues customers *can't* solve on their own. And today's reps are struggling with these complex problems. As one service leader at a large retailer admitted to us, "Our people are woefully ill-equipped to handle today's customers and their issues. We're not running a contact center here. It's more like a factory of sadness."

Compounding the issue, as companies have focused on new self-service technologies, they've underinvested in frontline service talent. They still hire, onboard, develop, and manage their service reps in much the same way they always have. While the self-service experience has improved dramatically in recent years, the live service interaction has barely changed in decades, creating a

gap between customers' expectations and actual experience. Tales of poor service provoke outrage on social media and go viral despite companies' best efforts to contain them. Not surprisingly, customer satisfaction has been in steady decline across industries for years.

What's more, putting unprepared staff on the phone with irate customers is expensive. Complex issues take longer to handle, driving up costs: The average cost of a live service contact jumped from \$7 in 2009 to nearly \$10 five years later. Inadequate training also drives staff turnover, which is exacerbated by a tightening labor market—attrition among customer service reps has shot up from 19% during the Great Recession to 24% today. Not only does higher turnover increase recruitment and training costs, but it also forces companies to pay more to retain the reps they have, lest valuable knowledge and experience walk out the door.

In a world of self-service, talented reps matter more than ever. But what sort of people are best equipped to handle today's customers? And how can organizations ensure that they attract and retain the most-effective reps? That's what we set out to learn.

Seven Types of Reps

To determine the optimal service representative profile, we conducted a global, cross-industry study of 1,440 reps. We found that all reps fall into one of seven profiles we derived from the data: Accommodators, Competitors, Controllers, Empathizers, Hard Workers, Innovators, and Rocks (see the exhibit "The Seven Types of Reps"). Our team then interviewed dozens of reps to better understand how the different types approach their jobs. We also surveyed contact center supervisors about the types of reps they like to hire and manage.

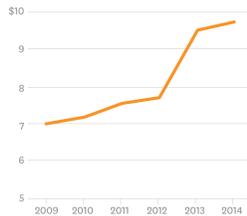
When managers see the seven profiles, they prefer, by a wide margin, Empathizers—42% of the managers we surveyed favored this profile. It's not surprising, then, that Empathizers made up 32% of all frontline service reps in our study. In interviews, managers described the ideal rep as "service-oriented," "a good listener and communicator," and someone who "likes helping others." That role is not an easy one. Said one VP of service for a large cable operator, "Today's customers are unbelievably impatient. As soon as we ask how we can help them, they jump down our throats. They're frustrated because of the amount of time they've had to invest on their own, frustrated by the amount of conflicting information they find on the internet, and frustrated by the thought of having to deal with a service rep. They're not calling us because they want to; they're calling us

because they have no other choice.”

Climbing Costs, Fleeing Reps

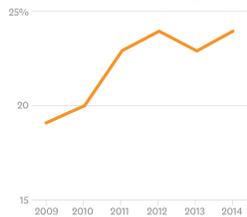
As call complexity increases, the average cost of a live service contact has risen 38% since 2009.

COST PER LIVE CONTACT (moving average, US\$)



Many reps are ill-equipped to handle complicated customer calls, and they're quitting in droves.

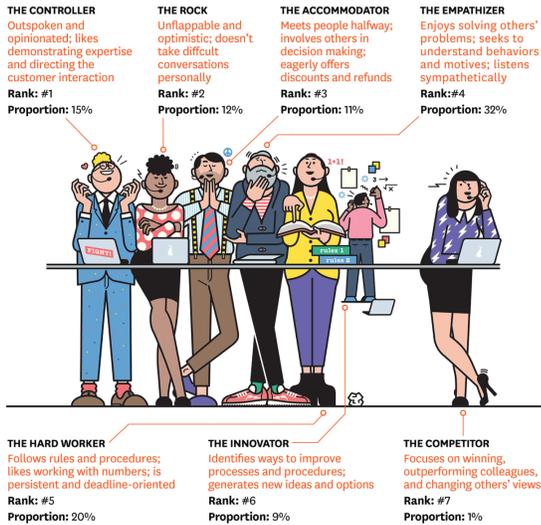
EMPLOYEE TURNOVER RATE (moving average)



SOURCE: CEB
FROM "KICK-ASS CUSTOMER SERVICE,"
BY MATTHEW DIXON ET AL.,
JANUARY-FEBRUARY 2017 © HBR.ORG

The Seven Types of Reps

A global, cross-industry study of 1,440 frontline service representatives revealed distinct differences in personality and approach to the job. Empathetic reps were by far the most common type, but Controllers ranked number one in making interactions efficient and painless.



SOURCE: CEB 2015 FRONTLINE WORKFORCE FIT AND ENGAGEMENT SURVEY FROM "KICK-ASS CUSTOMER SERVICE," BY MATTHEW DIXON ET AL., JANUARY-FEBRUARY 2017

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So how well do Empathizers perform? To find out, we collected rep-level data on key metrics used for performance management in service organizations. In line with our own research into what drives customer loyalty in the service environment, we focused on reps' ability to make service

interactions as effortless as possible. We also factored in other quality indicators, such as customer satisfaction levels, along with productivity measures such as average handle time.

Our results departed dramatically from what managers expect: Empathizers don't come out on top; Controllers do. The latter outperform all other types of reps on a host of quality and performance measures—most notably, reducing the effort required of customers. Yet service managers like this profile least: Only 2% said they would hire Controllers ahead of other types.

Simply Solve Customers' Problems

CEB data from more than 100,000 customers worldwide shows that interactions with service reps are four times likelier to lead to customer *disloyalty* than to loyalty. So, as we've argued elsewhere (see the "Further Reading" box), companies should focus on sparing customers grief rather than trying to delight them with over-the-top service. Here are some suggestions:

Improve self-service tools.

Customers may not need live help if self-service channels are simple and intuitive. That doesn't have to mean big investments in new technologies. A leading credit card company, for instance, designed an interactive tool that customers see as soon as they visit the support website. The tool asks two questions about the reason for their visit and then guides them to the optimal channel for solving the matter. This approach helped cut interactions via e-mail (a particularly high-cost and low-satisfaction channel) by a third.

Preempt repeat calls.

Why do Controllers do better than their counterparts? Our structured interviews revealed that they are driven to deliver fast, easy service and are comfortable exerting their strong personalities in order to demonstrate their expertise. They describe themselves as "take charge" people who are more interested in building and following a plan than "going with the flow," even in social situations. They're confident decision makers, especially when nobody's in charge, and they're opinionated and vocal. As one Controller explained, "I like to take control of the situation and guide people."

And as the problems reps deal with have become more complicated, Controllers have turned out to be the best problem solvers. Not only do they proactively diagnose customer issues, but they also consider the customer's personality and the context of the call in order to customize a solution and present it effectively. Controllers focus less on asking customers what they'd like to do and more on telling them what they *should* do—the aim always being to get to the fastest and easiest resolution. The conversation feels decidedly

Don't obsess about resolving customer issues in a single phone call or e-mail; instead, concentrate on "next-issue avoidance." Customers often recontact companies when the fix for their original problem creates a new concern. So be proactive: Help with whatever people call about, but also address issues they're apt to call back about. One of our clients, a utility provider, texts customers with status updates about how it's handling their issues—a strategy that prevents repeat calls to check on work-order progress.

Use "experience engineering" techniques.

Another effective strategy involves training frontline representatives to shape people's perceptions of the customer service experience. For example, you can teach your team how to use language to influence customers' reactions to disappointing answers or proposed solutions. Consider the cable operator whose subscribers were annoyed to be given an eight-hour service window for next-day repairs. Today the company's reps make that all-day window more palatable by offering another option: a two-hour window in three business days. Faced with a slower response, the vast majority of customers gladly take the eight-hour window.

human and off-script: Controllers tend to shun generic language and prescribed checklists, especially when their diagnosis suggests that customers have already invested significant time trying to resolve an issue on their own.

Consciously or not, Controllers deliver what information-saturated customers want (according to the research): clear guidance instead of excessive choice. In CEB's customer contact practice, for example, we've found that 84% of customers would prefer a straightforward solution to their problem rather than a broad array of self-service channels (e-mail, chat, social media-based service, and so on). In our sales practice, we've discovered that providing customers with prescriptive guidance that simplifies big purchase decisions leads to far lower levels of buyer's remorse. And in our marketing practice, we've found that brands scoring in the top quartile of the "decision simplicity index" are 85% likelier than those in the bottom quartile to be purchased by consumers.

Managers looking to shift to a Controller approach in their service interactions face three pressing challenges: hiring more Controllers; teaching other types of reps the skills necessary to create a

Controller experience with customers; and rebuilding the climate of the service organization to encourage and reward Controller behavior.

Hiring Controllers

Controllers accounted for only 15% of the customer service reps in our sample. Given their scarcity and their superior performance, you might assume they'd be harder to attract or more expensive to hire than other candidates. To test this, we studied a panel of 1,022 job seekers. After classifying each job seeker as one of the seven rep types, we tested each group's appetite for frontline customer service roles. Controllers, we found, are just as likely as other reps to accept a job paying under \$35,000 a year (the average for contact center workers), are less likely to hold a college degree, and are more likely to apply for a frontline customer service job.

ESSENTIAL BACKGROUND

How to Fix Customer Service

CUSTOMER SERVICE WEBINAR by Matthew Dixon

Featuring Matthew Dixon, group leader, CEB, and co-author of multiple Harvard Business Review articles, including "Kick-Ass Customer Service: Customers Want Results—Not Sympathy."

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This doesn't mean that hiring Controllers is easy. A number of obstacles stand in the way. First, the messaging that companies typically use to attract candidates to frontline service positions is more likely to repel than attract Controllers. Our team audited the job postings of several dozen *Fortune* 500 companies and found that the firms all used much the same language to describe their frontline rep positions—though, ironically, many of them tout the unique, differentiated customer

service they offer. These firms tend to call for candidates with "proven customer service skills," thereby limiting the candidate pool to applicants with previous service experience (who, according to our data, are far less likely to be Controllers).

These companies also offer a highly generic employment value proposition: Virtually every posting we reviewed promised some version of "challenging career opportunities" and a "culture that rewards performance." Additionally, the typical postings signaled a desire for candidates who conform to old stereotypes of customer service workers—people who "can meet quality and productivity standards," deliver service "through the use of multiple systems, applications, administrative processes, and operational tools," and "work an eight-hour shift." Unfortunately, this sort of role is exactly the opposite of what Controllers are looking for. In our interviews, they indicated a clear preference for the flexibility to express their personality and handle issues as they think best. A posting that describes a rote and mechanistic service role tells Controllers that the

company is seeking factory floor drones who can follow rules and procedures, not knowledge workers who will be trusted to exercise their own judgment to deliver superior customer service. That's a deal breaker for Controllers.

By rewriting job postings, companies can powerfully influence whom they attract. Macquarie Telecom, in Australia, surveyed its high-performing reps to find out what excited them about their work and then crafted a job posting to draw attention to those features. The company promises that reps will “serve as the customer’s primary point of contact” and “own customer issues, from start to finish.” Job listings also include phrases picked up from Macquarie supervisors, who describe their best customer service staffers as “keen problem solvers” with a unique ability to “think on their feet” and as “self-starters who are comfortable taking the initiative.” Finally, Macquarie’s postings spotlight the employee benefits that high performers said they valued most—such as a world-class training program for new hires, the ability to earn industry certification, and the opportunity to work in an energetic, fast-paced environment.

Fixing the Problem—and Then Some

More than other types of service reps, Controllers take charge, directing the customer interaction and efficiently solving customers’ problems.

ACTIVITY	WHAT MOST REPS DO	WHAT CONTROLLERS DO
Engaging the customer	<p>TREAT EACH CUSTOMER IN A CONSISTENT WAY, FOLLOWING A STANDARD SCRIPT</p> <p>“First, I’d like to thank you for being a loyal customer. Now how can I help you today?”</p>	<p>CUSTOMIZE THE INTERACTION TO INDIVIDUAL CUSTOMER PERSONALITIES AND CONTEXTS</p> <p>“I see that you’ve called three times recently. Let’s get this problem fixed for you.”</p>

Once an organization has learned how to draw in target candidates, it must become more aggressive about ensuring good fits. Like Macquarie, Canadian outsourcer Blue Ocean uses language designed to lure Controllers from diverse professional and personal backgrounds, not just those with prior service center experience: “If you excel at figuring out logic puzzles and logistics nightmares like organizing sports tournaments or planning long road trips with multiple vehicles, then we bet you have the right stuff.” The company also uses deflection language (“This job isn’t for the faint of heart”) and is candid about the difficulties reps face: “Sometimes you won’t know the right answer, but you’re the kind of person who is always up for the challenge. You’ll rely on your resources and quickly research a response—and sometimes

Pinpointing the problem	<p>STICK TO PRESCRIBED CHECKLISTS AND STEPS</p> <p>"First, we'll need to install the latest version of the software."</p>	<p>IDENTIFY WHAT CUSTOMERS HAVE ALREADY DONE ON THEIR OWN AND SKIP AHEAD TO THE RIGHT NEXT STEP FOR THEM</p> <p>"OK, if you've followed all the troubleshooting advice on the website, then you've obviously already installed the latest software. Let's try something else."</p>
Presenting solutions	<p>GIVE CUSTOMERS A CHOICE OF RESOLUTION OPTIONS</p> <p>"You can mail your device back to us at this address. Or you can bring it to one of our stores for a replacement."</p>	<p>PRESCRIBE THE FASTEST AND EASIEST RESOLUTION PATH</p> <p>"I don't see your device in stock at your local store. I'd recommend mailing us your old one—you'll get a replacement a lot faster."</p>
Resolving issues	<p>SOLVE ONLY THE PROBLEM THE CUSTOMER CALLED ABOUT</p> <p>"Have I fully resolved your issue today?"</p>	<p>ANTICIPATE AND RESOLVE ADDITIONAL POTENTIAL PROBLEMS</p> <p>"Customers in your situation often end up facing a related issue. Let me tell you about that now so you won't have to call back</p>

you'll just have to Google it." Clearly defining expectations not only dissuades poor-fit candidates—who are more likely to leave in the days and weeks following their initial training—but also signals that the service organization has exacting standards, contradicting the assumption that anyone can do the job. Blue Ocean also takes care to combat negative stereotypes about the role, disseminating videos on social media to challenge common misperceptions and present Blue Ocean's service center opportunities in a favorable light.

Carefully crafted messaging will attract Controllers, but it won't guarantee that they'll receive safe passage through the hiring process. As we've discussed, many customer service managers have a strong preference for Empathizers and a bias against Controllers. We've created an interview guide to help overcome these biases by suggesting questions that will help identify Controllers and highlight "red flag" responses. For example, we suggest that interviewers ask, "Tell me about a time you realized that a process you've been asked to follow didn't make sense. What did you do?" and "Describe a time when you needed someone to do something right away but you knew that person is usually passive. What did you do?" Many companies we work with are using this "Controller screen" in pre-hiring interviews and

assessment tests, helping to streamline employee selection.

Teaching the Controller Mindset

Even a robust hiring approach, retooled to attract and identify Controllers, will leave companies with a significant number of other types of reps on the front lines. So in addition to better hiring, companies need to consider new approaches to talent development and performance management to help non-Controllers act more like Controllers.

Companies that have committed to imparting Controller skills have shifted their training curricula away from teaching product knowledge, rote processes for handling calls, and procedures for using systems and tools. Instead they're teaching reps to apply listening techniques and frameworks that replicate the Controller's instincts for quickly understanding what the customer needs and how to deliver the optimal personalized resolution. However, nuanced Controller skills can't be taught through traditional classroom instruction alone. Companies intent on developing Controller skills are increasingly moving toward on-the-job, manager-led coaching that helps reps attain greater mastery over time.

Unfortunately, most frontline managers confuse coaching with performance management. In the typical service organization, most coaching is an episodic, "check the box" exercise done away from the floor, usually once every week or two. These sessions often involve reviewing recorded calls from days or weeks prior, making reps struggle to recall and explain the details. And because the focus tends to be on what went wrong rather than why it happened, the sessions can feel punitive rather than constructive.

Though such coaching is common, in a study of more than 300 frontline customer service managers, we found that some managers use more-effective "integrated coaching"—interactions that happen on the floor in short bursts during the regular daily workflow. We saw a dramatic difference in the impact of the two coaching styles. Teams for which the majority of coaching was of the integrated variety performed 12% higher than average on company-reported quality and productivity metrics. Just as significantly, when managers focused on scheduled coaching, those teams performed 5% lower than average.

Building a Controller-Friendly Service Organization

Controllers value being allowed to solve problems in a way that doesn't require strict adherence to a rigid protocol. They also prize the freedom "to bring up problems with policies and procedures"—they want to be part of organizations that are serious about continual improvement and willing to

give reps a voice in that process.

Creating this sort of climate—where reps are permitted to exercise judgment and help identify improvement opportunities—requires new ways of managing individual performance and team engagement. First, from a performance management perspective, companies must rethink their current “checklist” approach to quality assurance. The traditional QA method—which requires reps to stick very closely to a defined call process and scripted interactions (“Say the customer’s name three times,” “Apologize for any difficulty the customer may be experiencing,” “Always thank the customer for being loyal,” and so on)—runs directly contrary to a Controller approach.

One large bank replaced its QA checklist with a “flexible competency framework.” Rather than scoring reps on their ability to stick to a script, the bank assesses them on core competencies such as negotiation and rapport building. Its framework doesn’t tell them what to say but instead describes behaviors on a spectrum of performance from “novice” to “expert.” For example, a novice might “talk over the customer,” while a more advanced rep would “use a collaborative and assertive tone.” By articulating the characteristics of high performance in each competency but not dictating a precise script, the bank leaves reps to exercise their own judgment in individual customer interactions—and to be evaluated by managers accordingly.

The bank’s client interaction outcomes have dramatically improved as a result of this change. The approach helped fuel both a 5% increase in the number of customers paying their balances during the calls and a 30% improvement in customers’ committing to a payment plan. The new framework also helped reduce rep appeals of QA scores. Previously the bank saw an average of 20 to 30 appeals each month—a rate that’s since dropped to fewer than five a month. Said one of the organization’s QA managers, “You want people to become experts in the skills that matter—not experts at rotely following directions. Our staff feel like the handcuffs have been removed.”

Further Reading

For more on improving the service experience for customers by reducing their effort, see the following:
“Stop Trying to Delight Your Customers”
Matthew Dixon, Karen Freeman, and

In addition to approaching performance management differently, companies need to employ new vehicles for soliciting feedback from reps and involving them in creating a better customer experience. Fidelity Investments created an online discussion platform for reps to

Nicholas Toman
HBR, July-August 2010

"To Keep Your Customers, Keep It Simple"
Patrick Spenner and Karen Freeman
HBR, May 2012

*The Effortless Experience: Conquering the
New Battleground for Customer Loyalty*
Matthew Dixon, Nick Toman, and Rick
DeLisi
Portfolio/Penguin, 2013

funnel improvement ideas to senior management and seek colleagues' advice on how to handle customer issues. The forum is moderated by veteran service reps who act as conduits between the rep community and management, passing the best ideas along to the leadership team and communicating responses back to their fellow reps. In the forum's first year, reps posted more than 3,000 comments, including 350 ideas that management considered worthy of further evaluation. For example, reps identified a website timeout issue that was frustrating customers and leading to increased calls—a problem that was

rapidly fixed once it came to light. More than 100 improvement ideas have since been approved by senior management, helping the organization to save more than \$4 million.

Another major financial institution, in Australia, likewise created a process for inviting improvement ideas from reps. The company has a quarterly "Have Your Say Day," when reps present concepts to senior management. To help reps prepare, the company provides after-hours coaching on building business cases, making presentations to leaders, and developing project plans. Proposals are scored by management against standard criteria relating to financial impact, customer impact, ease of implementation, and other factors, and those clearing a defined score threshold are green-lighted for action. In addition to surfacing dozens of improvement opportunities—for instance, consolidating an internal function in the contact center, which reduced call transfers and generated efficiency gains of 350,000 Australian dollars annually—the effort has led to an 11% improvement in frontline staff engagement.

CONCLUSION

When we share our research with managers, they sometimes cringe at the thought of a service organization full of Controllers, let alone Controllers interacting with their most frustrated and troubled customers. Managers frequently tell us that Controllers "wouldn't be a good cultural fit" and would lack the requisite empathy to succeed. But our interviews reveal that Controllers are, in

fact, quite empathetic. They do understand customers' needs and frustrations. But they respond in a distinctive way. They recognize that after toiling away online trying to self-serve, customers don't want an apology—they want a solution.

A version of this article appeared in the January–February 2017 issue (pp.110–117) of *Harvard Business Review*.



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larissa silva 2 months ago

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Forrester's Top Trends For Customer Service In 2016

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Kate Leggett
Vice President, Principal Analyst

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Forrester's Top Trends For Customer Service In 2016

to purchase, or help a customer resolve an issue post-purchase should be easy, effective, and strive to create an emotional bond between the customer and the company. Here are 5 top trends – out of a total of 10 – that I am keeping my eye on. [My full report highlighting all trends can be found here:](#)

Trend 1: Companies Will Make Self Service Easier. In 2015, we found that web and mobile self-service interactions exceeded interactions over live-assist channels, which are increasingly used by customers as escalation paths to answer harder questions whose answers they can't find online. In 2016, customer service organizations will make self-service easier for customers to use by shoring up its foundations and solidifying their knowledge-management strategy. They will start to explore virtual agents and communities to extend the reach of curated content. They will start embedding knowledge into devices – [like Xerox does with its printers](#) – or delivering it via wearables to a remote service technician.

Trend 2: Field Service Will Empower Customers To Control Their Time. 73% of consumers say that valuing their time is the most important thing a company can do to provide them with good service – whether on a call, in a chat, or while waiting for a service technician to troubleshoot and fix their product. In 2016, customer service organizations will better support customer journeys that start with an agent-assisted service interaction and end with a service call. They will explore lighter-weight field service management capabilities, which give customers self-service appointment management capabilities and allow agents to efficiently dispatch technicians and manage their schedules.

Trend 3: Prescriptive Advice Will Power Offers, Decisions, And Connections. Decisioning – automatically deciding a customer's or system's next action – is starting to be heavily leveraged in customer service. In 2016, organizations will use analytics in a much more prescriptive manner – for example to prescribe the right set of steps for customers or agents to more effectively service customers; to correlate online behavior with requests for service and prescribe changes to agent schedules and forecasts. Analytics will be used to better route a customer to an agent who can most effectively answer a question based on skills and behavior data, or to better understand customer call patterns and preempt future calls.

Trend 4: Insights From Connected Devices Will Trigger Preemptive Service and

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2/4

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Forrester's Top Trends For Customer Service In 2016

abound where companies are starting to monitor the state of equipment via IoT, and realizing new streams of revenue because of their customer-centric focus. To make the business model of IoT work, companies must keep a close eye on emerging [interoperability standards](#): device-to-network connectivity, data messaging formats that work under constrained network conditions, and data models to aggregate, connect with contact center solutions, and act on the data via triggers, alerts to service personnel or automated actions.

Trend 5: The Customer Service Technology Ecosystem Will Consolidate. The customer service process involves complex software that falls into [three main categories](#): queuing and routing technologies, customer relationship management (CRM) customer service technologies, and workforce optimization technologies. You need to use solutions from each of these three software categories, which you must integrate to deliver quality customer service. We believe that the combination of: 1) mature software categories in which vendors are struggling with growth opportunities; 2) the rise of robust software-as-a-service (SaaS) solutions in each category; 3) rising buyer frustration; and 4) the increasing importance of delivering simpler and smarter customer service makes for ripe conditions for further consolidation to happen in the marketplace. This consolidation will make it easier for buyers to support the end-to-end customer service experience with a single set of vendor solutions.

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3/4

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4/4

Harvard
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Review

CUSTOMER SERVICE

Stop Trying to Delight Your Customers

by Matthew Dixon, Karen Freeman, and Nicholas Toman

FROM THE JULY-AUGUST 2010 ISSUE

The idea that companies must “delight” their customers has become so entrenched that managers rarely examine it. But ask yourself this: How often does someone patronize a company specifically because of its over-the-top service? You can probably think of a few examples, such as the traveler who makes a point of returning to a hotel that has a particularly attentive staff. But you probably can't come up with many.

Now ask yourself: How often do consumers cut companies loose because of terrible service? All the time. They exact revenge on airlines that lose their bags, cable providers whose technicians keep them waiting, cellular companies whose reps put them on permanent hold, and dry cleaners who don't understand what “rush order” means.

Obstacles All Too Common

Most customers encounter loyalty-eroding problems when they engage with customer service.

56% report having to re-explain an issue

57% report having to switch from the web to the phone

59% report expending moderate-to-high effort to resolve an issue

59% report being transferred

Consumers' impulse to punish bad service—at least more readily than to reward delightful service—plays out dramatically in both phone-based and self-service interactions, which are most companies' largest customer service channels. In those settings, our research shows, loyalty has a lot more to do with how well companies deliver on their basic, even plain-vanilla promises than on how dazzling the service

62% report having to repeatedly contact the company to resolve an issue

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experience might be. Yet most companies have failed to realize this and pay dearly in terms of wasted investments and lost customers.

The Bad-Service Ripple Effect

Service failures not only drive existing customers to defect—they also can repel prospective ones. Our research shows:

25% of customers are likely to say something positive about their customer service experience

65% are likely to speak negatively

23% of customers who had a positive service interaction told 10 or more people about it

48% of customers who had negative experiences told 10 or more others

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To examine the links between customer service and loyalty, the Customer Contact Council, a division of the Corporate Executive Board, conducted a study of more than 75,000 people who had interacted over the phone with contact-center representatives or through self-service channels such as the web, voice prompts, chat, and e-mail. We also held hundreds of structured interviews with customer service leaders and their functional counterparts in large companies throughout the world. (For more detail, see the sidebar “About the Research.”) Our research addressed three questions:

- How important is customer service to loyalty?
- Which customer service activities increase loyalty, and which don't?

- Can companies increase loyalty without raising their customer service operating costs?

About the Research

We defined "loyalty" as customers' intention to continue doing business with a company, increase their spending, or say good things about it (or refrain from saying bad things). During a three-year period, we surveyed more than 75,000 B2C and B2B customers about their recent service interactions in major non-face-to-face channels, including live phone calls, voice prompts, web, chat, and e-mail. The companies represent dozens of industries, ranging from consumer electronics and packaged goods to banking and travel and leisure, in North America, Europe, South Africa, Australia, and New Zealand. We isolated the elements of each interaction that drove customer loyalty, both positively and negatively, and controlled for variables including the type of service issue, whether it was handled by an in-house or an outside contact center, the rep's tenure with the company, the company's size, the customer's personality type, the customer's mood prior to the interaction, switching costs, the frequency with which ads were seen or heard, the perceived product quality and value, product price, the industry, and the specific company. Finally, we conducted several hundred structured interviews in order to understand companies' customer

Two critical findings emerged that should affect every company's customer service strategy. First, delighting customers doesn't build loyalty; reducing their effort—the work they must do to get their problem solved—does. Second, acting deliberately on this insight can help improve customer service, reduce customer service costs, and decrease customer churn.

Trying Too Hard

According to conventional wisdom, customers are more loyal to firms that go above and beyond. But our research shows that exceeding their expectations during service interactions (for example, by offering a refund, a free product, or a free service such as expedited shipping) makes customers only marginally more loyal than simply meeting their needs.

For leaders who cut their teeth in the service department, this is an alarming finding. What contact center doesn't have a wall plastered with letters and e-mails from customers praising the extra work that service reps went to on their behalf? Indeed, 89 of the 100 customer service heads we surveyed said that their main strategy is to exceed expectations. But despite these Herculean—and costly—efforts, 84% of customers told us that their expectations had not been

exceeded during their most recent interaction.

One reason for the focus on exceeding expectations is that fully 80% of customer service organizations use customer satisfaction (CSAT) scores as the primary metric for gauging the customer's experience. And managers often assume that the more satisfied customers are, the more loyal they will be. But, like others before us (most notably Fred Reichheld), we find little relationship between satisfaction and loyalty. Twenty percent of the "satisfied" customers in our study said they intended to leave the company in question; 28% of the "dissatisfied" customers intended to stay.

The picture gets bleaker still. Although customer service can do little to increase loyalty, it can (and typically does) do a great deal to undermine it. Customers are four times more likely to leave a service interaction disloyal than loyal.

Another way to think about the sources of customer loyalty is to imagine two pies—one containing things that drive loyalty and the other containing things that drive disloyalty. The loyalty pie consists largely of slices such as product quality and brand; the slice for service is quite small. But service accounts for most of the disloyalty pie. We buy from a company because it delivers quality products, great value, or a compelling brand. We leave one, more often than not, because it fails to deliver on customer service.

Make It Easy

Let's return to the key implication of our research: When it comes to service, companies create loyal customers primarily by helping them solve their problems quickly and easily. Armed with this understanding, we can fundamentally change the emphasis of customer service interactions. Framing the service challenge in terms of making it easy for the customer can be highly illuminating, even liberating, especially for companies that have been struggling to delight. Telling frontline reps to exceed customers' expectations is apt to yield confusion, wasted time and effort, and costly giveaways. Telling them to "make it easy" gives them a solid foundation for action.

Telling reps to exceed customers' expectations is apt to yield confusion, wasted time and effort, and costly giveaways.

What exactly does “make it easy” mean? Simply: Remove obstacles. We identified several recurring complaints about service interactions, including three that focus specifically on customer effort. Customers resent having to contact the company repeatedly (or be transferred) to get an issue resolved, having to repeat information, and having to switch from one service channel to another (for instance, needing to call after trying unsuccessfully to solve a problem through the website). Well over half the customers we surveyed reported encountering difficulties of this sort. Companies can reduce these types of effort and measure the effects with a new metric, the Customer Effort Score (CES), which assigns ratings from 1 to 5, with 5 representing very high effort. (For details, see the sidebar “Introducing the Customer Effort Score.”)

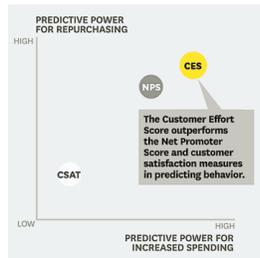
Introducing the Customer Effort Score

We evaluated the predictive power of three metrics—customer satisfaction (CSAT), the Net Promoter Score (NPS), and a new metric we developed, the Customer Effort Score (CES)—on customer loyalty, defined as customers’ intention to keep doing business with the company, increase the amount they spend, or spread positive (and not negative) word of mouth. Not surprisingly, CSAT was a poor predictor. NPS proved better (and has been shown to be a powerful gauge at the company level). CES outperformed both in customer service interactions.

During our study, we saw many companies that had successfully implemented low-customer-effort approaches to service. Following are five of the tactics they used—tactics that every company should adopt.

1. Don’t just resolve the current issue—head off the next one.

By far the biggest cause of excessive customer effort is the need to call back. Many companies believe they’re performing well in this regard, because they have strong first-contact-resolution (FCR) scores. (See the sidebar “What Should You Measure?”) However, 22% of repeat calls involve downstream issues related to the problem that prompted the original call, even if that problem itself was adequately addressed the first time around. Although companies are well equipped to anticipate and “forward-resolve” these issues, they rarely do so, generally because they’re overly focused on managing call time. They need to realize that customers gauge the effort they expend not just in terms of how an individual call is handled but also according to how the company



CES is measured by asking a single question: "How much effort did you personally have to put forth to handle your request?" It is scored on a scale from 1 (very low effort) to 5 (very high effort). Customer service organizations can use CES, along with operational measurements of such things as repeat calls, transfers, and channel switching, to conduct an "effort audit" and improve areas where customers are expending undue energy. Many of the companies we work with use CES to intervene with customers at risk of defecting.

We found the predictive power of CES to be strong indeed. Of the customers who reported low effort, 94% expressed an intention to repurchase, and 88% said they would increase their spending. Only 1% said they would speak negatively about the company. Conversely, 81% of the customers who had a hard time solving their problems reported an intention to spread negative word of mouth.

We believe that the superior performance of CES in the service environment derives from two factors: its ability to capture customer impressions at the transactional level (as opposed to NPS, which captures

manages evolving service events, such as taking out a mortgage or setting up cable service, that typically require several calls.

What Should You Measure?

The number one cause of undue effort for customers interacting with contact centers is the need to call back because their issue wasn't resolved on the first attempt.

Companies trying to measure how well reps resolve issues in a single call typically use the first-contact-resolution (FCR) metric, but fully half the time that doesn't supply information about repeat calls and the reasons behind them. Tracking repeat calls within a specified period (we recommend seven to 14 days) is not only easier than measuring FCR but also casts a wider net, capturing the implicit, or nonobvious, reasons customers call back, such as related downstream issues or an emotional disconnect with a rep. A word of caution: Tracking repeat calls instead of using FCR inevitably makes performance appear worse. However, we believe that it is a far better way to spot and eliminate sources of undue customer effort and that it can help companies boost loyalty in ways FCR cannot.

Bell Canada met this challenge by mining its customer interaction data to understand the relationships among various customer issues. Using what it learned about "event clusters," Bell began training its reps not only to resolve the

more-holistic impressions of a company) and its ability to capture negative experiences as well as positive ones.

A related diagnostic tool, the Customer Effort Audit, can be downloaded at <http://www.executiveboard.com/salesandm/Customereffortaudit.html>.

customer's primary issue but also to anticipate and address common downstream issues. For instance, a high percentage of customers who ordered a particular feature called back for instructions on using it. The company's service reps now give a quick tutorial to customers about key aspects of the feature before hanging up. This sort of forward resolution enabled Bell to reduce its "calls per event" by 16% and its customer

churn by 6%. For complex downstream issues that would take excessive time to address in the initial call, the company sends follow-up e-mails—for example, explaining how to interpret the first billing statement. Bell Canada is currently weaving this issue-prediction approach into the call-routing experience for the customer.

Fidelity uses a similar concept on its self-service website, offering "suggested next steps" to customers executing certain transactions. Often customers who change their address online call later to order new checks or ask about homeowners' or renters' insurance; therefore, Fidelity directs them to these topics before they leave the site. Twenty-five percent of all self-service transactions on Fidelity's website are now generated by similar "next issue" prompts, and calls per household have dropped by 5% since the policy began.

2. Arm reps to address the emotional side of customer interactions.

Twenty-four percent of the repeat calls in our study stemmed from emotional disconnects between customers and reps—situations in which, for instance, the customer didn't trust the rep's information or didn't like the answer given and had the impression that the rep was just hiding behind general company policy. With some basic instruction, reps can eliminate many interpersonal issues and thereby reduce repeat calls.

One UK-based mortgage company teaches its reps how to listen for clues to a customer's personality type. They quickly assess whether they are talking to a "controller," a "thinker," a "feeler," or an "entertainer," and tailor their responses accordingly, offering the customer the balance of detail and speed appropriate for the personality type diagnosed. This strategy has reduced repeat calls by a remarkable 40%.

One company teaches its reps how to listen for clues to a customer's personality type and tailor their responses accordingly.

The lighting company Osram Sylvania sifts through its call transcripts to pinpoint words that tend to trigger negative reactions and drive repeat calls—words like “can’t,” “won’t,” and “don’t”—and coaches its reps on alternate phrasing. Instead of saying “We don’t have that item in stock,” a rep might explain, “We’ll have stock availability for that item in two weeks.” Through such simple changes in language, Osram Sylvania has lowered its Customer Effort Score from 2.8 to 2.2—18.5% below the average we see for B2B companies.

LoyaltyOne, the operator of the AIR MILES reward program, teaches reps to probe for information they can use to better position potentially disappointing outcomes. A rep dealing with a customer who wants to redeem miles for an unavailable flight might learn that the caller is traveling to an important business meeting and use this fact to put a positive spin on the need to book a different flight. The rep might say, “It sounds like this is something you can’t be late for. The Monday morning flight isn’t available, but with potential delays, you’d be cutting it close anyway. I’d recommend a Sunday evening flight so that you don’t risk missing your meeting.” This strategy has resulted in an 11% decrease in repeat contacts.

3. Minimize channel switching by increasing self-service channel “stickiness.”

Many companies ask, “How can we get our customers to go to our self-service website?” Our research shows that in fact many customers have already been there: Fifty-seven percent of inbound calls came from customers who went to the website first. Despite their desire to have customers turn to the web, companies tend to resist making improvements to their sites, assuming that only heavy spending and technology upgrades will induce customers to stay there. (And even when costly upgrades are made, they often prove counterproductive, because companies tend to add complicated and confusing features in an attempt to keep up with their competitors.)

Customers may become overwhelmed by the profusion of self-service channels—interactive voice response, websites, e-mail, chat, online support communities, social media such as Facebook and Twitter, and so on—and often lack the ability to make the best choice for themselves. For example,

technically unsophisticated users, left to their own devices, may go to highly technical online support communities. As a result, customers may expend a lot of effort bouncing between channels, only to pick up the phone in the end.

Cisco Consumer Products now guides customers to the channel it determines will suit them best, on the basis of segment-specific hypotheses generated by the company's customer experience team. Language on the site's home page nudges technology gurus toward the online support community; those with less technical expertise are steered toward knowledge articles by the promise of simple step-by-step instructions. The company eliminated the e-mail option, having found that it didn't reliably reduce customer effort. (Our research shows that 2.4 e-mails, on average, are needed to resolve an issue, compared with 1.7 calls.) When Cisco Consumer Products began this program, in 2006, only 30% of its customer contacts were handled through self-service; the figure today is 84%, and the volume of calls has dropped accordingly.

Travelocity reduced customer effort just by improving the help section of its website. It had learned that many customers who sought solutions there were stymied and resorted to the phone. By eliminating jargon, simplifying the layout, and otherwise improving readability, the company doubled the use of its "top searches" and decreased calls by 5%.

4. Use feedback from disgruntled or struggling customers to reduce customer effort.

Many companies conduct postcall surveys to measure internal performance; however, they may neglect to use the data they collect to learn from unhappy customers. But consider National Australia Group's approach. The company has frontline reps specifically trained to call customers who have given it low marks. The reps focus first on resolving the customers' issues, but they also collect feedback that informs service improvements. The company's issue-resolution rate has risen by 31%.

Such learning and intervention isn't limited to the phone channel. Some companies monitor online behavior in order to identify customers who are struggling. EarthLink has a dedicated team of reps who step in as needed with clients on its self-service website—for example, by initiating a chat with a customer who has spent more than 90 seconds in the knowledge center or clicked on the "Contact Us" link. This program has reduced calls by 8%.

5. Empower the front line to deliver a low-effort experience.

Incentive systems that value speed over quality may pose the single greatest barrier to reducing customer effort. Most customer service organizations still emphasize productivity metrics such as average handle time when assessing rep performance. They would be better off removing the productivity “governors” that get in the way of making the customer’s experience easy.

An Australian telecommunications provider eliminated all productivity metrics from its frontline reps’ performance scorecards. Although handle time increased slightly, repeat calls fell by 58%. Today the company evaluates its reps solely on the basis of short, direct interviews with customers, essentially asking them if the service they received met their needs.

Freed to focus on reducing customer effort, frontline reps can easily pick low-hanging fruit. Ameriprise Financial, for example, asks its customer service reps to capture every instance in which they are forced to tell a customer no. While auditing the “no’s,” the company found many legacy policies that had been outmoded by regulatory changes or system or process improvements. During its first year of “capturing the no’s,” Ameriprise modified or eliminated 26 policies. It has since expanded the program by asking frontline reps to come up with other process efficiencies, generating \$1.2 million in savings as a result.

Some companies have gone even further, making low customer effort the cornerstone of their service value proposition and branding. South Africa’s Nedbank, for instance, instituted an “AskOnce” promise, which guarantees that the rep who picks up the phone will own the customer’s issue from start to finish.

The immediate mission is clear: Corporate leaders must focus their service organizations on mitigating disloyalty by reducing customer effort. But service managers fretting about how to reengineer their contact centers—departments built on a foundation of delighting the customer—should consider this: A massive shift is under way in terms of customers’ service preferences. Although most companies believe that customers overwhelmingly prefer live phone service to self-service, our most recent data show that customers are, in fact, indifferent. This is an important tipping point and probably presages the end of phone-based service as the primary channel for

customer service interactions. For enterprising service managers, it presents an opportunity to rebuild their organizations around self-service and, in the process, to put reducing customer effort firmly at the core, where it belongs.

A version of this article appeared in the July–August 2010 issue of *Harvard Business Review*.



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**CONNECTING SATISFACTION WITH
NEXT-GENERATION FIELD SERVICE
TECHNOLOGIES**

HOW COMPANIES MANAGE SERVICE OPERATIONS TO
DELIVER ON CUSTOMER AND EMPLOYEE EXPECTATIONS

A 2017 Field Service USA Report | featuring direct insights from field service experts





TABLE OF CONTENTS

1	Introduction
2	Identifying Holistic Field Service Solutions
8	Smart Technologies Boost Core Competencies
12	Building Next-Generation Service Teams
14	Conclusion
15	Authors

INTRODUCTION

Field service companies are at a turning point in their history as customer and employee demand for empowerment and visibility coincides with an enormous transition of responsibilities from veteran technicians to new field service recruits. While the vast majority of these companies acknowledge that creating outcome-based business models with the help of new technologies is essential to meeting those requirements, many doubt their ability to develop these solutions sufficiently to deliver on both customer and employee demands.

In many ways, the industry has not changed. Customer satisfaction remains the most widely acknowledged KPI among these companies and their greatest pressure over the next twelve months. However, field service companies are discovering that their old models for achieving customer satisfaction are no longer sufficient. Demands for better service performance and greater visibility into processes are the source of their new, intrinsic problem.

Nonetheless, the solutions are within their reach. By leveraging new field service technologies—such as mobile applications and remote access to experts—and making incremental process improvements, these companies can both facilitate the success of their new employees and deliver on customer

expectations. This requires a holistic approach in which workforce optimization and technology adoption strategies extend to service efficiency, greater customer visibility, and greater collaboration across departments and among remote workers in the field. Although field service companies must take all of these factors into consideration—next-generation technologies, knowledge management, and enabling customer satisfaction—they are finding that each contributes to the success of the other in a smart, next-generation field service environment.

In partnership with DSI, creator of mobile-first and cloud supply chain solutions, Field Service USA conducted a study of 100 industry leaders to gauge success metrics and preparedness among field service companies. In this report, we explore:

- the connections between new technologies and customer satisfaction
- customer and employee demands for greater visibility into service processes, including requesting service, accessing service history, and both inspecting and approving work
- Internet of Things (IoT) and other methods for improving field service capabilities
- knowledge management and readiness for the next-generation of field service employees

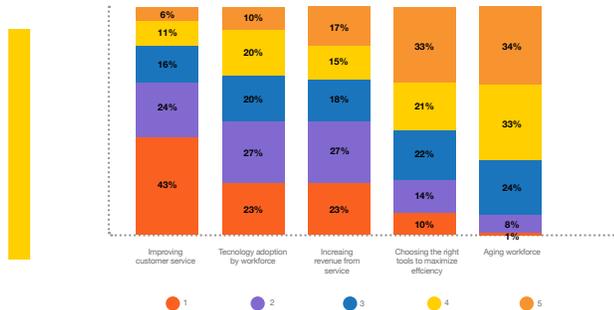
IDENTIFYING HOLISTIC FIELD SERVICE SOLUTIONS

In our study, field service companies acknowledge that successful customer service hinges on the expertise, resources, and timeliness of its technicians and staff. Among the options available, the largest group of field service companies (43%) considers improving customer service the greatest pressure facing their businesses for the next 12 months, and another 24% consider improving customer service their second-greatest pressure.

Improving customer service is the greatest pressure facing field service companies for the next 12 months. In fact, customer satisfaction is a relevant metric to more companies than any other metric in the study.

But while customer service is a top two priority for 67% of field service companies, technology adoption by their workforce—a challenge that spans generations—is the greatest or second-greatest pressure facing 50% of field service companies for the next twelve months.

Among the following options, please rank the top five pressures your business is facing for the next 12 months, where "1" is "greatest pressure" and "5" is "least greatest pressure."



Meanwhile, driving revenue from services is an additional priority among field service companies, in no small part related to improving customer service. 54% consider choosing the right tools to maximize efficiency as their least or second-least greatest pressure, and 67% consider an aging workforce as such.

What specific challenges are you looking to overcome in 2018?

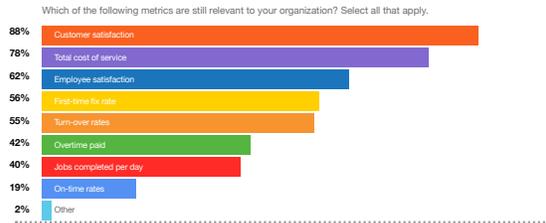
"Keeping both staff and customers happy. It is vital that our staff is happy to ensure efficient service delivery so that eventually customers are happy. But with the changing and expanding needs of customers... we certainly have a challenge."

"Technology is now the real challenge. There is no clarity on the best technology; and as the technology landscape is changing all the time, it is very difficult to adjust."

What emerges is a clear set of themes—maximizing efficiency and productivity to improve customer service and subsequently drive revenue. To this end, field service companies must take on requisite challenges associated with technology adoption and training. This applies to both existing employees and younger recruits with expectations as to what technology resources will be available to them. Preserving and improving satisfaction among both customers and employees in order to drive revenue command the greatest executive attention, where aging employees is perhaps a less direct concern.

Critical Factors for Technology Adoption

Just as customer service is the greatest pressure field service companies are facing over the next twelve months, customer satisfaction is a relevant metric among the greatest number of companies (88%) today, between eight options available. Total cost of service (78%) and employee satisfaction (62%) are also relevant to a majority of organizations.



Adopting new technologies can improve opportunities to meet these three related criteria directly—improve service quality, reduce costs, and improve employee satisfaction. However, field service companies face challenges in adopting new technologies on two fronts: first, incorporating new technologies into their regular workflow; and second, facilitating the success of a new generation of employees with greater familiarity—and greater expectations—in terms of technology capabilities.

What strategies are you using to manage the shift to new technologies?

"Technology is changing fast and so are the demands of our customers. We need to be able to adapt to these changes as quickly as possible and certainly ahead of our competitors."

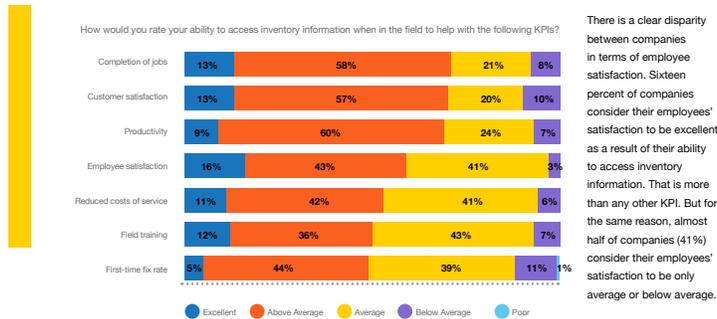
"Coupling technology between designers, engineers, and staff, which will enable on-field staff to make better, informed, and agiler field decisions."

"We are increasing our spend on IT and making the most efficient use of newer services and technologies to bring better revenues."

Smaller majorities include first-time fix rate (56%) and turn-over rates (55%). Fewer than half of field service organizations find that overtime paid (42%), jobs completed per day (40%), and on-time rates (19%) continue to be relevant metrics to their organizations. 2% of organizations claim there are other relevant metrics not listed.

Achieving Field KPIs and Customer Satisfaction

Despite these priorities, field service leaders doubt their ability to deliver on customer satisfaction because of technology restraints, and these shortcomings are directly related to technology issues among field technicians. Upon considering one important field capability—accessing inventory information— we learn that only 13% of field service companies rate their ability to access inventory information when in the field to help with customer satisfaction as excellent, while 30% rate this ability as average or below average.



12% of field service companies consider their ability to access inventory information for the purpose of improving first-time fix rates as below average or poor, while only 5% consider their ability to be excellent. In fact, more field service companies consider this ability to be below average or poor than any other ability measured.

What measures are your FSOs accountable for?

"Participating in field problem-solving situations and customer acceptance."

"Communicating repair plans to technicians aligned with customer quotes to ensure profitability."

"Inventory control, merchandising, marketing, customer relations, and employee relations."

"Providing information and informal training on technical and operational fronts."

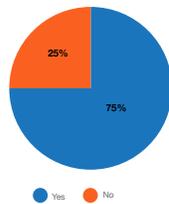
The KPIs that suffer the most among field service companies due to poor access to inventory information in the field are reduced costs of service, field training, and first-time fix rates. To reiterate, total cost of service is still a relevant metric to a majority of field service companies (78%), as are first-time fix rates (56%); but as a new workforce requires better-performing field technology and training on a range of abilities, field training becomes a greater priority among all companies, many of which are ill-equipped.

Taking on Rapidly Growing Customer Visibility Expectations

Both customers and members of the workforce demand more sophisticated technologies—for greater visibility into the field service process, as a means for validating the success of operations, or to enable better capabilities for completing services and delivering on customer expectations at the work site. In fact, customers' demands for visibility into field service processes as they affect their business have become unprecedented. Field service companies must acknowledge this essential issue and take steps to accommodate those demands while equipping workforces with the requisite skills and technologies to do so.



Do you find that your end customers (B2B and/or B2C) have greater expectations in terms of visibility into the process?



Already, 75% of companies find that their end customers (B2B or B2C) have greater expectations in terms of visibility into their processes. Now facing the regular scrutiny of their customers, field service companies need the capability to prefigure customer requirements and demands, then facilitate safe and efficient operations for each and every visit. Respondents to the survey who have encountered greater customer demand for visibility have already indicated what their customers' expectations are, and must develop the methods, guidelines, policies, and technology implementations to empower their workforce and deliver on those needs.

Among those who responded yes, how would you describe your end customers' expectations in terms of visibility? Select all that apply.



Among those companies who have found that their end customers have greater expectations in terms of visibility into their process, 87% find that their customers expect to be able to inspect work against service orders and approve, and 85% claim their customers expect the ability to request service as well. Each of these groups of respondents makes up a majority of not only those that answered in the positive to the previous question, but of *all* respondents to the survey—approximately 65% and 64%, respectively—meaning a majority of all field service companies experience these demands.

In each case, a majority of those field service companies who do have customers with greater visibility expectations find those customers expect the ability to access service history (60%) and the ability to see tech locations on a map (55%).

Customers with greater expectations in terms of visibility expect not one, but all measured capabilities, allowing greater visibility into the system. Additionally, a majority of all field service companies find that customers expect to be given the ability to inspect work against service orders and approve, and a majority of all companies find that customers expect the ability to request service.

Achieving specific KPIs like cost reduction, customer service, and employee satisfaction require more than investments in new technologies. Field service companies must shift the spotlight to real-time visibility and better communication between both team members and customers. As we will find, technology adoption is secondary to aligning customer interests to build long lasting relationships, as well as developing specifically designed applications that cater to all customer needs. When field service technicians can work with policies and procedures that help them achieve both customer and administrative goals, those companies will gain true perspective into which next-generation technologies will succeed.

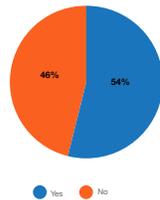


SMART TECHNOLOGIES BOOST CORE COMPETENCIES

In 2018, field service companies will launch initiatives to achieve complete visibility of service processes, proactively following up with both field service teams and customers to ensure satisfaction among both parties. This will require that companies make decisions regarding service requirements and effectively schedule field service teams with customers' prerequisites in mind. Respondents to the study claim 'schedule coherence' is a specific challenge they seek to overcome in the coming year, which includes tracking project schedules to ensure complete understanding and timely completion.

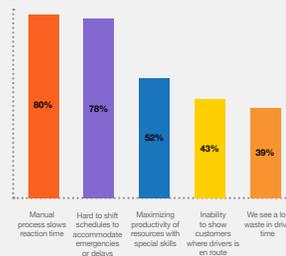
Advancements in Scheduling and Dispatching

Is scheduling and dispatching resources a challenge in your organization?



Scheduling and dispatching resources remains a persistent challenge for most field service companies. In our study, field service companies are divided in terms of whether or not they find scheduling and dispatching resources to be an obstacle: just over half of field service companies (54%) find it to be a challenge, while 46% do not. Interestingly, the key component to overcoming this challenge is better technology.

Among those who responded yes, what specific challenges do you encounter with scheduling and dispatching resources? Select all that apply.



Existing technology limitations are hurting business. Among the 54% of companies for whom scheduling and dispatching resources is a challenge, the vast majority find that their manual scheduling and dispatching processes slow reaction times (80%). Another majority of these field service companies (78%) find it is hard to shift schedules to accommodate emergencies or delays, and 43% of these companies have an inability to show customers where their driver is en route.

43% of companies who struggle with scheduling and dispatching have an inability to show customers where their driver is en route. Among companies that have customers with greater visibility expectations, 55% claim those customers expect to be able to see tech locations on a map.

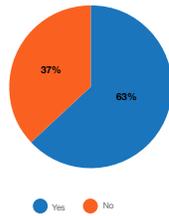
The additional major contributor to scheduling and dispatching problems is an inability to successfully dispatch and apply expertise in areas where it is most needed. Over half of this segment of field service companies (52%) struggle to maximize productivity of resources with special skills due to difficulties with scheduling and dispatching resources. 39% of companies who have difficulties with scheduling and dispatching resources experience a great deal of waste in drive times as well.

The combined lack of technological capabilities and the resulting misplacement of skills present another area in which multiple field service capabilities are related. The ultimate shortcoming is with flexibility where the unique needs of end customers cannot be met due to procedural and technological restraints. Consequently, many field service companies are adopting next-generation technologies that best deliver on the needs of their customers and employees—while others continue to lag behind.

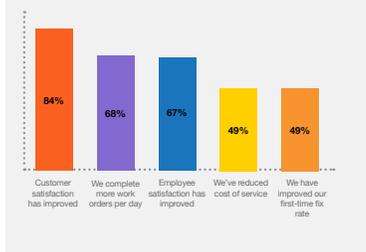


Mobile Apps Successfully Facilitate Field Work

Do you use mobile applications to facilitate work in the field?



Among those who responded yes, what benefits do you see from using mobile applications to facilitate work in the field? Select all that apply.



A majority of companies (63%) use mobile applications to facilitate work in the field, which has driven customer satisfaction for 84% of those companies (approximately 53% of all companies surveyed)—the most popular benefit of using mobile applications to be measured. Companies also cite completion of more work orders (68% of companies using mobile) and employee satisfaction (67% of companies using mobile)—the latter of which may be related to new workers' demands for better field technologies and better resources for performing their jobs.

Almost half of these field services companies (49%) have reduced their cost of service as a result of using mobile applications to facilitate work in the field, and another 49% have improved their first-time fix rate in this way.

The rate at which mobile technology is developing is having an effect on the overall strategies within service organizations. Even larger companies with the means to implement sophisticated solutions are falling short due to an inability to break from existing systems of training, management, and technology applications. As companies increasingly prioritize mobile within their strategies, they are realizing new degrees of flexibility and responsiveness to customer needs. But field service companies cannot rely on technology rollouts to their technicians to remain up-to-date for more than one or two years. As these companies adopt younger workers who are more open to a wide variety of mobile technologies and IT support mediums, they must take advantage of that availability by considering additional advances into artificial intelligence, automation, and—in the case of this study—Internet of Things (IoT).

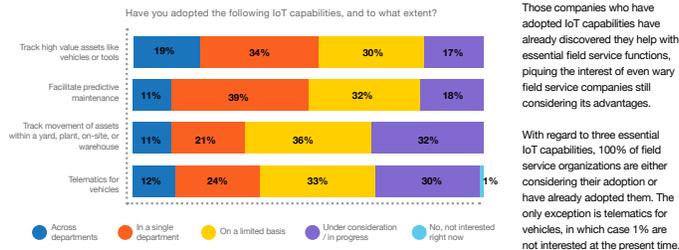
IoT Is In Motion for Some, Still a Dream for Others

When implemented properly, IoT helps improve essential field service functions, but the degree to which companies must invest for success is a hold-up for many of them. For some, IoT is revolutionizing their business as they make substantial investments to bring technology to their service teams and customers. They are adopting new technologies to support their IoT model and are building pipeline resources using data analytics capabilities to manage IoT.

Still, some companies are cautious about adopting an IoT strategy. Most companies that are slow to IoT technologies find themselves in the early phase of adoption, either considering ways in which to build out IoT capabilities or investigating opportunities to build staff capabilities in-house. Other organizations are turning to third parties to manage their IoT initiatives.

"There is still lot of ambiguity around IoT and its actual effectiveness. We do not want to be rapid at it and risk failure; we want to be slow and steady so that we understand and implement with complete knowledge for success."

"We are not yet very confident of the IoT concept and are thus first having a complete understanding of the technology and its influence before going for it in larger scale."



Most notably, half or more field service companies are already using IoT to either track high value assets like vehicles or tools (53%) or facilitate predictive maintenance (50%) in a single department or across departments—two key areas for improvement in terms of servicing customers. Most field service companies have adopted IoT capabilities for telematics for vehicles (69%) and tracking movement of assets within a yard, plant, on-site, or warehouse (68%) on at least a limited basis.

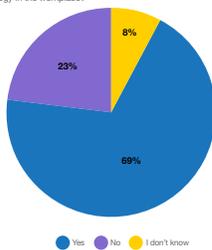
Among those companies still in the IoT planning phase (rather than investment), many cite a limited exposure to IoT capabilities, a desire to identify the specific capabilities to implement, and a need to align new IoT technologies with traditional lines of business. Identifying where new technologies fit within existing environments—and enhancing the capabilities of technicians and staff—is a consistent theme among field service companies.

BUILDING NEXT-GENERATION SERVICE TEAMS

Almost one-quarter of companies (23%) feel they are not meeting the next generations' expectations in terms of technology in the workplace, and an additional 8% do not know whether they are meeting those expectations.

Today, veteran field service employees on whom companies have relied for decades are retiring, transferring their responsibilities to younger workforces. This includes Millennials, for whom digital technologies are considered second nature, but for whom industry best practices honed over years of work by older generations are understandably lacking. Fortunately, most field service companies (69%) are confident they are meeting the next-generation's expectations in terms of technology in the workplace.

Are you meeting the next-generation's expectations in terms of technology in the workplace?

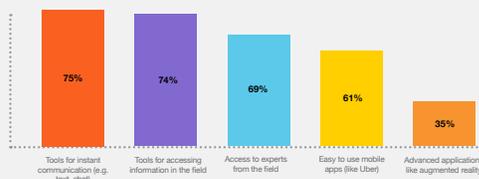


However, almost one quarter of companies (23%) feel they are not meeting those expectations. In context, this figure might be misleading. One-quarter of field service companies is not a majority, but since it represents companies' preparedness for an entirely new workforce, it is nonetheless a substantial number of companies who are unprepared.

Twenty years ago, one wonders, would this number be so high?

Although most field service companies (69%) are confident they are meeting the next-generation's expectations in terms of technology in the workplace, all companies have found that their young employees have high demands for a wide range of technology solutions. Consequently, field service companies face both inherent challenges and incredible opportunities in equipping the next workforce for success.

What technologies does your next-generation workforce favor or desire? Select all that apply.



In considering these factors, three focus areas emerge from our research:

1. Enable novice technicians to collaborate and access information in real time.

The majority of field service companies in the study found that new field service workers expect tools for instant communication, such as text and chat (75%), and tools for accessing information in the field (74%).

Companies can leverage connected technicians to meet customers' expectations for greater visibility, access to expertise, and faster job completion.

2. Connect novices with experts with effective knowledge management solutions.

Transferring knowledge is a pressing and immediate challenge for field service companies. Fortunately, it needn't take place in only a passive setting. 69% of next-generation workers desire digital access to experts while in the field, inviting new methods for knowledge management and passing down expertise—even remotely, in real time—to provide the best possible service to customers.

3. Make superior tools, services, and customer-oriented applications a part of technicians' digital environment.

Those 61% of field service companies who acknowledge their next-generation workforce desires easy-to-use mobile apps can expedite benefits to customers using specialized mobile applications, allowing greater opportunities for improving both customer and employee satisfaction. This includes apps for special services as well as benefits such as instant access to experts—all of which can speed up and improve service processes.

The fact that the majority of field service companies believe they are meeting the next-generation's expectations in terms of technology in the workplace indicates most are making progress in at least one of these key areas. However, those respondents who felt their companies are not meeting those expectations face two problems: the first, falling behind competitors who take advantage of unique attributes among their new workers, and the second, experiencing complications integrating a new generation into their established but outmoded systems and processes. Regardless of their willingness to adopt new technologies, the degree to which field service companies connect new employees to their veterans will be a determinate factor in their success.

CONCLUSION

"We are in a very competitive market where new technologies are causing disruption. Adapting to these technologies and meeting customer expectations is the challenge we need to overcome."

There are two sides to field service companies' objectives entering 2018, both of which are directly affected by technology implementation. On one side, these companies face challenges in terms of driving customer satisfaction with greater visibility into their processes and services; on the other, they must increase employee satisfaction—enabling them to do their job effectively with the next-generation tools that empower them. To that end, service organizations must capture the knowledge of experienced technicians and make it available to new employees in real time, provide service information at the technician's fingertips, and enable tracking of vehicles, tech, and other tools; all of which will improve modern services and help field service companies excel.



AUTHORS



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The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-73
Page 1 of 25

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-24-6
Page 1 of 25

Current State Assessment

nationalgrid gas business enablement



GBE Customer Engagement
July 31, 2017

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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-24-6
Page 2 of 25

Customer Feedback nationalgrid gas business enablement

Online research and CSAT verbatim were used to capture the Voice of Customer

The following sources have been used to capture the voice of the customer.

1 Customer Satisfaction Surveys	2 Customer Online Review
<p>4k+ Gas Customers Surveyed via National Grid After Call Surveys</p> <p>8.1 Average CSAT score</p> <p>Over 8 months</p> <p>From all 5 regions</p> <ul style="list-style-type: none">Upper New YorkMetro New YorkLong IslandRhode IslandMassachusetts	<p>90 reviews evaluated</p> <p>2 online resources</p> <p>CONSUMER AFFAIRS yelp</p> <p>Over 2 years</p> <p>From all 5 regions</p> <ul style="list-style-type: none">Upper New YorkMetro New YorkLong IslandRhode IslandMassachusetts

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1

Customer Feedback

Currently, National Grid has a customer average online rating of **one star**

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Customer Average Online Rating ★★★★★

CONSUMER AFFAIRS
yelp

"Deplorable service. If I could give them 0 stars I would. National Grid turned off our gas instead of that of our next door neighbor."

-Jummy from Rosendale, NY
[eRateReview](#)

"I had to take a sick day at work, and then they told me they can show up from 8 AM to midnight."

-Wlad from Brooklyn, NY
[Yelp](#)

"They do not give clear information and take too long for a service that is necessary. The people that work there are either rude or uninformd - or both."

-A.W. from Brooklyn, NY
[Yelp](#)

Source: Yelp, Consumer Affairs
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3 Pain Points and Opportunities nationalgrid | gas business enablement

Employee input provides possible sources of Customer dissatisfaction

- Assessment phase outputs (gathered from National Grid employees) highlight internal pain points and opportunities for improvement
- Industry examples show how other companies have addressed similar issues
- Capability Assessment shows gaps in Customer areas
- Cross industry leading practices show a direction National Grid can aspire to achieve



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The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-73
Page 7 of 25

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-24-6
Page 7 of 25

3 Pain Points and Opportunities nationalGrid | gas business enablement

Opportunities exist to address the observed pain point themes

Pain Point Themes	Examples	Opportunities
 Visibility of Work & Resources	<ul style="list-style-type: none"> Work entered in multiple systems Not all work added to a system; manual work arounds common Work and resource statuses not visible to relevant stakeholders 	<ul style="list-style-type: none"> Increased automation between systems
 Integration between Systems	<ul style="list-style-type: none"> Minimal integrations between the customer, work management and dispatch tools Inconsistent processes and workaround tools (Excel, MS Access databases) used to manage work as it flows through systems Billing Representatives perform duplicative work (cancel/rebills in two different systems) Issues exist with establishing customer identity / credit Inflexibility of systems to adequately serve the needs of employees 	<ul style="list-style-type: none"> Single source of truth for relevant data
 Data Accuracy	<ul style="list-style-type: none"> Heavy use of paper contributes to inaccuracy of data Data managed in multiple systems without definitive system of record Manual interventions required to true up information and create reports via Excel 	<ul style="list-style-type: none"> Increase in regulatory compliance Reinforce and Align Data Model and Governance
 Agility	<ul style="list-style-type: none"> Existing technology does not provide the flexibility to adjust to changing regulatory requirements and customer demands Relevant information not readily available to execute tasks Customers receive delinquent bills Issues require manual cancel/rebills to remove late charges from customer accounts Regulatory deadlines are missed by operators due to rising demand for interconnection from generators 	<ul style="list-style-type: none"> Standardize and consistent processes Increase Digital Adoption Business Rules Rationalization

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6

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-73
Page 8 of 25

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-24-6
Page 8 of 25

3 Pain Points and Opportunities nationalGrid | gas business enablement

Opportunities exist to address the observed pain point themes

Pain Point Themes	Examples	Opportunities
 Roles & KPIs	<ul style="list-style-type: none"> Workaround processes create excessive administrative responsibilities for Field Supervisors Inconsistent metrics & KPIs hinder organizational best practice Large amount of work completed by 3rd parties due to National Grid skill gaps or capacity constraints 	<ul style="list-style-type: none"> Consistent and reliable performance measures Increased supervisor time in the field Refine Operational Goals, Measurements, Tracking Enable Talent Acquisition and Retention
 Customer Visibility & Communication	<ul style="list-style-type: none"> Minimal visibility into field activities or work status Limited self-service tools available to customers; no confirmation or validation of work status or completion Fragmented or non-existent Customer communications for certain work types Lack of consistent information on programs to customers 	<ul style="list-style-type: none"> Increased first touch resolution Improved long & short term forecasts/plan and relevant activities
 Customer Expectations	<ul style="list-style-type: none"> Inflexible appointment options do not meet the customer demand inability to provide the customer with specific and accurate timeframes for long cycle work Customers receive delayed bills due to issues that require manual cancellations to remove late charges from customers accounts before processing payments Lack of payment flexibility for customers Billing issues associated with mid-month switching by customers 	<ul style="list-style-type: none"> Improved customer satisfaction Develop and Deliver Learning / Skills Gaps

3 Pain Points and Opportunities

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Industry examples address similar opportunities

Data Accuracy

Challenge: Heavy use of paper contributes to inaccuracy of data. Data managed in multiple systems without definitive system of record. Manual interventions required to tie up information and create reports via Excel.

Impact:

- Limited customer/predictive insight and no analytics to see what customers were doing along with no personalization capabilities.
- Single, integrated digital platform with consistent look & feel with enhanced analytics & cloud capabilities to improve accessibility and requirements.

Source: Accenture

MSDS

- Minimal Data Governance structure, processes and tools leading to data integrity/security issues, pockets of manual data cleanup activities mostly at project level and some at system level, minimal ongoing data quality measurements.
- Information Governance structure established to provide vision and direction for critical data elements, leadership for data governance initiatives, enterprise-wide standards for data management, processes, policies, procedures, and standards to ensure data is correct and consistent, clarify owned data and information ownership. **Source:** Accenture

Integration between Systems

Challenge: Integrations between the customer, work management and dispatch tools give internal, inconsistent processes and mechanical tools (Excel, MS Access databases) used to manage work as it flows through the systems. Issues with establishing customer identity credit, infidelity in systems to adequately serve the needs of the Contact Center employees.

Impact:

- Next Generation CS implementation and execution in support of a five year Customer Transformation Program.
- Central platform enables more robust analytics capabilities for customer interactions and product/program effectiveness. Aids in presentation of the correct information, via the right channel. **Source:** Accenture

Direct Energy

- Formerly no single view of customer; data is decentralized and difficult to access.
- Consolidation of multiple customer databases e.g. CS and others into smaller number and an overarching CRM. **Source:** Accenture

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3 Pain Points and Opportunities

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Industry examples address similar opportunities

Roles & KPIs	Customer Visibility & Communication
<p>Challenge: Workaround processes create excessive administrative responsibilities for Field Supervisors. Inconsistent metrics & KPIs hinder organizational best practices. Large amount of work completed by 3rd parties due to National Grid M&E gaps or capacity constraints.</p> <p>FPL</p> <ul style="list-style-type: none"> Formerly unable to identify a "true north" measure(s) that rallies the organization to target overall customer needs. Development of integrated customer experience management capability to deliver and measure the customer experience. <p>Source: Accenture</p> <p>reliant</p> <ul style="list-style-type: none"> Strategic focus on Customer Effort Score Reduced focus on call-handle time, leading to improved agent throughput and new customer tools to empower greater visibility and control over energy usage. <p>Source: Accenture</p>	<p>Challenge: Minimal visibility into field activities or work status. Limited self-service tools available to customers; no confirmation or validation of work status or completion. Fragmented or non-existent Customer communications for certain work types. Lack of consistent information on progress to customers.</p> <p>ComEd</p> <ul style="list-style-type: none"> ComEd launched a full featured smartphone application and within one year of the app launch, nearly 80,000 customers had downloaded it and completed more than 1 million transactions. Every design decision was held to the golden rule: "Can consumers achieve their goal in three clicks or less?" <p>Source: Accenture</p> <p>SO2</p> <ul style="list-style-type: none"> The SO2& Marketplace platform empowers consumers to quickly and easily shop and make informed, energy wise product purchase decisions that help them save electricity and money. The platform also features incentives for energy efficient home appliances and consumer electronics offered by third party vendors. <p>Source: Accenture</p>

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3 Pain Points and Opportunities

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Industry examples address similar opportunities

Customer Expectations

Challenge: Inflexible appointment options do not meet the customer demand. Inability to provide the customer with specific and accurate information for long-lead work. Customers receive delayed bills due to issues that require manual cancellations to remove late charges from customer accounts before processing payments. Lack of payment flexibility for customers. Billing issues associated with non-resident landlords by customers.

CHCOR

- Prioritization of resources for CX included the establishment of a new position, a Customer Experience Manager
- Oversight over the CX Council which helps drive and support the goals of CHCOR's program. Voice of the Customer Program and the utility's outage communications tools. **Source: Chartered**

ENBRIDGE

- Customer Service of the Future through organization shift
- Innovative target state approach, anchored by Customer and Service Agent journeys examining interactions throughout various customer touchpoints. **Source: Accenture**

Visibility of Work & Resources

Challenge: Work entered in multiple systems. Not all work added to a system manual work arounds common. Work and resource issues not visible to relevant stakeholders.

British Gas

- As a feature built into its smart phone app, British Gas provides customers with the ability to book, manage and track engineer call outs as required
- Customers can book new appointments and specify whether they will involve an annual service check up or if they have experienced a break down
- The app also allows customers to track how far away the service crew is, reschedule the appointment or cancel the appointment without having to speak to a service agent. **Source: Accenture**

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3 Pain Points and Opportunities

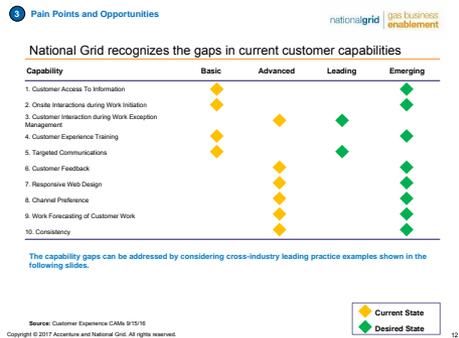


Industry examples address similar opportunities

Agility

Challenge: Existing technology does not provide the flexibility to adjust to changing regulatory requirements and customer demands. Relevant information not readily available to execute tasks. Customers receive delayed bills. Issues require manual cancellations to remove late charges from customers accounts. Regulatory deadlines are missed by operations due to rising demand for interconnection from generators.

- BE RENOLIA**
- Investments in digitizing, transforming and automating business processes were done to drive new levels of productivity, meet compliance, improve quality and user experience.
 - The company has worked to transform the retail back office integrating BPO and AI to maximize the process efficiency.
 - Hundreds of email alerts and events have been created to automate end-to-end processes, reduce average handle time and speed processed requests based on rules. Resulted in cost savings and enabled the team to focus their time on higher value transactions, and increased operational flexibility to work and to absorb additional work. *Source: Accenture*



The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-73
Page 14 of 25

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-24-6
Page 14 of 25

nationalgrid gas business enablement

Cross-Industry examples showcase ways National Grid can emulate best practices

Company	Capability	Approach	Outcomes
Energy	Customer Access To Information	Online account management	<ul style="list-style-type: none"> • Shift to more online account management • Call center costs and reduced paper usage • Favored the savings to set an online account management discount • Features designed for customers to view the status of their order
OverNet Energy	Online Interactions during Work Initiation	Self-service tracking via mobile app	<ul style="list-style-type: none"> • Available through the web or a mobile device • Interface is visually appealing and steps are easy to understand
OverNet Energy	Customer Interaction during Work Exception Management	Real-time outage alerts	<ul style="list-style-type: none"> • Enhancement to the company's current electric outage communications • Power flow service automatically notifies customers via text, email or phone call • Includes a power service schedule of their flow • Includes estimates of when power will be restored
accenture	Customer Experience and Collaboration Program	Knowledge management and collaboration program	<ul style="list-style-type: none"> • Crosses organizational boundaries for collaboration, sharing, and learning • Integrated collaboration tools with knowledge repository • Targeted content based on organization and geography
FPL	Targeted Communications	Fully integrated campaigns to communicate with customers	<ul style="list-style-type: none"> • Created a number of communication tactics captured in a communications platform and utilized to deliver a consistent communication approach • Created a series of engaging points and videos telling consumers how they appreciated their service • Continually communicate with customers
Ochiltree	Customer Feedback	Capturing the voice of customer	<ul style="list-style-type: none"> • Listening posts capture real customer comments and concerns in all channels • Customer Experience team involved stakeholders in the design process, using immersion techniques and personas • Stakeholders across the organization become customer experience designers
SRI	Responsive Web Design	Digital platform transformation	<ul style="list-style-type: none"> • Responsive, device-optimized presentation • Tailored and targeted content for sales and service • Streamlined and consistent experience • Single platform, which is agile
FPL	Channel Preference Management	Personalized account management	<ul style="list-style-type: none"> • Enables personalized content and communications settings • Simple and intuitive interface design with logical grouping of preferred alert types • Choice of notification frequency, delivered to a validated preferred channel
Zoedoc	Work Forecasting of Customer Work	Enable customer appointment scheduling	<ul style="list-style-type: none"> • Online medical care scheduling service which integrates medical service information and doctor availability • Select specific service, doctor and time based on customer availability • Ability to schedule or reschedule medical appointments
Kia	Consistency	Customer experience consistency	<ul style="list-style-type: none"> • Consistency in the experience across web and call-in • Reduce call volume from call-backs • Increase first call resolution • Adherence to agreed upon credit and collection practices

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The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-73
Page 15 of 25

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-24-6
Page 15 of 25

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-24-6
Page 16 of 25

Leading Practice Examples

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Customer Access To Information

Ovo Energy - Energy provider focused on trust and simplicity

"We like to play fair at OVO; when we save, you save. That's why we give you a discount if you manage your account online.

By managing your account online we can cut our admin costs – and save a lot of paper. It's good news all round, especially as we pass the savings on to you as an online account management discount.

At the moment, the online account management discount is £60 a year if you get both gas and electricity from us. If you get just one fuel, it's £30. It's paid monthly as a discount on your bill: £2.50 per fuel."



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Leading Practice Examples



Onsite Interactions during Work Initiation

Dominoes Pizza - Self-Service Tracking

- Tracker is designed for customers to view the status of their order
- Viewable through the web or a mobile device
- Tracker is visually appealing and steps are easy to understand
- Increased revenue from increased customer connections and reduced time to connect



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 Leading Practice Examples



Customer Interaction during Work Exception Management

[CenterPoint - Real-Time Outage Alerts](#)

- CenterPoint Energy unveiled a convenient new enhancement to the company's current electric outage communications. Building on the company's current investment in smart grid technology, the Power Alert Service automatically notifies consumers via text, email or phone call whenever a power outage or other power problem is detected at or near their address
- The service includes estimates of when power will be restored and updated throughout the repair process



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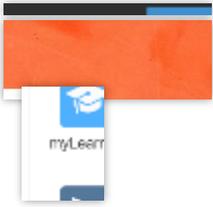
 **Leading Practice Examples**



Customer Experience Training

Establish a Knowledge Management and Collaboration Program

- Common portal across the organization for collaboration, sharing, and learning
- Integrated collaboration tools with knowledge repository
- Targeted content based on organization and geography
- Ability to subscribe to content areas
- Leverage materials for training purposes ultimately building employee uptake
- How is it managed and governed?
 - Global Knowledge Management team > KM Advisory Board (KM Leads) > KM Working Groups



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 Leading Practice Examples



Targeted Communications

FPL - Communications

Activity	Outcomes
<ul style="list-style-type: none">FPL realized that a joined up communication strategy and approach for interacting with customers was requiredFPL identified the efficiencies which could be realized by deploying fully integrated campaigns to communicate with customers <p> *Florida Power & Light Company, is a Juno Beach, Florida-based power utility company serving roughly 4.8 million accounts and 10 million people in Florida.</p>	<ul style="list-style-type: none">FPL have created a number of communication tactics which can be found in a communications playbook and utilized to deliver a consistent communications approach as well as deal with ad-hoc requirementsDuring the recent Florida storms, FPL created a series of engaging posts and videos letting consumers know that they appreciated their patience with recent outages and thanked them for working in partnershipFPL continually communicates with customers regarding the value of their electricity and how it continues to be one of the cheapest. This is particularly effective when identifying advocates for rate case changes

Leading Practice Examples

nationalgrid gas business enablement

Customer Feedback

Credit Suisse - Voice Of Customer

Activity	Outcomes
<ul style="list-style-type: none"> Listening posts capture real customer comments and concerns in all channels Customer Experience team involved stakeholders in the design process, using immersion techniques and personas Stakeholders across the organization become customer experience designers <p>CREDIT SUISSE <small>*Credit Suisse is an international bank that provides companies, institutional clients and high-net-worth private clients worldwide with advisory services, comprehensive solutions, and innovative products.</small></p>	<ul style="list-style-type: none"> Board and other leadership participate in the programs which simulate various segment customer experiences (e.g. one board member experienced the difficulty that some elderly customers have in doing some simple tasks) New Client Inauguration Management (CIM) team was tasked with driving customer centricity, and providing the customer experience team further reach into the bank to increase credibility with customers Ongoing collection and analysis of customer behavior patterns is acquired through direct customer feedback across all channels. This helps Credit Suisse identify problems, track results and design improvements to the customer experience.

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Leading Practice Examples

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Responsive Web Design

AGL - Digital Platform Transformation



Before

- Uniform display across devices
- One-size-fits-all content
- Inconsistent experiences across 47 sites
- Disparate platforms
- Limited digital marketing and analytics capability

After

- Responsive, device-optimised presentation
- Tailored and targeted content for sales and service
- Streamlined and consistent experience
- Single platform, which is agile
- Robust behavioural data to drive segmentation and campaigns

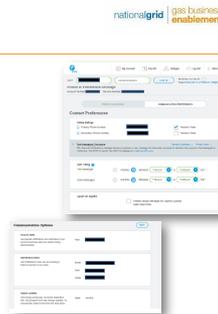
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Leading Practice Examples

Channel Preference

Florida Power & Light – Account Management

- Florida Power & Light enables customers to personalize their contact and communications settings. The interface design is simple and intuitive with logical grouping of preferred alert types.
- Customers are able to choose notification frequency, delivered to their preferred channel.
- Communication preferences include Account Alerts (payments, disconnects), Maintenance Alerts (planned outages), Special Updates (energy-saving tips, rate changes).



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Leading Practice Examples



Work Forecasting of Customer Work

Zocdoc - Enable Customer Appointment Scheduling

- Online medical care scheduling service which integrates medical service information and doctor availability
- Select specific service, doctor and time based on customers availability
- Ability to cancel or reschedule existing appointments
- Enabling customers to schedule through digital channels – creating seamless experience for customers on the go



Transform Customer Interactions & Experience

 Leading Practice Examples



Consistency

Portland General Electric - Customer Experience Consistency

Activity	Outcomes
<ul style="list-style-type: none"> • PGE found that it was easy to program logic into an internal calculator that took into account historical account data when estimating a deposit for a customer. • CSRs would be able to access this via a "Calculator" that was presented on their intranet. • The Web team had more difficulty performing this calculation due to security concerns. • The web team decided to implement a basic "table" with the deposit costs based on a simplified form of factors - this didn't take into account the customers history in the same way • If a customer priced out the deposit cost for new service on the web and then called in, the amounts would be different • Customers would frequently have multiple contacts to try and sort out the difference, and ultimately would go with the "lower cost" solution on the web • PGE was at greater financial risk because the business rules internally were not followed through the self service channels 	<p>New software is being implemented to address these inconsistencies and the expected outcomes are:</p> <ul style="list-style-type: none"> • Consistency in the experience • Reduce call volume from call-backs • Increase first call resolution • Adherence to agreed upon credit and collection practices • Reduction in Aged Accounts Receivables 

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Boston Gas Company and Colonial Gas Company
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D.P.U. 17-170
Information Request AG-21-25
March 12, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-25

Request:

Referring to page 16 of Exhibit NG-GBE-1 and National Grid's response to Request DPU-NG-1-4, please confirm that National Grid is unable to provide cost calculations or detailed cost estimates to support the claim that the "cost to update/upgrade the existing systems individually would be higher" than the cost of the proposed GBE Program.

Response:

Confirming the response to Information Request DPU-NG 1-4, detailed cost estimates to update existing systems individually was not completed during strategic assessment. This was to avoid unnecessary cost to customers of detailed evaluation of the option, since the option to individually update/upgrade existing systems is not always technically feasible given the vintage of the existing systems, and it does not meet the strategic objectives set out by the program as outlined in response to Information Request DPU-NG 1-4.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-26
March 15, 2018
H.O. Pieper
Page 1 of 2

Information Request AG-21-26

Request:

Referring to page 16 of Exhibit NG-GBE-1, please define “visibility” as the GBE Panel uses it in reference to “work performed in the field or at the customer’s home.” The definition should explain what information is or is not visible, who or what is viewing the information, and who or what is the source of the information being viewed.

Response:

The term “visibility” referred to on page 16 of Exhibit NG-GBE-1, is in reference to National Grid employees having relevant information available to them to help them respond to a customer request or successfully complete their job.

For example, today if a customer contacts the call center to inquire about an activity the National Grid truck on their street is performing, the call center representative does not have that information readily available to them. Call center representatives have limited/no visibility to the locations of field crews to efficiently respond to customer inquiries. The customer call often results in a number of hand-offs within the business to address the question. The call center representative would need to contact dispatch who may need to contact the local supervisor or crew, to confirm the activity and details to be able to respond back to the customer inquiry.

A second example would be for a customer meter services technician responding to an odor call, if they had visibility to prior work history at the premise, the information may aid the technician to more quickly diagnose the problem and safely address the condition.

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

A highlighted example is when a mandated work activity is missed such as a corrosion remediation, or the activity is completed but not within the required time period. Measures have been taken as part of the current processes to ensure the mandated activities are visible and actively managed between departments where there is a required follow-up activity. This has often required additional manual controls and human intervention with local tracking, follow up, and checking by the Compliance Analyst and/or Field Supervisor. Post GBE, all work will be contained in one system with pre-defined rules that will automatically create follow-up remediation work orders and schedule work in advance of its due date, and

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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-26
March 15, 2018
H.O. Pieper
Page 2 of 2

there will be central visibility to ensure all mandated activities are completed in a timely fashion.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-27
March 15, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-27

Request:

Referring to page 17 of Exhibit NG-GBE-1, please define “platform” as the GBE Panel uses it in reference to a “single operating platform,” and provide a complete and detailed explanation of the “single operating platform” to which the GBE Panel refers.

Response:

Please note that the responses to Information Requests AG 21-20 and AG 21-21 provide useful context for this question.

The term “platform” refers to the simplified system portfolio for the core capabilities of Asset Management, Work Management, and Customer Engagement.

With the delivery of the GBE Program, the portfolio will be vastly simplified:

- All Asset Management data and business process will reside in IBM Maximo, with integration to ESRI for spatial functions.
- All Work Management / Work Planning data and business processes will reside in IBM Maximo.
- All Work Management / Schedule, Dispatch, and Mobility data and business process will reside in Salesforce.
- All Customer Engagement data and business process will also reside in Salesforce, with synergies for customer experience when the field crews have access to customer data and customer engagement functionality within the shared Salesforce platform.

This combination, used together to provide end-to-end business process, is the “platform” for GBE.

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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-28
March 15, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-28

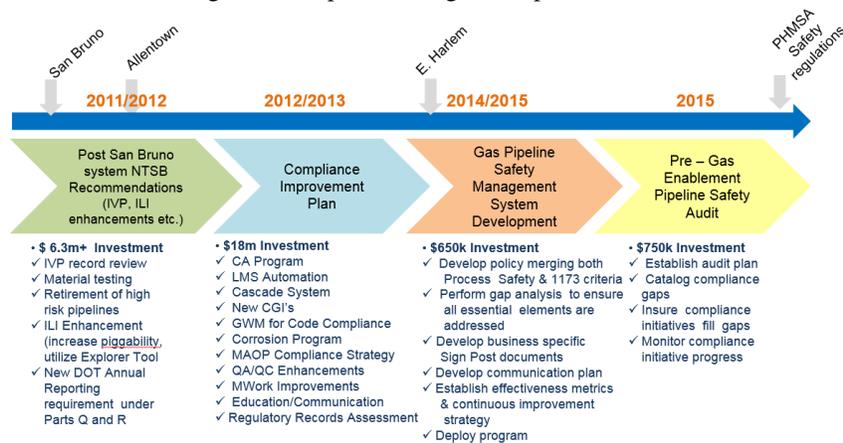
Request:

Referring to page 17 of Exhibit NG-GBE-1, please identify all of the changes to the regulatory environment to which the GBE Panel refers when it references “a changing regulatory . . . environment.”

Response:

Pipeline safety regulations are viewed as minimum requirements for the safe operation of a natural gas system. In recent years gas safety has never had higher profile due in part to the 2010 industry incident in San Bruno in the San Francisco area and events in Allentown, PA and East Harlem, NY that have resulted in (1) the whole industry increasing efforts in ensuring compliance with and being able to demonstrate compliance with existing regulatory requirements; (2) new legislation expected to materially increase obligations on National Grid; and (3) increased workload driving necessary staff additions to apply more focus on asset management, maintenance and operations to maintain pipeline safety and reliability.

The Company has been working diligently since the 2010 San Bruno incident to examine existing assets, adjust practices and procedures based on the National Transportation Safety Board (“NTSB”) recommendations, make investments in compliance improvements, establish a gas pipeline safety management system, complete an independent audit of pipeline safety practices and align future Gas Business Enablement activities with changes in regulations. The timeline below highlights the Company’s efforts and investments as the Gas Business Enablement Program concept was being developed in 2015.



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each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-29
March 15, 2018
H.O. Pieper
Page 1 of 2

Information Request AG-21-29

Request:

Referring to page 17 of Exhibit NG-GBE-1, please identify (1) the “system gaps” and (2) the “data gaps” that give rise to gas-safety compliance challenges, and provide a complete and detailed explanation of what specific gas-safety compliance challenges those “system gaps” and “data gaps” pose.

Response:

Attachment AG 21-29-1 highlights the current state system gaps and data gaps represented across different categories; (1) Customer Experience, (2) Employee Enablement and Work Management, (3) Asset Management, (4) Data Management, and (5) Gas Operations Employee Technical Training. The information is presented from the perspective of the employee and customer.

Additionally, highlighted below are examples of how the Gas Business Enablement Program will improve safety and compliance:

Example 1: Missed Winter Leak Patrol for Active Grade 2A Leak.

Future State Solution: Asset/Work Management System will automatically schedule preventative maintenance work for mandated activities such as surveys, as well as follow-up work such as Leak Repair rechecks. This also includes abandonment of inactive services and meter changes.

Example 2: Not documenting service regulator inspection.

Future State Solution: The field data capture of information in the mobile solution will populate the Asset/Work Management System. Paper forms will be eliminated to avoid information being lost. Also, all supervisors and regions will be able to view the information. Information will be more easily made available for review.

Example 3: Failure to conduct and/or document Warning Tag: Action and Follow-up.

Future State Solution: Current "Procedures or Process" rely on human review to insure the Company does not miss target dates. The Asset/Work Management Solution will remove the reliance on human intervention, automating many activities and capturing information electronically in a common work management system.

Example 4: Failure to properly document an activity.

Future State Solution: Electronic field forms within the mobile solution will be "Smart". Required information must be entered before a worker can "complete" a form. In some cases

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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-29
March 15, 2018
H.O. Pieper
Page 2 of 2

a supervisor would need to review the forms before he or she can "file" the information. All forms will be used across the territories so any supervisor can review the information.

Example 5: Incorrect classification of leaks.

Future State Solution: The mobile device will have "Smart" forms for leak investigation that will assign a leak grade based on the information captured by a field worker. Once field readings are input into the device, leak grading logic will be applied to correctly assign a grade to the leak. The field supervisor will have review capability as well to ensure adherence to the policy.

Example 6: Failure to properly document exposed pipe inspection.

Future State Solution: Field crews will be able to capture all investigation work completed, as required, on their mobile device. Work that is completed and requires follow up will be automatically routed to the organization responsible for remediation and easily tracked through life cycle.

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-79
Page 1 of 11

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-29
Page 1 of 11



Enhancing the Customer Experience...

Customer Enablement Workstream			Benefit Category		
ID	Opportunities & Challenges	Capability Aspirations	Customer	Compliance & Safety	Employee
1	Our customers have limited to no self-service options to request or monitor field work.	Ability to schedule/change appointments, submit photos, view crews in my vicinity, and/or track progress of work.	✓		
2	Our customers do not receive appointment confirmations or work progress updates via their channel of preference (email, call, and/or text).	Ability to receive appointment confirmations/reminders, updates on status, identify the level of communication wanted and/or update their channel preference.	✓		✓
3	Our call centers have limited view of field activities.	Ability to view status of work requests, provide real time updates, and reach the field worker if needed.	✓		✓
4	Our call centers have no view of construction activities.	Ability to view crew location in the customer vicinity and determine status of work.	✓		✓
5	All employees have limited view of customer contacts, interaction, and history in one place.	Full 360 degree view of the customer and their entire history.	✓	✓	✓
6	Customers that own multiple properties receive multiple uncoordinated communications and requests for access.	Ability to bundle appointments, delegate communication preferences, and/or receive alerts about issues at properties.	✓	✓	✓



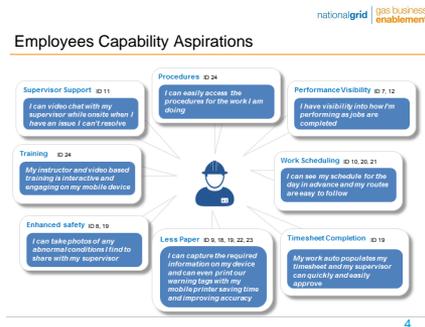
The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-79
Page 3 of 11

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-29
Page 3 of 11



Enabling our Employees...

Work Management Workstream		Benefit Category			
ID	Opportunities & Challenges	Capability Aspirations	Customer	Compliance & Safety	Employee
7	Field workers are not always aware of all mandated work due at a given address or street	Ability for the dispatcher and field worker to see all pending work at a location	✓	✓	✓
8	During gas outages, we are not always able to quickly identify which customers are impacted, and which customers have been restored	Our dispatch system will have all service information available to generate meter "off" for safety and meter "on" for restoration	✓	✓	✓
9	Data collection and Regulatory Reporting capabilities vary by region, making consistent reporting a challenge. Additionally new report requests require technical programmer time that delays implementation	All regions will be collecting information in a standard manner, which then populates one reporting database that can generate reliable, timely, consistent regulatory reporting	✓	✓	✓
10	We would like to meet all customer expectations regarding Customer Agreements	Standard systems in all regions, availability of real time status of all field staff, map locations for all work, street level routing will provide more effective scheduling tools	✓	✓	✓
11	Field supervisors spend additional time in the office to perform tasks such as reviewing map updates, approving timesheets	Field supervisors, with access to the systems remotely, will spend more time coaching and counseling for safety and efficiency	✓	✓	✓
12	Assignment of First Responders is based on last known location based on field laptop timesheets	New systems allow dispatchers to see REAL-time location and staff of field workers to determine the most appropriate choice of first responder	✓	✓	✓



The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-79
Page 5 of 11

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-29
Page 5 of 11



More Efficient Asset Management...

Asset Management Workstream		Benefit Category			
ID	Opportunities & Challenges	Capability Aspirations	Customer	Compliance & Safety	Employee
13	Current mapping system does not include all service lines. Accuracy of asset location within mapping system relative to street centerline, and land base needs improvement.	New mapping system will include updated landbase and conflation of assets along with service information being made available within the application.	✓	✓	✓
14	Asset information is currently stored in various non-integrated systems with an inability to quickly reference a "map view" of gas assets. Retrieval maintenance and inspection data to assets is manual and time consuming. Field work is currently managed in separate systems limiting our ability to manage multiple crew types in a single view.	New Enterprise Asset Management System will become the one location for all work activities, including maintenance and inspection, and associated data to exist.	✓	✓	✓
15	Current design tools are outdated and not standardized. Difficulty in creating accurate job estimates as a result of non-integrated systems.	Implementation of a standard tool for design work and standard process will create consistent construction designs.	✓	✓	✓
16	Data analysis to support integrity management programs are largely manual and inconsistent across asset classes (i.e., Distribution, Transmission, and Pressure Regulating Facilities).	New Enterprise Asset Management system will become the one location for all work, including maintenance and inspection, and associated data to exist and allow for analytical tools to analyze data.	✓	✓	✓
17	Portfolio management of investment projects is largely a manual process, requiring input from various non-integrated systems. Difficulty in monitoring current projects regarding level of completion, and cost variance to estimate.	Implementation of an Asset Investment Planning and Management tool along with integration to Enterprise Asset Management will provide a single view of planned work and in-progress work.	✓	✓	✓

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-79
Page 6 of 11

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-29
Page 6 of 11

nationalgrid | gas business
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Improving and Making Data More Accessible...

ID	Data Management Workstream		Benefit Category		
	Opportunities & Challenges	Capability Aspirations	Customer	Compliance & Safety	Employee
18	Planning and Engineering employees are spending most of their time gathering, consolidating, and clearing data from multiple sources.	Ability for employees to easily access with ease gas operations data (archived, historical, and current data) for reporting capabilities. Ability for employees to improve asset (including geospatial data) and work order data accuracy to improve our asset management strategies. Ability for employees to more effectively manage data from creation to completion by improving digital record-keeping.	✓	✓	✓
19	Field Crews inaccurately or incompletely document work performed	Ability to increase work completion data quality by implementing electronic validation rules on work completion data entry and attaching photos of completed work.	✓	✓	✓
20	Mandated work currently managed through spreadsheets to meet compliance deadlines	Ability to view all work in one system and prioritize/bundle according to location, work type, customer appointment, compliance deadline, etc.	✓	✓	✓
21	Limited integration with work plans from different departments	Ability to schedule customer work (CAMS) and improve customer communication in conjunction with Construction and Maintenance work (CAM).	✓	✓	✓
22	Field records need to be more readily available electronically in GIS	Ability to capture work completion data (main locations, service locations, etc.) electronically and reduce time to get field data into GIS for viewing	✓	✓	✓
23	Unique processes and data due to different systems in different jurisdictions	Having a standard suite of systems allow for consistent processes and consistent information collected and reported.	✓	✓	✓
24	Work Standards and Procedures need to be more easily accessible by Field Crews	Ability to provide training and job aids such as video-based training on mobile devices.	✓	✓	✓

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-79
Page 7 of 11

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-29
Page 7 of 11



Training our Employees...

Gas Operations Technical Training			Benefit Category		
ID	Opportunities & Challenges	Capability Aspirations	Customer	Compliance & Safety	Employee
25	Training is OJ rather than competency focused. Underfunded relative to industry benchmarking.	Separate OJ from training. Fund Academy appropriately to develop and deliver needed training.	✓	✓	✓
26	Learning councils had been ineffective in aligning training to business needs.	Align training to business needs via new governance model.	✓	✓	✓
27	Training materials not always up to industry standards (currently developed by instructors).	Build rigorous/repeatable curriculum design, development, and measurement process. Emphasize live to retire approach: new live, OJT, refresher. Consistently developed training shared with and used by contractors.	✓	✓	✓
28	Ineffective implementation of 7020/10 training model (OJT, coaching/mentoring, and classroom training) leading to unmeasured and inconsistent training results.	Implement structured OJT/coaching with updated curriculum. Extend training into the field where it's measured and tracked electronically.	✓	✓	✓
29	Limited use of technology in training. Management and reuse of materials is costly/inefficient and limited access for students to training or supporting materials.	Improve use of existing/ implement new technologies such as content development/management, virtual learning, training effectiveness, and records.	✓	✓	✓
30	Difficulty hiring and retaining qualified instructors.	Instructor excellence program to provide tools, resources, and opportunities to grow.	✓	✓	✓



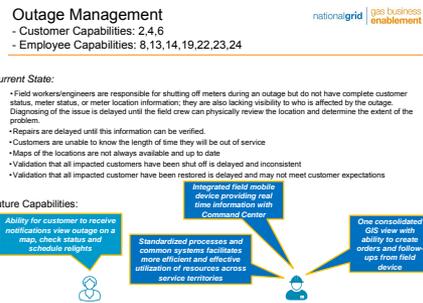
Inside Inspections nationalgrid | gas business enablement
- Employee Capabilities: 7,6,19,20,21,22,23

Current State:

- Difficult to report how many times we have attempted and how many times the customers have been notified
- Some of the inspection job types are managed through spreadsheets so this work is not available to automatically bundle with other customer requested work.
- Opportunities to schedule mandated work without a customer requested appointment are limited.
- The system does not auto-generate mandated work based on date of installation, date of last inspection, activity levels, previous work completed

Future Capabilities:





Mapping Cycle Time

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- Customer Capabilities: 3,4
- Employee Capabilities: 9,13,14,19,22,23

Current State:

- Current turn around time to reflect updated maps after completion of work results in:
 - *Use of out dated information when marking for 3rd party contractors (811 calls)
 - *Additional rework to verify installed facilities for office personnel
 - *Updated mains and service data is delayed
- Completion of work is tied to contracting invoices causing delay of payment and processing of paperwork (i.e. work closure and closing financially)

Future Capabilities:



Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-30
March 15, 2018
H.O. Pieper
Page 1 of 4

Information Request AG-21-30

Request:

Referring to page 18 of Exhibit NG-GBE-1, please identify each of the regulatory requirements and expectations that have arisen since the 2010 San Bruno incident in the San Francisco area and events in Allentown, PA and East Harlem, NY, and provide a complete and detailed explanation of which specific future programs, applications, systems, and other tools implemented through the GBE Program will assist National Grid in meeting those requirements and expectations.

Response:

There has been an increase in requirements and expectations within the regulated natural gas distribution and transmission industry since the 2010 San Bruno incident in the San Francisco area and events in Allentown, PA and East Harlem, NY. Although there is always uncertainty that any one particular incident is the sole motivation for a new specific state/federal rule or legislative change, in the area of pipeline safety, major incidents have historically provided the impetus for major regulatory change. The following list of regulatory actions and proposed rulemakings represent the most recent regulatory requirements following from the San Bruno and other significant incidents.

- In 2016, PHMSA issued a Notice of Proposed Rulemaking (“NPRM”) that will address the 2011 Pipeline Safety Act mandates and implement a number of additional changes to the regulations for gas pipelines.
- Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 (“Pipeline Safety Act of 2011”), signed into law by the President on January 3, 2012 (Public Law. No. 112-90).
- Pipeline Safety: Safety of Gas Transmission Pipelines; Advance Notice of Proposed Rulemaking, Federal Register, Vol. 76, No. 165 (August 25, 2011).
- NTSB Safety Study: NTSB/SS-15/01 PB2015-102735 (Integrity Management of Gas Transmission Pipelines in High Consequence Areas) – January 27, 2015 PHMSA Docket No. PHMSA-2011-0023 Revised Pipeline Safety Regulations (NPRM)
- PHMSA's Gas Pipeline Advisory Committee is currently in the rulemaking process of a “Gas Mega Rule”.

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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-30
March 15, 2018
H.O. Pieper
Page 2 of 4

In addition to the traditional core requirements of minimum safety standards associated with pipeline safety, new methods and technologies have availed expectations in several areas:

Gas Leak Management and GIS Applications: Gas leak investigation, grading, response and reporting represent the heart of pipeline safety and daily field activities for both natural gas customer service and construction operations. Utilizing mobile field applications that link an accurate field location to the maps and record system have become an important tool in natural gas operations. Geographic information system (“GIS”) is a technology framework for gathering, managing, and analyzing data. The new Gas Business Enablement solution will deliver both GIS and gas leak management capabilities. These systems will be integrated with new mobile field technology. The field mobility application tools will be utilized by field personnel on mobile devices while responding to a variety of tasks such as field investigation of gas odors and pinpointing underground leaks.

Distribution Integrity Management Program (“DIMP”) and Transmission Integrity Management Program (“TIMP”): PHMSA’s methodology for compliance inspections of pipeline operator’s integrity management programs has evolved considerably as a result of major incidents during the last decade. State of the art integrity management systems that are now available for pipeline operators in the industry employ analytic based risk-modeling to formulate more informed repair vs. replace decisions and guide in system planning. All of the analytic based risk-modeling tools build upon the asset management datum input of a natural gas distribution system. The Gas Business Enablement solution will deliver an enterprise asset management system that will be utilized to track the operation, maintenance and disposal of assets. The new asset management system enables a geographic information system (“GIS”) for gas operations.

The GBE Program will migrate asset data from multiple existing dis-similar legacy systems that currently warehouse this information and unify it into an enterprise-wide new Maximo-based asset management system. This type of asset management platform facilitates the use of analytic based risk-modeling that provides more rigorous and meaningful pipeline system repair vs. replace decision and system planning strategies. While the use of more advanced analytic based risk-modeling may not strictly be a minimum safety standard, it is a powerful tool especially in the Northeast region for pipeline operators such as National Grid that face the challenge of operating distribution systems with a mix of new and aged infrastructure. In other jurisdictions in the Northeast, GIS and asset management systems have been included in regulatory orders based on the important role these new systems play in fully developing integrity management programs.

Operator Qualification Compliance (“OQ”): The Operator Qualification rule was adopted into the Code of Federal Regulations under Subpart N in 49 CFR Part 192 and Subpart G in 49 CFR Part 195. Under the rule, each pipeline operator is responsible for developing an OQ

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program, following their written OQ plan, establishing a covered task list applicable to their system, and defining the training and qualification requirements for personnel performing covered tasks on their pipeline facility. It is the operator's responsibility to ensure their contractors and vendors comply with their program requirements. The GBE solution will incorporate OQ compliance when dispatching work orders and required maintenance tasks. The following examples of GBE OQ functionality illustrate plans for both "Hard" and "Soft" logic built-in to dispatching logic:

1. "Hard" Dispatching Rule: Before dispatching a twoperson fitting crew to a leak investigation or meter-set Work Order the system functionality checks/verifies that each fitter processes the required OQ covered task certification otherwise dispatching is blocked to those personnel.
2. "Soft" Warning Message: When a three-person construction crew is assigned to install a new plastic service a GBE system assignment rule verifies the targeted crew has the required qualified plastic pipe joining tasks otherwise a warning message alerts the Supervisor. The Salesforce, Field Service Scheduling and Dispatch application will be the GBE system used for scheduling and dispatching work orders and will be developed with improved OQ compliance from the existing practices.

Supply Chain Management - Materials /Inventory Control/ Shipping-Receiving: The GBE solution will use the supply chain management aspects of the asset and work management system for materials management, inventory control and shipping/receiving of piping and distribution system components. Bar-code scanning of plastic pipe and pipe fittings and the inclusion/documentation of detailed steel "mill-specifications" has become an important attribute of evolving pipeline safety compliance. Similarly, managing the inventory-levels of emergency stock has become an increasing important aspect of utility storm hardening and readiness. The Gas Business Enablement solution will deliver a higher level of accountability associated with the parts and components used in the completion of a field inspection, periodic maintenance task and customer and distribution system facility replacement or installation work orders.

The currently proposed Gas Mega Rule amends 49 C.F.R. Part 192 and is one of the largest rulemakings in the history of PHMSA. The proposed rule was initially published on April 8, 2016 and its current horizon date is less certain than traditional rule making. The proposed rule strengthens the pipeline integrity management protocols currently applied in high-consequence areas. The rule also creates a new concept of "moderate consequence areas" in locations where people are normally expected and where certain aspects of integrity management (such as periodic integrity assessments, material documentation, and MAOP) would be applied. The proposed rule requires inspections of pipelines in areas affected by extreme weather, natural disasters, and similar events. This type of new regulation and the

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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-30
March 15, 2018
H.O. Pieper
Page 4 of 4

regulatory expectation that it brings reinforces the need for National Grid's GBE Program which will deliver asset management, GIS platforms, more field operations accountability and more powerful integrity management capabilities. The GBE Program is a key factor in enhancing pipeline safety.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-31
March 15, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-31

Request:

Referring to page 18 of Exhibit NG-GBE-1, please identify which current programs, applications, systems, and other tools are used for assistance in satisfying the 10 key elements of AP RPI 1173 and which programs, applications, systems, and other tools will be used for assistance in satisfying the 10 key elements of AP RPI 1173 once National Grid fully implements the GBE Program.

Response:

The Company is in the process of implementing a Pipeline Safety Management System (“PSMS”), a process safety model based on employing and strengthening the ten essential elements of American Petroleum Institute’s recommended pipeline safety standards (Recommended Practice 1173) (API RP 1173). Gas Business Enablement (“GBE”) Program initiatives have been mapped to the ten elements of API RP 1173 for strong alignment to enhance safety and compliance upon implementation.

National Grid’s Pipeline Safety and Compliance organization played a central role during the strategic assessment phase of the GBE Program to ensure that the initiatives have a direct linkage to improving pipeline safety and compliance. One of the key elements of API RP 1173 is building a culture of continuous improvement. National Grid’s legacy systems made that exceedingly challenging driving the need to replace, update, consolidate, and simplify aging and disparate systems to, among other things, strengthen operational and safety performance and build a platform that supports future pipeline safety and compliance initiatives. Refer to Exhibit NG-GBE-2 highlighting the simplified future state GBE solution.

Also, important to note, National Grid contracted with an external vendor, Process Performance Improvement Consultants, LLC (“P-PIC”) to conduct an assessment on National Grid’s Pipeline Safety Compliance Program. The final report was issued in March 2017 and is provided as Attachment 21-31-1. In the report, P-PIC’s assessment confirmed the value of GBE in supporting the full implementation of API RP 1173 noting that GBE initiatives are designed to address improvements in being able to ensure and demonstrate compliance and to make data accessible.

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Information Request AG-21-32

Request:

Referring to pages 18, 19, and 20 of Exhibit NG-GBE-1, please identify and provide copies of any studies, surveys, or other research on which the GBE Panel relies in representing to the Department the following:

- a. "Customers today have different expectations of customer service."
- b. "[T]he expectation of fast, easy, mobile applications and solutions is shared by all customers"
- c. "Customers expect to have access to mobile applications that can be used to set-up or reschedule service appointments, find out status of their request or find out information about outages."
- d. "When customers experience such a high level of service and ease of service in one area of their commercial transactions, they begin to expect that level of ease with other services they use."
- e. "[A]pplications that allow customers to easily access information regarding the deployment of resources teach customers to have the expectation that all deployed resources can easily be tracked electronically."

Response:

Please refer to the response to Information Request AG 21-24 in which the Company provided a number of references to examples of inputs that have been leveraged as a framework for the delivery of the customer interactions and capabilities.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-33
March 15, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-33

Request:

Referring to page 20 of Exhibit NG-GBE-1, please describe in complete detail the research that a customer service representative must conduct in order to answer the hypothetical customer inquiry posed by the GBE Panel on that page.

Response:

Today if a customer contacts the call center to inquire about an activity the National Grid truck on their street is performing, the call center representative does not have that information readily available to them. Call center representatives have limited/no visibility to the locations of field crews to efficiently respond to customer inquiries. The customer call often results in a number of hand-offs within the business to address the question. The call center representative would need to contact the dispatch group first, the dispatchers currently only have visibility to the location of customer meter service technicians and crews performing leak repair. If the location of the referenced activity does not match the location of one of their dispatched technicians or leak repair crews, a dispatcher would need to contact the local supervisor or crew leader, to confirm the activity and details to be able to respond back to the customer inquiry which could come from the field supervisor or the original call center representative. The timing to research, verify and respond back to the original inquiry can vary depending on the ability to connect with the different groups. The result of which is frustration for the customer which can lead to multiple inquiries for a response and distraction for a number of employees tasked with responding to the original inquiry.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-34
March 15, 2018
H.O. Pieper
Page 1 of 2

Information Request AG-21-34

Request:

Referring to page 21 of Exhibit NG-GBE-1, please identify which specific programs, applications, systems, and other tools will “provide more complete data capture and enable associated data reporting” once National Grid fully implements the GBE Program, and provide a complete and detailed explanation of how any such programs, applications, systems, or other tools will do so.

Response:

Please note that the responses to Information Requests AG-21-20, AG-21-21, and AG-21-27 provide useful context for this question.

The original testimony refers to “core capabilities” of Asset Management, Work Management, and Customer Enablement. In the current state of systems, there are redundant and/or disconnected systems filling portions of each core capability. Depending on work type and location of work type, the combination of systems to achieve an end-to-end process will vary. For the end user in gas operations, this creates a confusing and error prone mix of processes and systems which are difficult to maintain let alone enhance to meet evolving business, regulatory, and security needs. It is in this sense that the current portfolio of systems is inefficient.

Within the current state of duplicate legacy applications, the following data capture challenges exist:

- Business rules must be implemented in multiple duplicate systems, increasing the chance that rules are implemented with unintended variations.
- Legacy systems often have no data entry validations to enforce high quality data capture. Many legacy systems have only free form text fields where a user can enter any value. Users are trained to use only certain values or value ranges, but variation is an inevitable outcome.
- Many of the current business processes are paper based, which requires manual entry into systems, creating risk of data entry error.
- The data structures and relationships vary across the duplicate systems. In one system, a customer may be called “customer” where in another system a customer is called “account”. This creates complicated reporting efforts to harmonize the different data sources into a single report.

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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-34
March 15, 2018
H.O. Pieper
Page 2 of 2

For example, in the current state systems, the CSS and CRIS legacy mainframe applications are used to create customer initiated work orders, depending on jurisdiction, despite the underlying work type being common across all jurisdictions. Both CSS and CRIS have free form text fields, which are error prone for data entry. Any report relating to customer initiated work must harmonize the different data models from CSS and CRIS. And there is a compounding effect of duplicate integrations in and out of CSS and CRIS to surrounding systems, which creates yet another opportunity for incorrect data. The end result is poor data quality and challenging reporting capabilities.

As part of the GBE platform (as described in response to Information Request AG 21-27), the redundancy is replaced by single systems removing the system and capability duplication from the current business processes. The resulting end to end business process utilizes a single data model, which is beneficial for reporting. Also, modern systems have sophisticated and configurable user data entry validations to ensure the entry of high quality and consistent data.

For example, within the GBE platform, all customer-initiated work orders will be created in Salesforce regardless of location. This will leverage the single data model as found within Salesforce. The Salesforce platform has sophisticated and configurable data entry validations to ensure high quality data. And the integrations relating to customer initiated work order are greatly simplified as well, creating high quality and trusted data which in turn leads to greatly improved reporting opportunities.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-35
March 15, 2018
H.O. Pieper
Page 1 of 4

Information Request AG-21-35

Request:

Referring to page 25 of Exhibit NG-GBE-1, the GBE Panel refers to “lessons learned from the past.” Please identify with specificity what other programs National Grid has tried to implement in the past that have informed how it has decided to structure implementation of the GBE program, and provide a complete and detailed explanation of the lessons learned from such programs.

Response:

The Gas Business Enablement Program is leveraging the lessons learned from a number of different programs including National Grid’s SAP deployment programs, specifically US Foundations Program (“USFP”) Release 1 and the following US Foundations Program – Business Improvement (“USFP-BI”) Releases 2, 3 and EHR1, and UK Gas Distribution Front Office (“GDFO”). In addition to the strategic examples provided in Exhibit NG-GBE-1 pages 25 and 26, the Gas Business Enablement program applied those lessons learned in the following ways:

Program Governance and Management:

- The GBE Program Steering Group includes senior executives from National Grid US and National Grid plc. The Steering Group meets periodically with the Program Sponsor to exercise oversight, including on budget and timing, over the GBE Program and to provide guidance and access to resources as required.
- A full time Program Sponsor has been appointed to lead the Program and ensure alignment and focus on strategic business priorities and outcomes.
- The Program Sponsor and Leadership Team’s success is directly tied to the achievement of the GBE Program as well as budget and timing.
- High level design workshops with participation from business subject matter experts and leadership were conducted. These served to focus the GBE Program scope on business need and opportunity, tightly aligned with the business case, and supported by the business itself.
- The GBE Program implemented a comprehensive change control – including scope – process and educated team members on their responsibilities in the scope management process.
- Clear ambitions have been set for the program – to reduce operational risk, improve operational performance and create a flexible platform for the future.

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- The program team has clearly defined business benefits.
- A value framework has been defined to baseline, measure and track improvements in operational performance metrics.
- Change management and business engagement activities will occur continuously throughout the GBE Program’s lifecycle and have been planned and resourced with the same rigor as the systems delivery work streams.
- Business resources will participate in all phases of the work including design, development, testing and deployment. This will facilitate smooth handover from the GBE Program team to the business user community.
- The GBE Program will use a scaled agile development methodology that is performance data driven and includes regular planning workshops and retrospectives to evaluate progress, quality, risk and outcomes achieved.
- A comprehensive GBE Program Handbook has been developed including processes, tools, templates, roles and responsibilities. The Handbook supports integrated program planning, resource and finance management, scope control, risk and issues management, commercial management, quality assurance, performance management and governance support.
- The GBE Program engages independent reviewers to provide feedback on deliverable quality, process compliance, alignment to business case and strategic business objectives and priorities.
- A rigorous sourcing process was executed to retain highly capable consulting partners at competitive rates.
- Partner service levels and incentives are tied to achievement of the National Grid business benefit case and is captured in their contracts.
- Fixed price contracts have been established and are supported by rigorous oversight and change control processes.
- The GBE Program is competitively recruiting all team members for the right mix of capabilities, skills and experience, as well as alignment with National Grid and GBE values and culture.
- Program “ways of working” are designed to foster a “badge-less, one team” culture between employees and consultants.

Deployment Strategies and Development Methodologies

- Place greater emphasis on upfront and continuous business engagement and alignment and invest significant effort in ensuring that the scope and road map are aligned and supportable.
- The performance of both GBE consulting partners and the National Grid team is directly measured by success in realizing the business case.
- Enable the governance and management organizations to support the size and complexity of the efforts they are supporting. National Grid is deploying a governance structure that is appropriate to the size, scale and impact of the GBE Program.
- Deploy multiple work streams working concurrently and delivering in a phased approach based on geography and work type to reduce the time between kick-off and deployment of functionality and capability to the user community while controlling costs, reducing and managing delivery risks.
- Adopt an agile deployment method based on SAFe (Scaled Agile Framework) that supports quicker development of initial functionality, routinely engages the user community throughout, and provides an approach to prioritizing and delivering enhancements.
- Leverage cloud-based industry standard solutions to support faster deployments, provide greater scalability and security, and reduce legacy infrastructure upgrades and risk of obsolescence.

Change Management

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

In some previous programs, change management tended to be regarded as more of a "back end" activity performed by a select group of change specialists focused more on educating users on solutions they were receiving rather than engaging them in the actual process of developing the solution. Additionally, business engagement tended to be more episodic and

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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-35
March 15, 2018
H.O. Pieper
Page 4 of 4

focused primarily on the employees who would be directly using the solution. The GBE Program treats change management as an essential capability and key enabler of successful program delivery. Change management activities occur continuously throughout the program lifecycle, are supported by the entire program team, and engage not only the US gas business leaders and employees but also stakeholders within the Jurisdictional teams, support organizations such as Supply Chain and Information Services, as well as other parts of the US Business.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-36
March 15, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-36

Request:

Referring to page 32 of Exhibit NG-GBE-1, please provide copies of all documents, including but not limited to communications, concerning the conceptual development of the GBE Program in 2015.

Response:

Please see the following attachments for the documents concerning the conceptual development of the GBE Program in 2015.

Attachment AG 21-36-1; Gas Transformation Proposal dated 5 Feb 2015
Attachment AG 21-36-2 CONFIDENTIAL; Gas Transformation Update dated 16 April 2015
Attachment AG 21-36-3 CONFIDENTIAL; Gas Enablement Executive Off-site dated 1 October 2015

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-37
March 15, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-37

Request:

Referring to pages 32 and 33 of Exhibit NG-GBE-1, please provide copies of all documents, including but not limited to communications, concerning the presentation of the conceptual basis of the GBE Program to the Group Executive Committee in November 2015 and the authorization of \$25 million to assess program alternatives and commence program planning.

Response:

Please see Attachment AG 21-36-3 for the Group Executive Committee presentation concerning the conceptual basis of the Gas Business Enablement program and authorizing \$25 million to assess program alternatives and commence program planning.

The date of this presentation was actually October 2015 and not November as cited in Exhibit NG-GBE-1.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-38
March 15, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-38

Request:

Referring to page 33 of Exhibit NG-GBE-1, please provide copies of all documents, including but not limited to communications, concerning the GBE Steering Group's review and approval of the initial GBE Program scope and strategy.

Response:

Please see the following attachments for the GBE Steering Group documents related to the approval of the initial GBE Program scope and strategy.

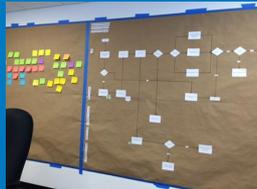
Attachment AG 21-38-1 – May 2016 Steering Group presentation.
Attachment AG 21-38-2 – May 2016 Steering Group Meeting Minutes

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Gas Business Enablement

Steering Group Pack



Johnny Johnston

May 5, 2016 @ 1400 GMT, Dean's Board Room – W3.003



Agenda

<u>Topic</u>	<u>Time</u>	<u>Presenter</u>
Opening Remarks / Meeting Objectives	1400-1405	JJ
Action Item Follow Up	1405-1410	JJ
Program Scope Review	1410-1430	JJ
Procurement Strategy	1430-1450	JJ
Program Update	1450-1455	JJ
Meeting Close & Feedback	1455-1500	JJ



Meeting Objectives

1. Gain Steering Group endorsement of Program scope
2. Gain Steering Group approval of the proposed Program procurement strategy
3. Provide an update on Program start up activities

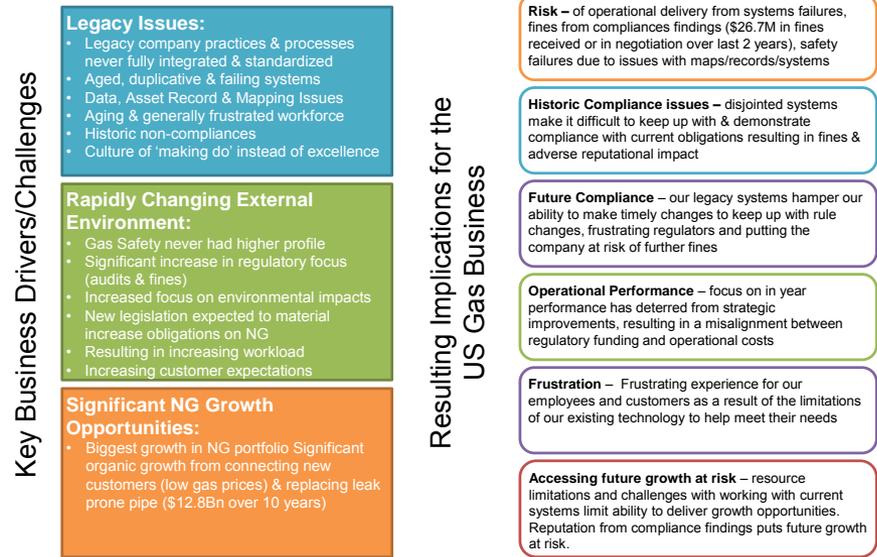


Action Item Follow Up

	Action	Owner	Assigned	Due	Comment	Complete?
1	Ensure that Enablement is added to the QPR agenda	PS	10 Mar 16	1 Apr 16		Yes
2	To provide visibility of the expect impact of Gas Business enablement on the ability to run the business due to a potential talent drain.	JJ	10 Mar 16	1 May16	Defer to completion of vendor bid analysis	Projected Aug 16
3	To identify the appropriate approach to ensure that the SG has visibility to the level of customization being undertaken by the project.	JJ	10 Mar 16	1 Oct16	Pending	
4	To share the rate case strategy and ensure that any appropriate costs are included in the MA Gas rate case.	JJ	10 Mar 16	1 Jul 16	Pending	



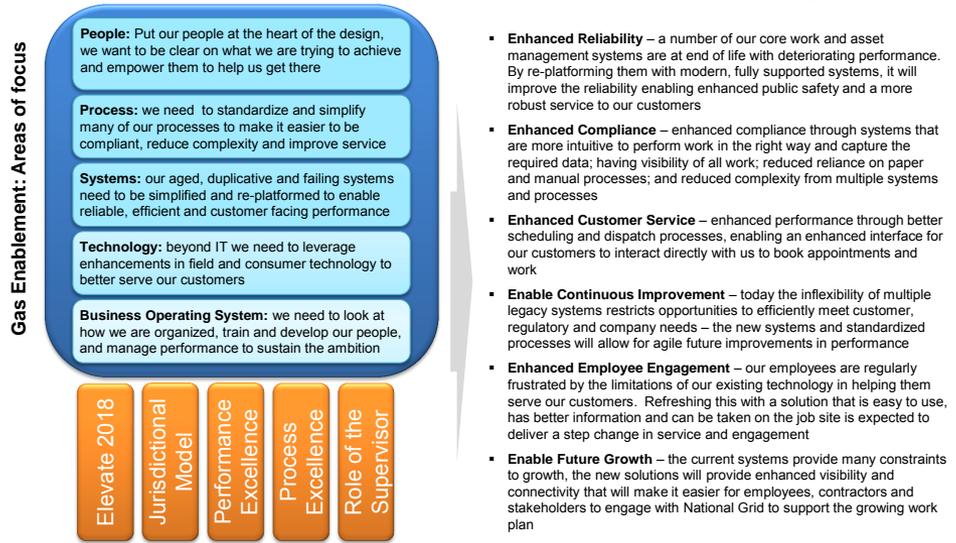
Context: Legacy challenges and a rapidly changing external environment leave the US Gas Business in an unsustainable position of carrying an elevating risk profile while being poorly positioned to access future growth opportunities





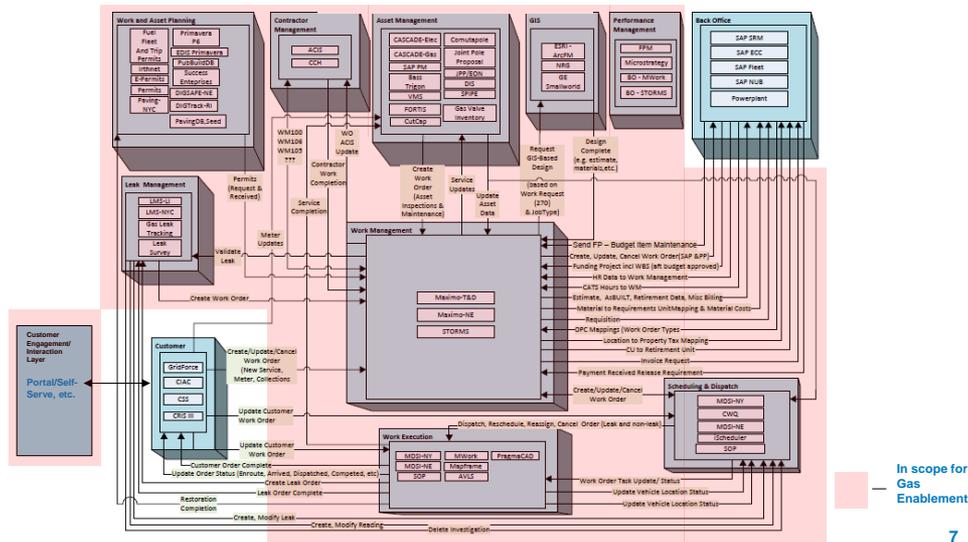
Ambition: Gas Enablement aims to secure the US Gas Business by improving how our employees serve our customers today and by creating the platform for tomorrow's growth.

Gas Enablement will deliver changes across people, process, systems and technology but will look to build on and link in with existing National Grid initiatives. Benefits of successful delivery should be measurable across a wide range of key measures:





Technology: The Program will drive simplification and modernization of the application architecture supporting the US Gas Business





Principles: These core principles have been proposed to help guide the project in its designs and decision making as the project progresses to keep the focus and deliver the required outcomes

Simplicity– over time as our business has evolved from legacy companies and as we have built work around on top of work around it has become more and more complex, but at its heart a utility is simple. Everyone will win if we focus on stripping away layers of complexity

Consistency– Because we currently do the same thing differently across our organization this drives complexity, makes change difficult, makes it expensive to train, and introduces significant waste and inefficiency that is holding the business back

Usability – this is about putting our employees and our customers at the heart of the solution, making things easy to use, intuitive and reliable which will help us to get the data right, be compliant and provide a better customer experience

Visibility– of our data across our processes is key to making it easy for our customer to do business with us, for our employees to serve our customers, our supervisors to manage performance and for us to secure appropriate rate case recovery

Agility – the fast changes in the external environment mean that our requirements of tomorrow will be different to the requirements of today so we want to build a more continuous improvement and agile way of thinking into our organization and systems through Gas Enablement

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Scope Summary: This scope hypothesis supports early planning and commercial activities - it will be “locked down” as a key design phase Program deliverable

In Scope

- Compliance - short term 'get well' plan as well as longer term initiatives to sustain desired performance
- Core US Gas Business M2C, Maintain & Deliver processes (including emergency response and electric short cycle work (CMS)) – need to standardize and simplify
- 61 Core work management, asset management & GIS systems (incl. Mwork, MDSI, iScheduler, Storms, Maximo, LMS, ESRI, Smallworld – see Slide 17) – need to standardize and consolidate
- Integration with the Customer systems to enable appointment booking, call center visibility and customer engagement services
- Design the 'To Be' US Gas Delivery Op Model focusing on RACI decision rights and accountability. To including embedding strategic resourcing and training impact
- Adv. Field technology strategy for demonstration & implementation of technology to enhance field delivery

Not in Scope:

- The UK business
- Electric Operations Initially (albeit principles and technical solution should be appropriate to be extended at a later date)
- Transgas/Generation
- Legacy customer systems (CSS/CRIS)
- SAP Backoffice (NOTE below likely need to reposition Powerplan)
- Control systems (SCADA)

Assumed Prerequisites:

- Realignment of Powerplan
- Consolidation of GIS systems

Definition and execution of a procurement strategy is a Program critical path activity

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Program Leadership and Procurement worked collaboratively to define and evaluate options for procurement of consulting services

1. Review Program goals, objectives and desired end state - **complete**
2. Review Program scope - **complete**
3. Define planning assumptions and success factors - **complete**
4. Form and analyze sourcing options and identify recommended option - **complete**
5. Develop draft RFPs - **complete**
6. Define procurement timelines - **complete**
7. Perform QA and legal / regulatory reviews - **in progress**
8. Obtain Steering Group approval - **pending**
9. Execute strategy - **pending**



Planning assumptions and success criteria include

Planning Assumptions for Strategic Assessment (Design) Phase

- Avoid a "Big Bang" approach – a phased approach based on process, technology and organization is STRONGLY preferred
- Standardize on a single NG way of working recognizing there may be some limited variations around a single process to meet jurisdictional regulatory requirements
- Minimize customization -use core software functionality to the greatest degree practical
- Build in flexibility
 - Use a BPM & SAAS architecture to speed up time to deliver and enable future improvements – if practical
 - Use standard APIs wherever possible to enable sharing of data and 'plug and play' of applications
- Based on the above, again if practical, looking to implement a MVP (Minimum Viable Product) approach with agile development to improve the initial solution

Success Criteria for Strategic Assessment (Design) Phase

- Business buy-in and commitment to process – solution – methodology & approach – business case (& changes required to deliver it)
- Multiple delivery phases with defined roadmap to reduce risk to delivery
- Gas Enablement and CET programs are aligned
- Clear visibility of critical path dependencies to ensure successful delivery
- Costing's that can actually be delivered (allow for rate case and delivery strategy)
- Delivers key principles – simplicity, consistency, visibility, usability & agility
- Delivers defined business case including expected benefits – enhanced reliability, compliance, customer service & employee engagement; and enables continuous improvement & growth
- NG and Partner relationships are clear and supported
- Solution and business case that National Grid will approve for the next phase and regulators will fund as a prudent investment

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Analysis began by challenging traditional large program procurement strategies and assumptions

- Traditional Project Approach:



- Challenges with traditional approach:

- Designer often win implementation – are you getting the best deal, are they incentivized to build complexity into the design as they will get rewarded in the build?
- Design often lends itself to large scale implementations (big bang approaches)
- Once you select the designer you are often getting their traditional way of doing these projects – may have less flexibility than you think
- Very few implementers are strong in all areas
- Assuming the traditional approach as our baseline, we challenged ourselves to identify better value, more innovative options for National Grid



Six options and the baseline were considered

	Option	Pro	Con	Comment
1	Begin with an RFI Phase <i>Follow with RFP's</i>	Results in more informed RFPs	Time Consuming	Bridge Energy work lessens the need
2	Planning Phase "Competitive Dialog" <i>Engage multiple partners in planning</i>	Opportunity for less cost and risk to NG	Challenging to execute	Very theoretical, complex, untried
3	Multiple Design Phase Work Packs <i>Best partner for each pack</i>	Easy to design	Hard to integrate	Likely to add cost and complexity
4	Independent Designer and Integrator <i>Designer may not implement</i>	Best design for NG	But may not be easily implementable	Missed incentive opportunities
5	Independent Design Assurance <i>Independent design review</i>	Early focus on "Fit – For – Purpose"	Requires careful relationship mgt	An expert 3 rd party will be needed
6	Independent Business Integrator and Designer <i>3rd Party adviser engaged with designer</i>	Could provide NG with more management capability	Complex relationships and blurred accountabilities	Interesting but likely more complex and risky
0	Baseline – Traditional <i>Design, Implement</i>	Proven, relatively easy to manage	"Are we getting the best?"	May not support GE program breadth of scope and ambitions

A more detailed description and analysis can be found in the appendix

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Based on our analysis, a blended option is **nationalgrid** recommended: Option 5 and Traditional

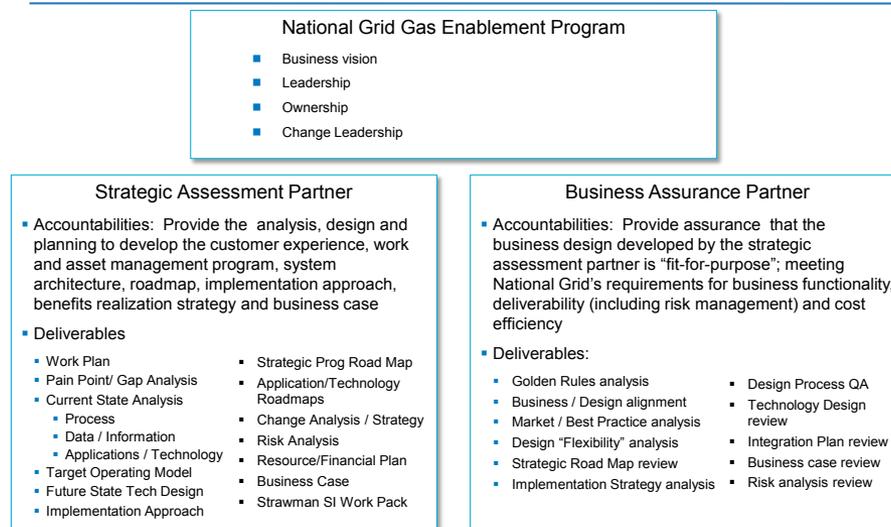
- As much as we want this project to be different, having explored a few different models the 'traditional' approach is a good baseline and quality of implementation appears to be the key driver of value.
- You want the designer to be a potential implementer – solution has to be credible and deployable. Therefore as part of the assessment we want to be sure they could also deliver, however it is important that there are no assurances of delivery as that would create the perverse incentive of 'designing in' cost
- Procuring 3rd party support to perform the Design Assurance role will be value adding. NG can retain the option to "invite" the Assurance Partner to continue into the implementation phase or even to compete for implementation work.
- Adding stage-gate/feedback loops through the RFP will give NG the opportunity to learn from the different suppliers and provide feedback into the solutions they are developing – enabling an enhanced solution and avoiding suppliers going off track
- We need to be super clear on the outputs we are looking for, not the process to deliver them (we want to encourage supplier innovation)
- Design is a relatively low cost activity compared to delivery. While it is difficult to incentivize we should explore opportunities for appropriate long term risk/reward sharing incentives we could place on successful delivery of the design phase outputs

Recommended Strategy

- Two phase approach
 - High level design
 - Implementation
- High level design will
 - Set scope
 - Establish business and technical design
 - Provide a multi-year road map
 - Inform our implementation strategy
 - Create the business case
- Issue two RFPs now
 - Strategic Assessment (Design) partner
 - Business Assurance partner
- Begin defining criteria for implementation partner selection



The recommended procurement strategy will support a collaborative relationship between National Grid and its key service partners



Anticipated Responders include: Accenture, Bridge Energy Solutions, CapGemini, IBM, KPMG, PA Consulting, PWC & Vesta Partners 15



The design phase procurement timeline is necessarily aggressive

Activity	Date
Request for Proposal Issued	05/09/16
Vendor clarification calls	05/12/16
Intention to Bid Due	05/17/16
Deadline for Respondent Questions	05/18/16
Pre-bid Vendor Meetings	05/23-24/16
Response to Vendor questions	05/26/16
Submission deadline for approach, deliverables and plan section of proposal	06/03/16
Down select of selected vendors and communications	06/10/16
Review sessions with selected vendors	06/16-17/16
Proposal Submission Deadline	06/24/16
Vendor Presentations/Orals	06/29-30/16
Vendor Selection	07/01/16
Negotiations	07/05-15/16
Contract award	07/18/16
Targeted Project Start	08/01/16

Implications

- Timing for Executive Sanctioning will likely be driven out to 1Q CY2017
- National Grid stakeholders will need to perform their roles promptly
 - Q&A responses
 - Meeting participation
 - Vendor meetings
 - Internal reviews
 - Negotiations
 - Others as required
 - Proposals reviews
 - Procurement process administration
- We must be ready to make a decision
 - Early identification and clarification of RAPID roles
- Plan to execute our commercial activities quickly
- We must also be prepared to extend the timeline if needed to set ourselves up for long term success



The Gas Enablement Program requests from the Steering Group:

- Your endorsement of the current proposed scope (subject to refinement during the Design Phase)
- Your approval of the proposed procurement strategy

Program Update



5e Gas Business Enablement Executive Summary

<p>Project Summary Status – May 16</p> <div style="text-align: center;"> </div> <p>Progress in the period</p> <p>People</p> <ul style="list-style-type: none"> Appointed KC Healy – PMO lead, Chris Connolly – Business/Process Lead, Dan McNamara – Compliance Lead & Dennis Ruppert for the Advanced Technology Role Interviews on-going for the Business Change Lead <p>Pilot to standardize a process</p> <ul style="list-style-type: none"> 4 'To Be' standardized & simplified Pilot Process developed – average of 56% reduction in process steps identified (Workshops included 47 + attendees representing multiple operations and jurisdictions). 71 performance improvement opportunities identified <p>Strategy</p> <ul style="list-style-type: none"> Procurement strategy developed for Strategic Assessment and High Level design phase. Combination of rigorous procurement approach, timeline for staffing and working around 12003 contract end will push project timeline out and need the program to be re-baselined – thus RED overall <p>Best Practice Visits</p> <ul style="list-style-type: none"> Completed visits to One Gas, OK, Atmox, TX, and DTE, MI 	<p>Risks</p> <table border="1"> <thead> <tr> <th>Risk</th> <th>Actions</th> </tr> </thead> <tbody> <tr> <td>Missing expectations on progress due to slow start</td> <td> <ul style="list-style-type: none"> JJ released from CMS role Key project roles close to being finalized including the PMO Will re-baseline the plan with and reset delivery expectations </td> </tr> <tr> <td>Unsuccessful delivery due to scope creep and overlap with other initiatives</td> <td> <ul style="list-style-type: none"> Building scope around business case – will use Steering Group to baseline scope and any changes going forwards Reporting spending to plan (i.e., budget) monthly Coordinating with Growth Playbook initiatives to avoid duplication or gaps with other activities </td> </tr> <tr> <td>Risk to delivery due to business/IS capacity limitations</td> <td> <ul style="list-style-type: none"> Will track progress and escalate specific areas of risk/ concern to Steering Group and through cadence </td> </tr> <tr> <td>Impact on schedule of industrial action</td> <td> <ul style="list-style-type: none"> Working closely with the labor relations team to understand timings and risk Will look to mitigate as much as possible, however if employees are locked out there will likely be a delay to the project as management focus is elsewhere </td> </tr> </tbody> </table> <p>Focus for Next Period</p> <p>Pilot</p> <ul style="list-style-type: none"> Close down the process phase Start engaging partners for technology pilot & demonstration as part of Phase 2 <p>People</p> <ul style="list-style-type: none"> Continue search for business change role Will look to start building out the organization <p>Strategy</p> <ul style="list-style-type: none"> Plan to release Strategic Assessment and Design Assurance RFPs on May 9, start August 1 Develop & agree RFP assessment and selection criteria <p>Governance</p> <ul style="list-style-type: none"> Re-baseline plan with the team now in place 	Risk	Actions	Missing expectations on progress due to slow start	<ul style="list-style-type: none"> JJ released from CMS role Key project roles close to being finalized including the PMO Will re-baseline the plan with and reset delivery expectations 	Unsuccessful delivery due to scope creep and overlap with other initiatives	<ul style="list-style-type: none"> Building scope around business case – will use Steering Group to baseline scope and any changes going forwards Reporting spending to plan (i.e., budget) monthly Coordinating with Growth Playbook initiatives to avoid duplication or gaps with other activities 	Risk to delivery due to business/IS capacity limitations	<ul style="list-style-type: none"> Will track progress and escalate specific areas of risk/ concern to Steering Group and through cadence 	Impact on schedule of industrial action	<ul style="list-style-type: none"> Working closely with the labor relations team to understand timings and risk Will look to mitigate as much as possible, however if employees are locked out there will likely be a delay to the project as management focus is elsewhere
Risk	Actions										
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Additional detail can be found in the appendix **18**

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Meeting close

- AOB
- New Action Item Summary
- Leadership Pulse Check and Closing Remarks

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Appendices



Options Considered

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Procurement Options Considered to address concerns

Procurement Variations considered	Anticipated Benefits	Potential Downsides	Comments
1. Add an RFI phase – before RFP	<ul style="list-style-type: none"> Allow vendors to show their hands on their ideas and preferred approach's to help NG solidify their request before going to RFP 	<ul style="list-style-type: none"> Adds time to the process Vendors likely to give generic answers 	Through the Bridge Energy work, NG has a pretty strong view of what it is looking for. By structuring the Design RFP with 2 phases we should be able to get the majority of the value you would get from an RFI phase without needed to do a separate one
2. Use a 'competitive dialogue' approach to the planning phase where you have a much more collaborative multi phase approach – this would allow NG to get input from multiple vendors and shape solution to get best bits from each partner	<ul style="list-style-type: none"> Theoretically would mean potential partners would do more of the initial design work at risk (less cost to NG) Theoretically would allow for collaboration between partners and suppliers to get an enhanced solution that NG has been involved in co-developing with the suppliers 	<ul style="list-style-type: none"> Risk key suppliers would not want to engage in a long and costly process without certainty of remuneration Would be a complex process that NG has not run before and so implementation risk is high 	Theoretically attractive but in reality will be a challenge to pull off. Can adapt the standard RFP approach to allow for some of the benefits to be manifested
3. Break Design into Multiple Work Packages	<ul style="list-style-type: none"> This would allow for individual elements to be simpler, more focused and more targeted 	<ul style="list-style-type: none"> Would need to phase to try and allow packages to appropriately integrate – this would significantly extend the time Likely to add complexity through the integration and any benefits of focus and simplification likely to be lost 	Likely to add complexity, costs and time. We may want to break delivery up in to a number of phases but having an integrated design approach will be critical to getting a coherent solution that will help deliver the business case
4. Prevent Designer from being Implementer	<ul style="list-style-type: none"> Force an independent design to help get to the 'right answer' rather than the answer that will generate the most revenue through implementation 	<ul style="list-style-type: none"> Cost of design is much lower than cost of implementation so might prevent key partners for bidding for design If you are designing something you know you don't have to implement then less incentive to make sure that it is derivable 	The alignment of having to deliver something you have to design seems a more important incentive as although there is a risk of over paying you should receive a design that is implementable with a credible cost and delivery schedule
5. Design Assurance Role	<ul style="list-style-type: none"> This would allow an independent view of the design, does it meet the requirements, is it the simplest solution or has it been over complicated. Is the proposed solution, costs and timeline credible. 	<ul style="list-style-type: none"> It will increase the cost of the design Depending on the partners involved there is the potential for the designer to not want to engage with the assurance partner – we will need to make this relationship clear from the start 	As NG does not have the internal capability to complete nor assure this work it will be critical to engage an independent 3 rd party to be actively involved through the design to assure the quality of the product we will be receiving
6. Add a 'Business Integrator' role – this would be a trusted partner providing 'deep' assurance and guidance through the process	<ul style="list-style-type: none"> Potentially adds to NGs capability to effectively manage the process Would provide more advice and guidance than just a pure assurance role 	<ul style="list-style-type: none"> Complexity in the relationships Risk of blurred accountabilities Risk/Remuneration incentives likely to be misaligned with the BI 	Whilst an interesting model, this is likely to add more complexity and risk than value

Privileged and confidential draft



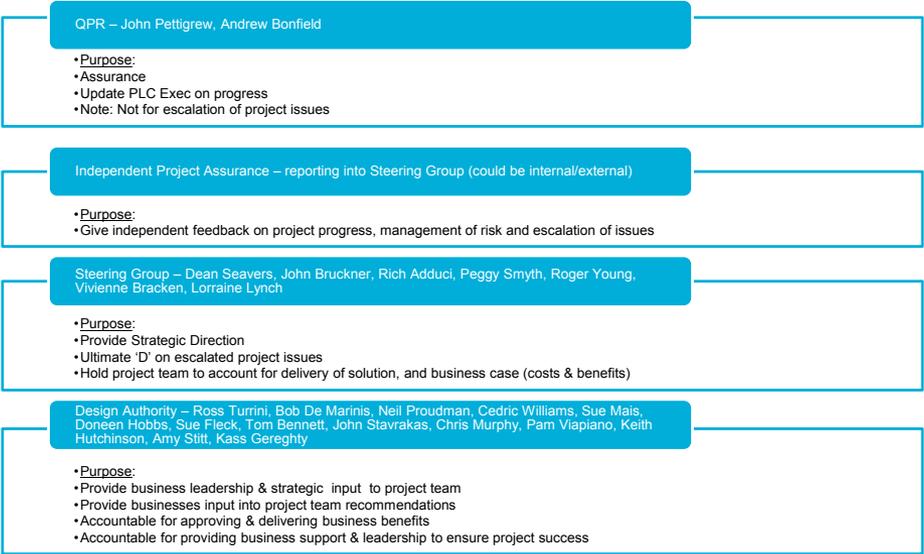
Appendix: Assessment against Critical Success Factors

Area	Full Project	Phase 1 (Strategic Assessment)	Basis/Comment
Active Sponsorship	Too early		Johnny Johnston – completed sponsorship training and taken offline to sponsor program
Scope Management	Too early		Scope of strategic assessment defined in the RFPs
Clear Success Criteria	Too early		Success criteria for Strategic Assessment Phase (phase 1) defined
Rigorous Stage gating	Too early		Stage gating clearly defined through RFP process and RFP requested Phase 1 plan with stage gates
Business change/readiness	Too early		There is limited business change required for Phase 1. There is strong business demand for this piece of work. Resources for Phase 1 will be defined during the RFP phase to confirm business can support
Good Governance Controls/Planning	Too early		Program Management Office formed, Steering Group formed & governance signed off
Partner Management	Too early		Set out clear expectations and roles for partners and NG within the RFPs for Phase 1
High Performance Team	Too early		Team just being formed, strong individuals, work to now align as a team behind a common goal

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Business Enablement Governance Structure

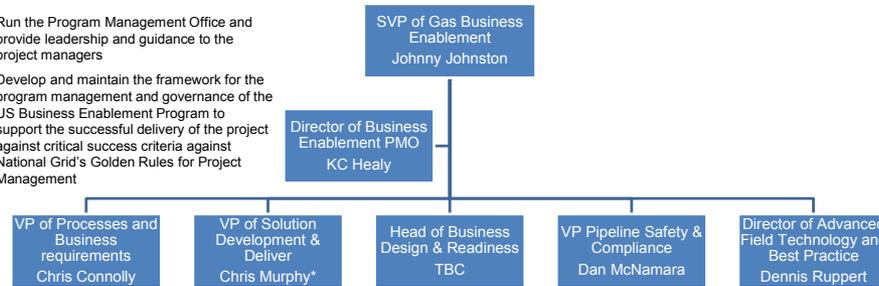


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Leadership Structure and Accountabilities: It should be noted that although these are the key roles to kick off the project, as the project develops the roles and structure will need to evolve to support delivery

- Run the Program Management Office and provide leadership and guidance to the project managers
- Develop and maintain the framework for the program management and governance of the US Business Enablement Program to support the successful delivery of the project against critical success criteria against National Grid's Golden Rules for Project Management



Key Accountabilities

- Accountable for delivering the standard 'to be' processes and business needs
- Accountable for defining the data structure & hierarchy required to meet business needs
- Accountable ensuring delivery of the business requirements through the end to end delivery of the project
- Develop and delivery the IS solution to meet the business's requirements
- Develop and deliver the support and development model for post implementation operations and improvement
- Manage the relationship with and performance of the delivery partners
- Design the 'To Be' US Gas Distribution operating model within the Jurisdictional Model
- Developing and implementing a change program to deliver the process, system and cultural changes that are desired to be implemented as part of the project.
- Manage the relationship with and performance of the delivery partners
- Complete 3rd party audits to confirm health of current compliance approach and gaps
- Develop risk based investment plan for addressing historic/legacy issues
- Develop plan to enhance today's compliance activities
- Actively engage in future policy changes and ensure NG has timely preparation plans
- Set up an innovation and best practice team for field practices
- Identify technology & innovative practices that could improve the performance of the team and develop the business case for implementation
- Pilot the technology and practices and work with the business for full implementation

* Chris Murphy currently Interim US CIO but also providing strategic IS leadership to the program



Project Plan Summary

Gas Enablement Summary Project Plan		Date of last update: 4/28/16										
Enablement Project Plan		Key: On Track Completed Less than 2 weeks behind More than 2 weeks behind										
		Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16
Governance	PLC Update on Funding (Confirm Dates)											
People	Build Core Team											
Pilot	RFP for process support											
	Initial process Standardization											
	Develop Technology Pilot approach											
	Technology Pilot Development											
	Pilot Test period in field											
Process/System Solution	Get core team in place											
	Agree key principles											
	Develop procurement materials											
	Announce Process											
	Complete procurement process											
	Complete Requirements, High level design & Implementation Plan											
Compliance	Get core team in place											
	Select and Appoint 3rd party auditor											
	Complete 3rd party gap assessment											
	Receive interim report with required actions											
	Develop action plan, costs and recovery options											
Advanced Technology	Get core team in place											
	Do initial market intelligence sweep & develop strategy											
	Agree priorities and develop plan for implementation											
HR	Get core team in place											
	Complete strategic resource planning round 1											
	Build resourcing strategy and action plan											
	Secure support for reviewing operating model											
	Complete operating model review to optimise delivery											
	Get recommendations approved and develop implementation plan											
Regulatory Strategy	Develop regulatory strategy											
	Start regulatory engagement											
Business Cases	Develop business case											
Exec approval for funding and progress	Pull together analysis & requirements											
	First Draft of paper											
	Feedback from stakeholders including regulatory											
	Second Draft of paper											
	Sign off from Steering Group											
	Take paper to the US Exec/Group Exec/Board as required											

Summary of Scope for Phase 1

Area	Ask	Outputs
Central Team	\$2M	<ul style="list-style-type: none"> Establish a PMO – governance & reporting established – including Golden Rules Refine the Case for Change Develop the Prioritized & Phased Plan Define the Ask & Benefits Case Develop the regulatory cost recovery strategy including for KEDNY/KEDLI rate cases
Compliance Plan	\$1.5M	<ul style="list-style-type: none"> 3rd party independent compliance assessment Risk based compliance plan to address historic issues, current performance and strategic investments for future performance
Compliance Immediate Actions	\$5.5M	<ul style="list-style-type: none"> Public Awareness enhancements including Damage Prevention Web Portal 10 Compliance Analysts + 2 QA/QC Analysts Plastic Joining Compliance monitoring post East Harlem Service Line Definition preparation Tactical IS solutions
IS Plan	\$6M	<ul style="list-style-type: none"> Project principles & scope approved Target Data Architecture model developed (including ownership) Approach to process governance established with tool to support Detailed plan to map processes Target technology architecture approach confirmed Benchmarking with other utilities and other leading companies completed Key applications & devices selected Procurement strategy developed
IS Pilot	\$6M	<ul style="list-style-type: none"> First process (Collections) fully mapped Significant progress made on the build of a single process pilot
HR Plan	\$0.85M	<ul style="list-style-type: none"> Strategy and implementation plan including embedding strategic resource planning, transforming hiring & training processes
HR Immediate Actions	\$0.65M	<ul style="list-style-type: none"> Refreshed strategic resourcing planning model 3 FTEs on-boarded to support future hiring requirements
Advanced Ops Plan	\$0.35M	<ul style="list-style-type: none"> Strategy and implementation plan including investment recommendation, deployment plan and regulatory recovery strategy
Advanced Ops Immediate Actions	\$0.3M	<ul style="list-style-type: none"> 3 supervisors embedded in NY & MA operations to deploy CISBOT & advanced lining techniques in the field
Risk Margin	\$2.3M	@ 10%
Total	\$25.5M	

Boston Gas Company and Colonial Gas Company
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D.P.U. 17-170
Information Request AG-21-39
March 15, 2018
H.O. Pieper
Page 1 of 3

Information Request AG-21-39

Request:

Please provide copies of all requests for proposals and bids submitted as part of the process to procure third-party service providers to assist National Grid with the GBE program.

Response:

The following documents are provided to demonstrate the fair and equitable bid process undertaken to procure the third-party service providers. Please refer to the following attachments:

Attachment AG-21-39-1 CONFIDENTIAL – GBE RFI Vendor Info Packet
Attachment AG-21-39-2 CONFIDENTIAL – GBE RFI Document
Attachment AG-21-39-3 CONFIDENTIAL – GBE RFI Attachment A Response Template
Attachment AG-21-39-4 CONFIDENTIAL – GBE RFI Attachment B Work Packages

Attachment AG-21-39-5 CONFIDENTIAL – GBE RFP VA Document

Attachment AG-21-39-6 CONFIDENTIAL – Vendor 1 RFI Response Package 1
Attachment AG-21-39-7 CONFIDENTIAL – Vendor 1 RFI Response Package 2
Attachment AG-21-39-8 – Vendor 1 RFI Response Package 3

Attachment AG-21-39-9 CONFIDENTIAL – Vendor 2 RFI Response Document 1 Overview
Attachment AG-21-39-10 CONFIDENTIAL – Vendor 2 RFI Response Document2 PO
Attachment AG-21-39-11 CONFIDENTIAL – Vendor 2 RFI Response Document3 BECM
Attachment AG-21-39-12 CONFIDENTIAL – Vendor 2 RFI Response Document4 OM
Attachment AG-21-39-13 CONFIDENTIAL – Vendor 2 RFI Response Document5 WM
Attachment AG-21-39-14 CONFIDENTIAL – Vendor 2 RFI Response Document6 AM-GIS
Attachment AG-21-39-15 CONFIDENTIAL – Vendor 2 RFI Response Document7 CE
Attachment AG-21-39-16 CONFIDENTIAL – Vendor 2 RFI Response Document8 DM
Attachment AG-21-39-17 CONFIDENTIAL – Vendor 2 RFI Response Document9 MSA

Attachment AG-21-39-18 CONFIDENTIAL – Vendor 3 RFI Response Document1 SOW

Attachment AG-21-39-19 CONFIDENTIAL – Vendor 4 RFP Response Document1 Proposal
Attachment AG-21-39-20 CONFIDENTIAL – Vendor 4 RFP Response Document2 Price Book

Prepared by or under the supervision of: Anthony H. Johnston and Reihaneh Irani-Famili

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D.P.U. 17-170
Information Request AG-21-39
March 15, 2018
H.O. Pieper
Page 2 of 3

Attachment AG-21-39-21 CONFIDENTIAL – Vendor 1 RFI Response Price Book

Attachment AG-21-39-22 CONFIDENTIAL – Vendor 2 RFI Response Document10 AM

Attachment AG-21-39-23 CONFIDENTIAL – Vendor 2 RFI Response Document11 SC

Attachment AG-21-39-24 CONFIDENTIAL – Vendor 2 RFI Response Document12 Key
Support

Attachment AG-21-39-25 CONFIDENTIAL – Vendor 2 RFI Response Document13
Services

Attachment AG-21-39-26 CONFIDENTIAL – Vendor 2 RFI Response Document14 Open
Source

Attachment AG-21-39-27 CONFIDENTIAL – Vendor 2 RFI Response Document15
Dependency Framework

Attachment AG-21-39-28 CONFIDENTIAL – Vendor 2 RFI Response Document16 Role
Mapping

Attachment AG-21-39-29 CONFIDENTIAL – Vendor 2 RFI Response Document17 BECM

Attachment AG-21-39-30 CONFIDENTIAL – Vendor 2 RFI Response Document18 OM
Milestones

Attachment AG-21-39-31 CONFIDENTIAL – Vendor 2 RFI Response Document19 SC
Milestones

Attachment AG-21-39-32 CONFIDENTIAL – Vendor 2 RFI Response Document20 WM
Milestones

Attachment AG-21-39-33 CONFIDENTIAL – Vendor 2 RFI Response Document21 Price
Book Hours

Attachment AG-21-39-34 CONFIDENTIAL – Vendor 2 RFI Response Document22 AM-
GIS Milestones

Attachment AG-21-39-35 CONFIDENTIAL – Vendor 2 RFI Response Document23 GBE
CO Rate Card

Attachment AG-21-39-36 CONFIDENTIAL – Vendor 2 RFI Response Document24 GBE
Roadmap

Attachment AG-21-39-37 CONFIDENTIAL – Vendor 2 RFI Response Document25 CE
Milestones

Attachment AG-21-39-38 CONFIDENTIAL – Vendor 2 RFI Response Document26 DM
Milestones

Attachment AG-21-39-39 CONFIDENTIAL – Vendor 2 RFI Response Document27
Instructions

Attachment AG-21-39-40 CONFIDENTIAL – Vendor 2 RFI Response Document28 ISE
Milestones

Attachment AG-21-39-41 CONFIDENTIAL – Vendor 2 RFI Response Document29
ISE09Module

Prepared by or under the supervision of: Anthony H. Johnston and Reihaneh Irani-Famili

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-90
Page 3 of 3

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-39
March 15, 2018
H.O. Pieper
Page 3 of 3

Attachment AG-21-39-42 CONFIDENTIAL – Vendor 2 RFI Response Document30
Clarification Questions

Prepared by or under the supervision of: Anthony H. Johnston and Reihaneh Irani-Famili

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D.P.U. 17-170
Information Request AG-21-40
March 15, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-40

Request:

Please provide copies of all contracts, terms and conditions, and any other agreements, including amendments or change orders, with third-party vendors, consultants, and/or Delivery Partners that are participating in or assisting National Grid with the GBE program.

Response:

Please refer to the following attachments representing key GBE service agreements:

Attachment AG-21-40-1 CONFIDENTIAL – System Integration Services Agreement
Attachment AG-21-40-2 CONFIDENTIAL – Services Agreement
Attachment AG-21-40-3 CONFIDENTIAL – Amended & Restated System Integration Services Agreement
Attachment AG-21-40-4 CONFIDENTIAL – Services Agreement
Attachment AG-21-40-5 CONFIDENTIAL – Master Framework Agreement

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-42
March 15, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-42

Request:

Please provide copies of all statements of work and/or work orders concerning the GBE program.

Response:

Please refer to the following sections of the Attachments listed in the response to Information Request AG-21-40:

Attachment AG-21-40-1 - Exhibit A-1, Schedule 1
Exhibit A-2, Schedule 1

Attachment AG-21-40-2 – Exhibit A

Attachment AG-21-40-3 – Exhibit A-1, Schedule 1
Exhibit A-2, Schedule 1
Exhibit A-3, Schedule 1
Exhibit A-4, Schedule 1
Exhibit A-5, Schedule 1
Exhibit A-6, Schedule 1
Exhibit A-7, Schedule 1
Exhibit A-8, Schedule 1
Exhibit A-9, Schedule 1

Attachment AG-21-40-4 – Exhibit B

Additionally, please refer to the following Attachment:

Attachment AG-21-42-1 CONFIDENTIAL – FY18 Statement of Work

Prepared by or under the supervision of: Anthony H. Johnston and Reihaneh Irani-Famili

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D.P.U. 17-170
Information Request AG-21-43
March 12, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-43

Request:

Referring to page 35 of Exhibit NG-GBE-1, the panel notes that it selected Kotter International to “perform the Strategic Change Management role” for the GBE Program. Please explain how the role of Kotter International differs from the role of Ms. Irani-Famili, whose role includes the “Change Management function of GBE,” as stated on page 3 of Exhibit NG-GBE-1.

Response:

Mrs. Irani-Famili’s role as head of Business Readiness and Design includes responsibility for developing an overall change strategy for GBE. The overall change strategy has three major elements:

1. Managing change imposed by deployment of technology, which includes: Stakeholder management, training, communications and facilitation of go-live decision making process.
2. Preparing the workforce and leadership for the transformation of the gas business, which includes: leadership alignment, change leadership capability build across the gas organization and building momentum across the gas business prior to technology deployment.
3. Building a gas operating model that would ensure value realization and sustainment of the value created by the program. This includes: Design and deployment of Organization structure, developing a performance framework, clarifying roles and responsibilities to ensure more effective handoffs.

The role of Kotter international as a strategic change partner is to execute element number 2 of the overall change strategy for GBE.

Prepared by or under the supervision of: Anthony H. Johnston and Reihaneh Irani-Famili

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D.P.U. 17-170
Information Request AG-21-44
March 13, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-44

Request:

Referring to page 35 of Exhibit NG-GBE-1, please provide copies of all Module Plans and a copy of the Integrated Program Plan.

Response:

Please refer to the Module Plans included in the Company's response to Information Request AG 21-40. The current version of the Gas Business Enablement Integrated Program Plan can be found in Attachment AG 21-44-1.

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-96
Page 1 of 27

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-44-1
Page 1 of 27

Line Item	Item Name	Quantity	Unit	Cost	% Complete	Indefinite	Comments
1	SRM Program Dates	1,000,000	Hour	140,000,000	100%		
2	Program Start Date	1	Month	1/1/02	100%		
3	Portfolio Anchor End Date	1	Month	12/31/08	100%		
4	Portfolio Anchor 1	1	Month	1/1/02	100%		
5	Portfolio Anchor 2	1	Month	1/1/02	100%		
6	Portfolio Anchor 3	1	Month	1/1/02	100%		
7	Portfolio Anchor 4	1	Month	1/1/02	100%		
8	Portfolio Anchor 5	1	Month	1/1/02	100%		
9	Portfolio Anchor 6	1	Month	1/1/02	100%		
10	Program Increments (MW)	1,000,000	Hour	140,000,000	100%		
11	Increment 1	1,000,000	Hour	140,000,000	100%		
12	Series 1.1	100,000	Hour	14,000,000	100%		
13	Series 1.2	100,000	Hour	14,000,000	100%		
14	Series 1.3	100,000	Hour	14,000,000	100%		
15	Series 1.4	100,000	Hour	14,000,000	100%		
16	Series 1.5	100,000	Hour	14,000,000	100%		
17	Program Increment 2 Planning	1,000,000	Hour	140,000,000	100%		
18	Series 2.1	100,000	Hour	14,000,000	100%		
19	Series 2.2	100,000	Hour	14,000,000	100%		
20	Series 2.3	100,000	Hour	14,000,000	100%		
21	Series 2.4	100,000	Hour	14,000,000	100%		
22	Series 2.5	100,000	Hour	14,000,000	100%		
23	Program Increment 3 Planning	1,000,000	Hour	140,000,000	100%		
24	Series 3.1	100,000	Hour	14,000,000	100%		
25	Series 3.2	100,000	Hour	14,000,000	100%		
26	Series 3.3	100,000	Hour	14,000,000	100%		
27	Series 3.4	100,000	Hour	14,000,000	100%		
28	Series 3.5	100,000	Hour	14,000,000	100%		
29	Program Increment 4 Planning	1,000,000	Hour	140,000,000	100%		
30	Series 4.1	100,000	Hour	14,000,000	100%		
31	Series 4.2	100,000	Hour	14,000,000	100%		
32	Series 4.3	100,000	Hour	14,000,000	100%		
33	Series 4.4	100,000	Hour	14,000,000	100%		
34	Series 4.5	100,000	Hour	14,000,000	100%		
35	Program Increment 5 Planning	1,000,000	Hour	140,000,000	100%		
36	Series 5.1	100,000	Hour	14,000,000	100%		
37	Series 5.2	100,000	Hour	14,000,000	100%		
38	Series 5.3	100,000	Hour	14,000,000	100%		
39	Series 5.4	100,000	Hour	14,000,000	100%		
40	Series 5.5	100,000	Hour	14,000,000	100%		
41	Program Increment 6 Planning	1,000,000	Hour	140,000,000	100%		
42	Series 6.1	100,000	Hour	14,000,000	100%		
43	Series 6.2	100,000	Hour	14,000,000	100%		
44	Series 6.3	100,000	Hour	14,000,000	100%		
45	Series 6.4	100,000	Hour	14,000,000	100%		
46	Series 6.5	100,000	Hour	14,000,000	100%		
47	Program Increment 7 Planning	1,000,000	Hour	140,000,000	100%		
48	Series 7.1	100,000	Hour	14,000,000	100%		
49	Series 7.2	100,000	Hour	14,000,000	100%		
50	Series 7.3	100,000	Hour	14,000,000	100%		
51	Series 7.4	100,000	Hour	14,000,000	100%		
52	Series 7.5	100,000	Hour	14,000,000	100%		
53	Program Increment 8 Planning	1,000,000	Hour	140,000,000	100%		
54	Series 8.1	100,000	Hour	14,000,000	100%		
55	Series 8.2	100,000	Hour	14,000,000	100%		
56	Series 8.3	100,000	Hour	14,000,000	100%		
57	Series 8.4	100,000	Hour	14,000,000	100%		
58	Series 8.5	100,000	Hour	14,000,000	100%		
59	Program Increment 9 Planning	1,000,000	Hour	140,000,000	100%		
60	Series 9.1	100,000	Hour	14,000,000	100%		
61	Series 9.2	100,000	Hour	14,000,000	100%		
62	Series 9.3	100,000	Hour	14,000,000	100%		
63	Series 9.4	100,000	Hour	14,000,000	100%		
64	Series 9.5	100,000	Hour	14,000,000	100%		
65	Program Increment 10 Planning	1,000,000	Hour	140,000,000	100%		
66	Series 10.1	100,000	Hour	14,000,000	100%		
67	Series 10.2	100,000	Hour	14,000,000	100%		
68	Series 10.3	100,000	Hour	14,000,000	100%		

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-96
Page 2 of 27

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-44-1
Page 2 of 27

Line Item	Program Name	Category	Start	End	Completion	Indicators	Comments
10	Series 10.1	10.1	Wed 10/20/09	Tue 10/20/09	0%	70	70
11	Series 10.2	10.2	Wed 10/20/09	Tue 10/20/09	0%	71	71
12	Series 10.3	10.3	Wed 10/20/09	Tue 10/20/09	0%	72	72
13	Series 10.4	10.4	Wed 10/20/09	Tue 10/20/09	0%	73	73
14	Series 10.5	10.5	Wed 10/20/09	Tue 10/20/09	0%	74	74
15	Series 10.6	10.6	Wed 10/20/09	Tue 10/20/09	0%	75	75
16	Series 10.7	10.7	Wed 10/20/09	Tue 10/20/09	0%	76	76
17	Series 10.8	10.8	Wed 10/20/09	Tue 10/20/09	0%	77	77
18	Series 10.9	10.9	Wed 10/20/09	Tue 10/20/09	0%	78	78
19	Series 10.10	10.10	Wed 10/20/09	Tue 10/20/09	0%	79	79
20	Series 10.11	10.11	Wed 10/20/09	Tue 10/20/09	0%	80	80
21	Series 10.12	10.12	Wed 10/20/09	Tue 10/20/09	0%	81	81
22	Series 10.13	10.13	Wed 10/20/09	Tue 10/20/09	0%	82	82
23	Series 10.14	10.14	Wed 10/20/09	Tue 10/20/09	0%	83	83
24	Series 10.15	10.15	Wed 10/20/09	Tue 10/20/09	0%	84	84
25	Series 10.16	10.16	Wed 10/20/09	Tue 10/20/09	0%	85	85
26	Series 10.17	10.17	Wed 10/20/09	Tue 10/20/09	0%	86	86
27	Series 10.18	10.18	Wed 10/20/09	Tue 10/20/09	0%	87	87
28	Series 10.19	10.19	Wed 10/20/09	Tue 10/20/09	0%	88	88
29	Series 10.20	10.20	Wed 10/20/09	Tue 10/20/09	0%	89	89
30	Series 10.21	10.21	Wed 10/20/09	Tue 10/20/09	0%	90	90
31	Series 10.22	10.22	Wed 10/20/09	Tue 10/20/09	0%	91	91
32	Series 10.23	10.23	Wed 10/20/09	Tue 10/20/09	0%	92	92
33	Series 10.24	10.24	Wed 10/20/09	Tue 10/20/09	0%	93	93
34	Series 10.25	10.25	Wed 10/20/09	Tue 10/20/09	0%	94	94
35	Series 10.26	10.26	Wed 10/20/09	Tue 10/20/09	0%	95	95
36	Series 10.27	10.27	Wed 10/20/09	Tue 10/20/09	0%	96	96
37	Series 10.28	10.28	Wed 10/20/09	Tue 10/20/09	0%	97	97
38	Series 10.29	10.29	Wed 10/20/09	Tue 10/20/09	0%	98	98
39	Series 10.30	10.30	Wed 10/20/09	Tue 10/20/09	0%	99	99
40	Series 10.31	10.31	Wed 10/20/09	Tue 10/20/09	0%	100	100
41	Series 10.32	10.32	Wed 10/20/09	Tue 10/20/09	0%	101	101
42	Series 10.33	10.33	Wed 10/20/09	Tue 10/20/09	0%	102	102
43	Series 10.34	10.34	Wed 10/20/09	Tue 10/20/09	0%	103	103
44	Series 10.35	10.35	Wed 10/20/09	Tue 10/20/09	0%	104	104
45	Series 10.36	10.36	Wed 10/20/09	Tue 10/20/09	0%	105	105
46	Series 10.37	10.37	Wed 10/20/09	Tue 10/20/09	0%	106	106
47	Series 10.38	10.38	Wed 10/20/09	Tue 10/20/09	0%	107	107
48	Series 10.39	10.39	Wed 10/20/09	Tue 10/20/09	0%	108	108
49	Series 10.40	10.40	Wed 10/20/09	Tue 10/20/09	0%	109	109
50	Series 10.41	10.41	Wed 10/20/09	Tue 10/20/09	0%	110	110
51	Series 10.42	10.42	Wed 10/20/09	Tue 10/20/09	0%	111	111
52	Series 10.43	10.43	Wed 10/20/09	Tue 10/20/09	0%	112	112
53	Series 10.44	10.44	Wed 10/20/09	Tue 10/20/09	0%	113	113
54	Series 10.45	10.45	Wed 10/20/09	Tue 10/20/09	0%	114	114
55	Series 10.46	10.46	Wed 10/20/09	Tue 10/20/09	0%	115	115
56	Series 10.47	10.47	Wed 10/20/09	Tue 10/20/09	0%	116	116
57	Series 10.48	10.48	Wed 10/20/09	Tue 10/20/09	0%	117	117
58	Series 10.49	10.49	Wed 10/20/09	Tue 10/20/09	0%	118	118
59	Series 10.50	10.50	Wed 10/20/09	Tue 10/20/09	0%	119	119
60	Series 10.51	10.51	Wed 10/20/09	Tue 10/20/09	0%	120	120
61	Series 10.52	10.52	Wed 10/20/09	Tue 10/20/09	0%	121	121
62	Series 10.53	10.53	Wed 10/20/09	Tue 10/20/09	0%	122	122
63	Series 10.54	10.54	Wed 10/20/09	Tue 10/20/09	0%	123	123
64	Series 10.55	10.55	Wed 10/20/09	Tue 10/20/09	0%	124	124
65	Series 10.56	10.56	Wed 10/20/09	Tue 10/20/09	0%	125	125
66	Series 10.57	10.57	Wed 10/20/09	Tue 10/20/09	0%	126	126
67	Series 10.58	10.58	Wed 10/20/09	Tue 10/20/09	0%	127	127
68	Series 10.59	10.59	Wed 10/20/09	Tue 10/20/09	0%	128	128
69	Series 10.60	10.60	Wed 10/20/09	Tue 10/20/09	0%	129	129
70	Series 10.61	10.61	Wed 10/20/09	Tue 10/20/09	0%	130	130
71	Series 10.62	10.62	Wed 10/20/09	Tue 10/20/09	0%	131	131
72	Series 10.63	10.63	Wed 10/20/09	Tue 10/20/09	0%	132	132
73	Series 10.64	10.64	Wed 10/20/09	Tue 10/20/09	0%	133	133
74	Series 10.65	10.65	Wed 10/20/09	Tue 10/20/09	0%	134	134
75	Series 10.66	10.66	Wed 10/20/09	Tue 10/20/09	0%	135	135
76	Series 10.67	10.67	Wed 10/20/09	Tue 10/20/09	0%	136	136
77	Series 10.68	10.68	Wed 10/20/09	Tue 10/20/09	0%	137	137
78	Series 10.69	10.69	Wed 10/20/09	Tue 10/20/09	0%	138	138
79	Series 10.70	10.70	Wed 10/20/09	Tue 10/20/09	0%	139	139
80	Series 10.71	10.71	Wed 10/20/09	Tue 10/20/09	0%	140	140
81	Series 10.72	10.72	Wed 10/20/09	Tue 10/20/09	0%	141	141
82	Series 10.73	10.73	Wed 10/20/09	Tue 10/20/09	0%	142	142
83	Series 10.74	10.74	Wed 10/20/09	Tue 10/20/09	0%	143	143
84	Series 10.75	10.75	Wed 10/20/09	Tue 10/20/09	0%	144	144
85	Series 10.76	10.76	Wed 10/20/09	Tue 10/20/09	0%	145	145
86	Series 10.77	10.77	Wed 10/20/09	Tue 10/20/09	0%	146	146
87	Series 10.78	10.78	Wed 10/20/09	Tue 10/20/09	0%	147	147
88	Series 10.79	10.79	Wed 10/20/09	Tue 10/20/09	0%	148	148
89	Series 10.80	10.80	Wed 10/20/09	Tue 10/20/09	0%	149	149
90	Series 10.81	10.81	Wed 10/20/09	Tue 10/20/09	0%	150	150
91	Series 10.82	10.82	Wed 10/20/09	Tue 10/20/09	0%	151	151
92	Series 10.83	10.83	Wed 10/20/09	Tue 10/20/09	0%	152	152
93	Series 10.84	10.84	Wed 10/20/09	Tue 10/20/09	0%	153	153
94	Series 10.85	10.85	Wed 10/20/09	Tue 10/20/09	0%	154	154
95	Series 10.86	10.86	Wed 10/20/09	Tue 10/20/09	0%	155	155
96	Series 10.87	10.87	Wed 10/20/09	Tue 10/20/09	0%	156	156
97	Series 10.88	10.88	Wed 10/20/09	Tue 10/20/09	0%	157	157
98	Series 10.89	10.89	Wed 10/20/09	Tue 10/20/09	0%	158	158
99	Series 10.90	10.90	Wed 10/20/09	Tue 10/20/09	0%	159	159
100	Series 10.91	10.91	Wed 10/20/09	Tue 10/20/09	0%	160	160
101	Series 10.92	10.92	Wed 10/20/09	Tue 10/20/09	0%	161	161
102	Series 10.93	10.93	Wed 10/20/09	Tue 10/20/09	0%	162	162
103	Series 10.94	10.94	Wed 10/20/09	Tue 10/20/09	0%	163	163
104	Series 10.95	10.95	Wed 10/20/09	Tue 10/20/09	0%	164	164
105	Series 10.96	10.96	Wed 10/20/09	Tue 10/20/09	0%	165	165
106	Series 10.97	10.97	Wed 10/20/09	Tue 10/20/09	0%	166	166
107	Series 10.98	10.98	Wed 10/20/09	Tue 10/20/09	0%	167	167
108	Series 10.99	10.99	Wed 10/20/09	Tue 10/20/09	0%	168	168
109	Series 11.00	11.00	Wed 10/20/09	Tue 10/20/09	0%	169	169
110	Series 11.01	11.01	Wed 10/20/09	Tue 10/20/09	0%	170	170
111	Series 11.02	11.02	Wed 10/20/09	Tue 10/20/09	0%	171	171
112	Series 11.03	11.03	Wed 10/20/09	Tue 10/20/09	0%	172	172
113	Series 11.04	11.04	Wed 10/20/09	Tue 10/20/09	0%	173	173
114	Series 11.05	11.05	Wed 10/20/09	Tue 10/20/09	0%	174	174
115	Series 11.06	11.06	Wed 10/20/09	Tue 10/20/09	0%	175	175
116	Series 11.07	11.07	Wed 10/20/09	Tue 10/20/09	0%	176	176
117	Series 11.08	11.08	Wed 10/20/09	Tue 10/20/09	0%	177	177
118	Series 11.09	11.09	Wed 10/20/09	Tue 10/20/09	0%	178	178
119	Series 11.10	11.10	Wed 10/20/09	Tue 10/20/09	0%	179	179
120	Series 11.11	11.11	Wed 10/20/09	Tue 10/20/09	0%	180	180
121	Series 11.12	11.12	Wed 10/20/09	Tue 10/20/09	0%	181	181
122	Series 11.13	11.13	Wed 10/20/09	Tue 10/20/09	0%	182	182
123	Series 11.14	11.14	Wed 10/20/09	Tue 10/20/09	0%	183	183
124	Series 11.15	11.15	Wed 10/20/09	Tue 10/20/09	0%	184	184
125	Series 11.16	11.16	Wed 10/20/09	Tue 10/20/09	0%	185	185
126	Series 11.17	11.17	Wed 10/20/09	Tue 10/20/09	0%	186	186
127	Series 11.18	11.18	Wed 10/20/09	Tue 10/20/09	0%	187	187
128	Series 11.19	11.19	Wed 10/20/09	Tue 10/20/09	0%	188	188
129	Series 11.20	11.20	Wed 10/20/09	Tue 10/20/09	0%	189	189
130	Series 11.21	11.21	Wed 10/20/09	Tue 10/20/09	0%	190	190
131	Series 11.22	11.22	Wed 10/20/09	Tue 10/20/09	0%	191	191
132	Series 11.23	11.23	Wed 10/20/09	Tue 10/20/09	0%	192	192
133	Series 11.24	11.24	Wed 10/20/09	Tue 10/20/09	0%	193	193
134	Series 11.25	11.25	Wed 10/20/09	Tue 10/20/09	0%	194	194
135	Series 11.26	11.26	Wed 10/20/09	Tue 10/20/09	0%	195	195
136	Series 11.27	11.27					

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-96
Page 3 of 27

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-44-1
Page 3 of 27

Item	Item Name	Location	Date	Time	Completion	Indicators	Comments
100	April 22.2	0.0	Wed 04/22/01	Tue 04/23/01	0%	504	500
101	April 22.3	0.0	Wed 04/23/01	Tue 04/24/01	0%	505	501
102	April 22.4	0.0	Wed 04/23/01	Tue 04/24/01	0%	505	502
103	April 22.5	0.0	Wed 04/23/01	Tue 04/24/01	0%	505	503
104	Release Order (R/O)	0.0	04/23/01	04/23/01	0%		
105	PA Release 1 (PA1)	0.0	04/23/01	04/23/01	0%		
106	PA Release 2 (PA2)	0.0	04/23/01	04/23/01	0%	136655	
107	PA Release 3 (PA3)	0.0	04/23/01	04/23/01	0%		
108	PA Release 4 (PA4)	0.0	04/23/01	04/23/01	0%		
109	PA Release 5 (PA5)	0.0	04/23/01	04/23/01	0%		
110	PA Release 6 (PA6)	0.0	04/23/01	04/23/01	0%		
111	PA Release 7 (PA7)	0.0	04/23/01	04/23/01	0%		
112	PA Release 8 (PA8)	0.0	04/23/01	04/23/01	0%		
113	PA Release 9 (PA9)	0.0	04/23/01	04/23/01	0%		
114	PA Release 10 (PA10)	0.0	04/23/01	04/23/01	0%		
115	PA Release 11 (PA11)	0.0	04/23/01	04/23/01	0%		
116	PA Release 12 (PA12)	0.0	04/23/01	04/23/01	0%		
117	PA Release 13 (PA13)	0.0	04/23/01	04/23/01	0%		
118	PA Release 14 (PA14)	0.0	04/23/01	04/23/01	0%		
119	PA Release 15 (PA15)	0.0	04/23/01	04/23/01	0%		
120	PA Release 16 (PA16)	0.0	04/23/01	04/23/01	0%		
121	PA Release 17 (PA17)	0.0	04/23/01	04/23/01	0%		
122	PA Release 18 (PA18)	0.0	04/23/01	04/23/01	0%		
123	PA Release 19 (PA19)	0.0	04/23/01	04/23/01	0%		
124	PA Release 20 (PA20)	0.0	04/23/01	04/23/01	0%		
125	PA Release 21 (PA21)	0.0	04/23/01	04/23/01	0%		
126	PA Release 22 (PA22)	0.0	04/23/01	04/23/01	0%		
127	PA Release 23 (PA23)	0.0	04/23/01	04/23/01	0%		
128	PA Release 24 (PA24)	0.0	04/23/01	04/23/01	0%		
129	PA Release 25 (PA25)	0.0	04/23/01	04/23/01	0%		
130	PA Release 26 (PA26)	0.0	04/23/01	04/23/01	0%		
131	PA Release 27 (PA27)	0.0	04/23/01	04/23/01	0%		
132	PA Release 28 (PA28)	0.0	04/23/01	04/23/01	0%		
133	PA Release 29 (PA29)	0.0	04/23/01	04/23/01	0%		
134	PA Release 30 (PA30)	0.0	04/23/01	04/23/01	0%		
135	PA Release 31 (PA31)	0.0	04/23/01	04/23/01	0%		
136	PA Release 32 (PA32)	0.0	04/23/01	04/23/01	0%		
137	PA Release 33 (PA33)	0.0	04/23/01	04/23/01	0%		
138	PA Release 34 (PA34)	0.0	04/23/01	04/23/01	0%		
139	PA Release 35 (PA35)	0.0	04/23/01	04/23/01	0%		
140	PA Release 36 (PA36)	0.0	04/23/01	04/23/01	0%		
141	PA Release 37 (PA37)	0.0	04/23/01	04/23/01	0%		
142	PA Release 38 (PA38)	0.0	04/23/01	04/23/01	0%		
143	PA Release 39 (PA39)	0.0	04/23/01	04/23/01	0%		
144	PA Release 40 (PA40)	0.0	04/23/01	04/23/01	0%		
145	PA Release 41 (PA41)	0.0	04/23/01	04/23/01	0%		
146	PA Release 42 (PA42)	0.0	04/23/01	04/23/01	0%		
147	PA Release 43 (PA43)	0.0	04/23/01	04/23/01	0%		
148	PA Release 44 (PA44)	0.0	04/23/01	04/23/01	0%		
149	PA Release 45 (PA45)	0.0	04/23/01	04/23/01	0%		
150	PA Release 46 (PA46)	0.0	04/23/01	04/23/01	0%		
151	PA Release 47 (PA47)	0.0	04/23/01	04/23/01	0%		
152	PA Release 48 (PA48)	0.0	04/23/01	04/23/01	0%		
153	PA Release 49 (PA49)	0.0	04/23/01	04/23/01	0%		
154	PA Release 50 (PA50)	0.0	04/23/01	04/23/01	0%		
155	PA Release 51 (PA51)	0.0	04/23/01	04/23/01	0%		
156	PA Release 52 (PA52)	0.0	04/23/01	04/23/01	0%		
157	PA Release 53 (PA53)	0.0	04/23/01	04/23/01	0%		
158	PA Release 54 (PA54)	0.0	04/23/01	04/23/01	0%		
159	PA Release 55 (PA55)	0.0	04/23/01	04/23/01	0%		
160	PA Release 56 (PA56)	0.0	04/23/01	04/23/01	0%		
161	PA Release 57 (PA57)	0.0	04/23/01	04/23/01	0%		
162	PA Release 58 (PA58)	0.0	04/23/01	04/23/01	0%		
163	PA Release 59 (PA59)	0.0	04/23/01	04/23/01	0%		
164	PA Release 60 (PA60)	0.0	04/23/01	04/23/01	0%		
165	PA Release 61 (PA61)	0.0	04/23/01	04/23/01	0%		
166	PA Release 62 (PA62)	0.0	04/23/01	04/23/01	0%		
167	PA Release 63 (PA63)	0.0	04/23/01	04/23/01	0%		
168	PA Release 64 (PA64)	0.0	04/23/01	04/23/01	0%		
169	PA Release 65 (PA65)	0.0	04/23/01	04/23/01	0%		
170	PA Release 66 (PA66)	0.0	04/23/01	04/23/01	0%		
171	PA Release 67 (PA67)	0.0	04/23/01	04/23/01	0%		
172	PA Release 68 (PA68)	0.0	04/23/01	04/23/01	0%		
173	PA Release 69 (PA69)	0.0	04/23/01	04/23/01	0%		
174	PA Release 70 (PA70)	0.0	04/23/01	04/23/01	0%		
175	PA Release 71 (PA71)	0.0	04/23/01	04/23/01	0%		
176	PA Release 72 (PA72)	0.0	04/23/01	04/23/01	0%		
177	PA Release 73 (PA73)	0.0	04/23/01	04/23/01	0%		
178	PA Release 74 (PA74)	0.0	04/23/01	04/23/01	0%		
179	PA Release 75 (PA75)	0.0	04/23/01	04/23/01	0%		
180	PA Release 76 (PA76)	0.0	04/23/01	04/23/01	0%		
181	PA Release 77 (PA77)	0.0	04/23/01	04/23/01	0%		
182	PA Release 78 (PA78)	0.0	04/23/01	04/23/01	0%		
183	PA Release 79 (PA79)	0.0	04/23/01	04/23/01	0%		
184	PA Release 80 (PA80)	0.0	04/23/01	04/23/01	0%		
185	PA Release 81 (PA81)	0.0	04/23/01	04/23/01	0%		
186	PA Release 82 (PA82)	0.0	04/23/01	04/23/01	0%		
187	PA Release 83 (PA83)	0.0	04/23/01	04/23/01	0%		
188	PA Release 84 (PA84)	0.0	04/23/01	04/23/01	0%		
189	PA Release 85 (PA85)	0.0	04/23/01	04/23/01	0%		
190	PA Release 86 (PA86)	0.0	04/23/01	04/23/01	0%		
191	PA Release 87 (PA87)	0.0	04/23/01	04/23/01	0%		
192	PA Release 88 (PA88)	0.0	04/23/01	04/23/01	0%		
193	PA Release 89 (PA89)	0.0	04/23/01	04/23/01	0%		
194	PA Release 90 (PA90)	0.0	04/23/01	04/23/01	0%		
195	PA Release 91 (PA91)	0.0	04/23/01	04/23/01	0%		
196	PA Release 92 (PA92)	0.0	04/23/01	04/23/01	0%		
197	PA Release 93 (PA93)	0.0	04/23/01	04/23/01	0%		
198	PA Release 94 (PA94)	0.0	04/23/01	04/23/01	0%		
199	PA Release 95 (PA95)	0.0	04/23/01	04/23/01	0%		
200	PA Release 96 (PA96)	0.0	04/23/01	04/23/01	0%		
201	PA Release 97 (PA97)	0.0	04/23/01	04/23/01	0%		
202	PA Release 98 (PA98)	0.0	04/23/01	04/23/01	0%		
203	PA Release 99 (PA99)	0.0	04/23/01	04/23/01	0%		
204	PA Release 100 (PA100)	0.0	04/23/01	04/23/01	0%		
205	PA Release 101 (PA101)	0.0	04/23/01	04/23/01	0%		
206	PA Release 102 (PA102)	0.0	04/23/01	04/23/01	0%		
207	PA Release 103 (PA103)	0.0	04/23/01	04/23/01	0%		
208	PA Release 104 (PA104)	0.0	04/23/01	04/23/01	0%		
209	PA Release 105 (PA105)	0.0	04/23/01	04/23/01	0%		
210	PA Release 106 (PA106)	0.0	04/23/01	04/23/01	0%		
211	PA Release 107 (PA107)	0.0	04/23/01	04/23/01	0%		
212	PA Release 108 (PA108)	0.0	04/23/01	04/23/01	0%		
213	PA Release 109 (PA109)	0.0	04/23/01	04/23/01	0%		
214	PA Release 110 (PA110)	0.0	04/23/01	04/23/01	0%		
215	PA Release 111 (PA111)	0.0	04/23/01	04/23/01	0%		
216	PA Release 112 (PA112)	0.0	04/23/01	04/23/01	0%		
217	PA Release 113 (PA113)	0.0	04/23/01	04/23/01	0%		
218	PA Release 114 (PA114)	0.0	04/23/01	04/23/01	0%		
219	PA Release 115 (PA115)	0.0	04/23/01	04/23/01	0%		
220	PA Release 116 (PA116)	0.0	04/23/01	04/23/01	0%		
221	PA Release 117 (PA117)	0.0	04/23/01	04/23/01	0%		
222	PA Release 118 (PA118)	0.0	04/23/01	04/23/01	0%		
223	PA Release 119 (PA119)	0.0	04/23/01	04/23/01	0%		
224	PA Release 120 (PA120)	0.0	04/23/01	04/23/01	0%		
225	PA Release 121 (PA121)	0.0	04/23/01	04/23/01	0%		
226	PA Release 122 (PA122)	0.0	04/23/01	04/23/01	0%		
227	PA Release 123 (PA123)	0.0	04/23/01	04/23/01	0%		
228	PA Release 124 (PA124)	0.0	04/23/01	04/23/01	0%		
229	PA Release 125 (PA125)	0.0	04/23/01	04/23/01	0%		
230	PA Release 126 (PA126)	0.0	04/23/01	04/23/01	0%		
231	PA Release 127 (PA127)	0.0	04/23/01	04/23/01	0%		
232	PA Release 128 (PA128)	0.0	04/23/01	04/23/01	0%		
233	PA Release 129 (PA129)	0.0	04/23/01	04/23/01	0%		
234	PA Release 130 (PA130)	0.0	04/23/01	04/23/01	0%		
235	PA Release 131 (PA131)	0.0	04/23/01	04/23/01	0%		
236	PA Release 132 (PA132)	0.0	04/23/01	04/23/01	0%		
237	PA Release 133 (PA133)	0.0	04/23/01	04/23/01	0%		
238	PA Release 134 (PA134)	0.0	04/23/01	04/23/01	0%		
239	PA Release 135 (PA135)	0.0	04/23/01	04/23/01	0%		
240	PA Release 136 (PA136)	0.0	04/23/01	04/23/01	0%		
241							

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-96
Page 7 of 27

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-44-1
Page 7 of 27

ID	Item Name	Version	Unit	Start	End	Complete	Deliverables	Comments
122	Module 9 - Information Services Enabling PMS	0.0.0	Mon 11/06/17	Wed 5/26/18	80%			
123	IE Mobilization - Technical Infrastructure Start-Up Requirements	0.0.0	Mon 11/06/17	Fri 4/24/18	100%			
124	IE Mobilization - Technical Infrastructure Start-Up Requirements	0.0.0	Mon 11/06/17	Tue 4/24/17	100%			
125	Development Environment Infrastructure (Acorn - GIS)	0.0.0	Mon 11/06/17	Mon 11/11/17	100%			
126	Process and tool (IE Backlog, Policy, Acorn)	0.0.0	Mon 11/06/17	Mon 11/11/17	100%			
127	Process and tool (IE AUI and Coretools)	0.0.0	Mon 11/06/17	Mon 11/11/17	100%		541	
128	Process and tool (IE Mobile Control App Storm-Runner)	0.0.0	Mon 11/06/17	Fri 8/18/17	100%			
129	Process and tool (Integration Architecture (Machete))	0.0.0	Mon 11/06/17	Mon 11/11/17	100%			
130	IE Mobilization - CSD (Comprehensive Integration Services (Enhancements))	0.0.0	Mon 11/06/17	Fri 11/24/17	100%			
131	Initiation/Assessment	0.0.0	Mon 11/06/17	Fri 7/21/17	100%			
132	Integration COE Charter, Process, GM, Patterns, Baseline Architecture for PMS	0.0.0	Mon 11/06/17	Fri 11/24/17	100%			
133	IE Mobilization - AUI (Application Development) Infrastructure	0.0.0	Mon 11/06/17	Fri 11/24/17	100%			
134	Initiation, Ass, Assessment, Equipment Strategy, Cloud Gov Model, Planning/Design, Ops Readiness	0.0.0	Mon 11/06/17	Fri 11/24/17	100%			
135	Process Development and Improvements/Build out and onboarding	0.0.0	Mon 11/06/17	Fri 11/24/17	100%			
136	CS/DM Initial tool installation and configuration for MVP	1.0	Fri 11/24/17	Fri 11/24/17	100%			
137	API Management Initial tool installation and configuration for MVP	1.0	Fri 11/24/17	Fri 11/24/17	100%			
138	WM Initial tool installation and configuration for MVP	1.0	Fri 11/24/17	Fri 11/24/17	100%			
139	CS/DM Initial tool installation and configuration for MVP	1.0	Fri 11/24/17	Fri 11/24/17	100%			
140	IE Mobilization - NE (Network Enhancements)	0.0.0	Mon 11/06/17	Fri 11/24/17	100%			
141	IE (Data) User Computing - Virtualization Strategy	0.0.0	Mon 11/06/17	Fri 11/24/17	100%			
142	Network Assessment and Target State Network Architecture	0.0.0	Mon 11/06/17	Fri 8/18/17	100%			
143	Network Optimization and Application Release Deployment Plan (Initial into overall deployment plan)	0.0.0	Mon 11/06/17	Fri 11/24/17	100%			
144	IE Mobilization - SD (Security)	0.0.0	Mon 11/06/17	Fri 11/24/17	100%			
145	Initial tool installation and configuration for MVP	0.0.0	Tue 8/15/17	Fri 11/24/17	100%			
146	SDV (Security)	0.0.0	Mon 11/06/17	Fri 11/24/17	100%			
147	GIS	0.0.0	Mon 11/13/17	Fri 11/24/17	100%			
148	Service	0.0.0	Tue 8/15/17	Mon 11/20/17	100%			
149	API (Management)	0.0.0	Mon 11/06/17	Fri 11/24/17	100%			
150	Project Architecture	0.0.0	Mon 11/06/17	Fri 11/24/17	100%			
151	IE Mobilization - P (Program Testing)	0.0.0	Tue 8/15/17	Tue 11/28/17	100%			
152	Use of Cross-Team Engineering	1.0	Tue 8/15/17	Tue 8/15/17	100%		503	
153	Control program test strategy design	1.0	Wed 8/15/17	Tue 11/24/17	100%		503	506, 506, 503, 504, 504
154	Y4-P4 - Overall Program Test Strategy Design, Design, and Coding	0.0.0	Wed 10/11/17	Tue 11/28/17	100%			
155	Design Communications Plan for Testing	0.0.0	Wed 10/11/17	Tue 11/21/17	100%		503	
156	Design Test Metrics and Reporting	0.0.0	Wed 10/11/17	Tue 11/21/17	100%		503	
157	Design non-functional test approach	0.0.0	Wed 10/11/17	Tue 11/21/17	100%		503	
158	Design test case generation	0.0.0	Wed 10/11/17	Tue 11/21/17	100%		503	
159	Design test environment	0.0.0	Wed 10/11/17	Tue 11/21/17	100%		503	
160	Design defect management process	0.0.0	Wed 10/11/17	Tue 11/21/17	100%		503	511
161	Review and sign-off overall design governance	1.0	Wed 11/22/17	Tue 11/28/17	100%		503	506, 515, 21.4
162	IE Mobilization - SA (Security Architecture Assessment)	0.0.0	Mon 11/06/17	Mon 11/28/17	100%			
163	Security Planning Security Arch gap analysis and Road Map deployment	0.0.0	Tue 8/15/17	Mon 11/28/17	100%			3045, 3095
164	IE (API)	0.0.0	Mon 11/06/17	Wed 11/28/17	80%			
165	IE (API) (Dev Ops)	0.0.0	Mon 11/06/17	Fri 8/18/17	80%			
166	DevOps (DevOps) - Design/Build and Remote Deployment	0.0.0	Mon 11/06/17	Mon 11/28/17	100%			
167	DevOps (DevOps) - Pipeline Design/Build and Remote Deployment	0.0.0	Mon 11/06/17	Mon 11/28/17	100%			
168	DevOps (DevOps) - Pipeline Design/Build and Remote Deployment	0.0.0	Mon 11/06/17	Fri 11/24/17	100%			
169	DevOps (DevOps) - Pipeline Design/Build and Remote Deployment	0.0.0	Mon 11/06/17	Fri 11/24/17	100%			
170	DevOps (DevOps) - Pipeline Design/Build and Remote Deployment	0.0.0	Mon 11/06/17	Fri 11/24/17	100%			
171	DevOps (DevOps) - Pipeline Design/Build and Remote Deployment	0.0.0	Mon 11/06/17	Wed 2/28/18	10%			
172	DevOps (DevOps) - Support and Improvements during UAT Testing	0.0.0	Mon 11/06/17	Fri 8/18/17	95%		337	
173	IE (API) (Comprehensive Integration Services (Enhancements))	0.0.0	Fri 8/18/17	Fri 11/24/17	100%			
174	Integration COE Governance Model	0.0.0	Fri 8/18/17	Tue 11/28/17	100%			
175	Integration Patterns Documents and Templates	0.0.0	Fri 8/18/17	Fri 11/24/17	100%		542, 543	
176	Building Integration Architecture for PMS	0.0.0	Fri 11/24/17	Fri 11/24/17	100%			
177	MLUC (Mobility COE and End-User Computing) - PMS - Mobility	0.0.0	Wed 11/15/17	Tue 11/21/17	100%			
178	Initiation/Assess	1.0	Wed 11/15/17	Tue 11/21/17	100%			376, 1, 895, 21.4
179	Mobile App Rollout/Readiness Strategy	0.0.0	Wed 11/15/17	Wed 11/15/17	100%		338	

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-96
Page 8 of 27

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-44-1
Page 8 of 27

Item	Item Name	Location	Unit	Start	Complete	Indications	Amount
126	NG US Gas Mobile App Rollout for PA1	1-0	1.0	Wed 1/15/18	Wed 1/23/18	100%	\$289,214.4
127	GE PA1 - Mobile App Rollout/Testing through Complete	1-0	1.0	Wed 1/15/18	Wed 1/23/18	100%	287
128	GE PA1 - NG US Gas Mobile App Rollout for PA1 Complete	1-0	1.0	Wed 1/15/18	Wed 1/23/18	100%	111
129	JMA Monitoring Initial Establishment	137-0	1.0	Thu 8/21/17	Thu 8/24/18	0%	
130	Establish JMA for mobile of deployment events	137-0	1.0	Thu 8/21/17	Wed 1/23/18	0%	
131	S&A Security Architecture Assessment - PA1 - Security Design and Configuration	139-0	1.0	Fri 8/18/17	Thu 8/24/18	0%	
132	JMA App Onboarding & Monitoring	139-0	1.0	Mon 1/8/18	Fri 1/26/18	100%	\$135,517
133	JMA Configuration/Setup Assessment	139-0	1.0	Mon 1/8/18	Fri 1/26/18	100%	56
134	JMA Current Statement Assessment and Requirement Gathering	139-0	1.0	Fri 8/18/17	Fri 1/26/18	100%	
135	JMA Platform, solution design, roadmap	139-0	1.0	Fri 8/18/17	Thu 8/24/18	0%	\$135
136	JMA Platform Security Review	139-0	1.0	Mon 1/8/18	Thu 8/24/18	0%	
137	SI Remediation and Integration - PA1 - Application Integration and Development	139-0	1.0	Fri 8/18/17	Fri 8/24/18	0%	\$27,476
138	Configure API for PA1 - Integration, Validation	139-0	1.0	Fri 8/18/17	Mon 1/8/18	75%	\$65
139	Validation of API and Batch Integration in PA1 and PA2	139-0	1.0	Mon 1/8/18	Fri 1/26/18	100%	\$462,145.5
140	Coordinate Oracle OIG (SS Only) integrations for PA1	139-0	1.0	Wed 1/23/17	Fri 1/26/18	0%	\$415,525.5
141	PA1 - Oracle 1 - SS Only	139-0	1.0	Fri 8/18/17	Fri 8/24/18	0%	\$415,525.5
142	PA1 - Oracle 2 - SS Only	139-0	1.0	Wed 1/23/17	Thu 8/24/18	0%	
143	PA1 - Oracle 3 - SS Only	139-0	1.0	Wed 1/23/17	Thu 8/24/18	0%	
144	Identify ISE user roles	139-0	1.0	Wed 1/23/17	Fri 1/26/18	100%	\$115,254.4
145	Create ISE test scenarios	139-0	1.0	Wed 1/23/17	Fri 1/26/18	100%	549
146	Identify testing, traceability and coverage	139-0	1.0	Thu 1/27/17	Fri 1/26/18	100%	549
147	Identify test data requirements	139-0	1.0	Thu 1/27/17	Fri 1/26/18	100%	549
148	Develop non-functional testing plan	139-0	1.0	Wed 1/23/17	Fri 1/26/18	100%	549
149	Review and validate non-functional testing plan	139-0	1.0	Mon 1/22/18	Mon 1/22/18	100%	549
150	Review and validate test plan	139-0	1.0	Wed 1/23/17	Fri 1/26/18	100%	\$614
151	PA1 - End to end and UAT Testing	139-0	1.0	Fri 8/18/17	Fri 1/26/18	50%	2814
152	PA1 - Config	139-0	1.0	Mon 1/8/18	Fri 1/26/18	0%	\$654
153	PA1 - Get Set	139-0	1.0	Fri 8/18/17	Fri 8/24/18	0%	\$22,356
154	SI Assessment PA1	139-0	1.0	Mon 1/22/18	Fri 1/26/18	100%	\$158,344.5
155	Distributing 13 training devices to OMO	139-0	1.0	Fri 1/26/18	Fri 1/26/18	100%	
156	Review PA1 Plans	139-0	1.0	Thu 1/25/18	Thu 1/25/18	100%	\$415,514.4
157	Obtain approval for order amounts & vehicle storage	139-0	1.0	Mon 1/22/18	Mon 1/22/18	100%	\$415,514.4
158	Review orders	139-0	1.0	Mon 1/22/18	Mon 1/22/18	100%	\$415,514.4
159	Order review	139-0	1.0	Mon 1/22/18	Mon 1/22/18	100%	\$415,514.4
160	Review accounts	139-0	1.0	Mon 1/22/18	Mon 1/22/18	100%	\$415,514.4
161	Obtain approval for order and order storage	139-0	1.0	Mon 1/22/18	Mon 1/22/18	100%	\$415,514.4
162	Review accounts	139-0	1.0	Mon 1/22/18	Mon 1/22/18	100%	\$415,514.4
163	Mobile - Analytics Office PA1	139-0	1.0	Mon 1/22/18	Thu 8/24/18	0%	
164	GA1 Analytics Office Assessment	139-0	1.0	Mon 1/22/18	Thu 8/24/18	0%	
165	Analytics Management	139-0	1.0	Mon 1/22/18	Thu 8/24/18	0%	
166	PO PA1 - GSE Governance Model Complete	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	2
167	Rollout Program Handbook and Templates	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	2
168	PO PA1 - Complete Program Handbook and Templates MVP	139-0	1.0	Fri 8/18/17	Fri 8/24/18	100%	174
169	Communications Program Handbook and Contact Training with Mobile teams	139-0	1.0	Mon 8/7/17	Fri 8/24/18	100%	174
170	Develop MVP	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	7
171	Develop MVP	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	7
172	Update and finalize the PF through PA2	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	578
173	PO PA1 - GSE mobile PA1 Rollout through PA2	139-0	1.0	Mon 8/7/17	Fri 8/24/18	100%	155
174	Agile Deployment	139-0	1.0	Mon 8/7/17	Fri 8/24/18	100%	155
175	Operational Program Process	139-0	1.0	Mon 8/7/17	Fri 8/24/18	100%	155
176	Operational Agile COE	139-0	1.0	Mon 8/7/17	Fri 8/24/18	100%	2
177	Session Architecture	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	
178	Development Solution Architecture Approach	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	
179	Finalize Solution Architecture Design for PA1	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	24,055
180	Define Service and Solution Architecture Compliance Rules	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	187
181	Review GSE PA1 Solution Architecture Feedback	139-0	1.0	Wed 1/23/17	Fri 8/24/18	100%	56
182	Report on the Solution Architecture Design for PA2	139-0	1.0	Mon 8/7/17	Fri 8/24/18	100%	
183	PO PA1	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	
184	Deployment Planning & Execution	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	\$97,157.4
185	Finalize PA1 Deployment Plan	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	
186	Finalize Deployment Approach	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	
187	Finalize Rollback Approach	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	
188	Finalize Deployment Schedule	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	
189	Develop Deployment Schedule	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	
190	Deployment Readiness Assessment Tool Development	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	
191	Execute and Track Performance of Deployment Plan	139-0	1.0	Mon 1/22/18	Fri 8/24/18	100%	561
192	Execute Program Process/ Methodologies	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	
193	PA1	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	
194	Align mobile teams to program capabilities	139-0	1.0	Mon 1/22/17	Fri 8/24/18	100%	2

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-96
Page 9 of 27

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-44-1
Page 9 of 27

Item	Item Name	Location	Unit	Start	Complete	Indicators	Comments
100	Set-up P1 and P2	1.0	Mon 10/26/17	01/04/17	100%	000	
101	Set-up P1 and P2	1.0	Mon 10/26/17	01/04/17	100%	000	
102	Program for P1 Planning Session	1.0	Mon 10/26/17	01/04/17	100%	0	000
103	P1 Planning Session	1.0	Tue 10/27/17	01/04/17	100%	003	000,007
104	P1 Update meeting from P1 Planning (Risk/Issue/PP/Resource Planning/Contingencies)	1.0	Mon 10/26/17	01/04/17	100%	004,008	
105	P1	1.0	Mon 10/26/17	01/04/17	100%		
106	Program for P2 Planning Session	1.0	Mon 10/26/17	01/04/17	100%	004	000P1-1.0
107	P2 Planning Session	1.0	Tue 10/27/17	01/04/17	100%	007P1-1.0	000,009P1-01.0
108	P2	1.0	Wed 10/28/17	Tue 10/27/18	100%		
109	Program for P3 Planning Session	2.0	Thu 10/28/17	Tu 10/27/18	100%	008P1-21.0	011
110	P3 Planning Session	2.0	Mon 10/26/17	Tue 10/26/18	100%	009	
111	Control Design (CD)	100.0	Mon 10/26/17	01/04/18	80%		
112	Initial Meeting	0.0	Mon 10/26/17	01/04/18	100%		
113	Risk & Controls Strategy and Plan	1.0	Mon 10/26/17	Tue 10/26/17	100%	010	010
114	Risk & Controls Strategy and Plan Complete	1.0	Tue 10/26/17	Tue 10/26/17	100%	014	010
115	Risk & Controls Training	1.0	Mon 10/26/17	01/04/18	100%	011	
116	Risk & Controls Training Complete	1.0	Wed 10/28/17	Wed 10/28/18	100%		
117	Define Initial Risk & Controls Matrix (Q1 2017)	10.0	Mon 10/26/17	01/04/18	100%		020
118	Risk & Controls Matrix (Q1 2018)	10.0	Mon 10/26/17	01/04/18	100%	019	020
119	Risk and Controls Strategy and Plan	10.0	Mon 10/26/17	01/04/18	70%		
120	Executive Leadership Management	10.0	Mon 10/26/17	Tue 10/27/18	100%		
121	Meeting Meeting	10.0	Mon 10/26/17	Tue 10/27/18	100%		
122	Program for and hold December Meeting	10.0	Mon 10/26/17	Tue 10/27/18	100%		030
123	Program for and hold January Meeting	10.0	Tue 10/26/17	Wed 10/26/18	100%		031
124	Program for and hold February Meeting	10.0	Mon 10/26/17	Tue 10/27/18	100%		032
125	Program for and hold March Meeting	10.0	Mon 10/26/17	Tue 10/27/18	70%		033
126	PM Task Set Up	100.0	Mon 10/26/17	01/04/18	100%		
127	PM Task	100.0	Mon 10/26/17	01/04/18	100%		
128	Process and implement Agreements	10.0	Mon 10/26/17	01/04/17	100%		
129	Process and implement Agreements	10.0	Mon 10/26/17	01/04/17	100%	0	034
130	Integrate with Dev Ops Team	10.0	Mon 10/26/17	01/04/17	100%	042	035
131	Integrate with Dev Ops Team	10.0	Mon 10/26/17	01/04/18	100%	043	036
132	Other PM Tasks	10.0	Mon 10/26/17	01/04/17	100%		
133	Service Bus	10.0	Mon 10/26/17	01/04/17	100%		
134	Define Program Metrics & Reporting	10.0	Mon 10/26/17	Tue 10/27/18	100%		
135	Developing report and report metrics	1.0	Mon 10/26/17	Tue 10/27/18	100%	044	030
136	R1 P11 - metrics and metrics complete	1.0	Tue 10/26/17	Wed 10/27/18	100%	045	
137	IPM Update & Management	10.0	Mon 10/26/17	01/04/18	70%		
138	IPM Reporting	10.0	Mon 10/26/17	01/04/18	100%		050P1-10.0
139	Confirming P1 IPM Dashboard	1.0	Mon 10/26/17	Tue 10/27/18	100%	046	
140	Implementing P1 IPM	1.0	Wed 10/28/17	Tue 10/27/18	70%		047
141	Module 20 - Change Management Office P11	100.0	Mon 10/26/17	Tue 10/27/18	70%		
142	CMO Engagement	10.0	Mon 10/26/17	01/04/18	100%		
143	CMO Strategy	10.0	Mon 10/26/17	01/04/17	100%		
144	CMO Governance Model	10.0	Mon 10/26/17	01/04/17	100%		
145	CMO Set up & Rollout	10.0	Mon 10/26/17	01/04/17	100%		
146	CMO Set up & Rollout	10.0	Mon 10/26/17	01/04/17	100%		
147	CMO Change Management Plan & Approach	10.0	Mon 10/26/17	01/04/17	100%		
148	CMO Change Management Plan	10.0	Mon 10/26/17	01/04/17	100%		
149	CMO Measurement Plan	10.0	Mon 10/26/17	01/04/17	100%		
150	CMO Reporting	10.0	Mon 10/26/17	01/04/17	100%		
151	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
152	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
153	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
154	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
155	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
156	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
157	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
158	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
159	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
160	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
161	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
162	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
163	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
164	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
165	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
166	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
167	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
168	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
169	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
170	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
171	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
172	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
173	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
174	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
175	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
176	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
177	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
178	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
179	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		
180	CMO Measurement	10.0	Mon 10/26/17	01/04/17	100%		

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-96
Page 16 of 27

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-44-1
Page 16 of 27

Item No.	Item Name	Location	Start	End	Complete	Indicators	Comments
1147	SC PA2 - SC Master Data Cleaning/Consolidation Process	0.0	Mon 6/2/18	Fri 8/3/18	0%	1146	1486E,1515G-70, 1478I
1148	Implement master data cleaning/consolidation effort	145.0	Mon 6/2/18	Fri 8/3/18	0%	1146	1486E,1515G-70, 1478I
1149	Define go forward item master updating process	20.0	Mon 6/2/18	Fri 8/3/18	0%	1146	1486E,1515G-70, 1478I
1150	SC PA2 - Master Data Cleansing Approach Defined	0.0	Fri 8/3/18	Fri 8/3/18	0%	1147	
1151	SC PA2 - Master Data Cleansing Approach Defined	0.0	Fri 8/3/18	Fri 8/3/18	0%	1148	1486E,1515G-70, 1478I
1152	SC PA2 - Master Data Cleansing Complete	0.0	Fri 8/3/18	Fri 8/3/18	0%	1149	
1153	SC PA2 - Master Data Cleansing Complete	0.0	Fri 8/3/18	Fri 8/3/18	0%	1149	1486E,1515G-70, 1478I
1154	SC PA2 - Fulfillment Model Strategy	0.0	Mon 6/2/18	Fri 8/3/18	0%	1150	
1155	SC PA2 - Fulfillment Model Strategy Defined	0.0	Mon 6/2/18	Fri 8/3/18	0%	1151	1486E,1515G-70, 1478I
1156	Current state fulfillment model assessment	20.0	Mon 6/2/18	Fri 8/3/18	0%	1150	
1157	Determine operational vs. operational model	20.0	Mon 6/2/18	Fri 8/3/18	0%	1151	1486E,1515G-70, 1478I
1158	Determine inventory positioning strategy	20.0	Mon 6/2/18	Fri 8/3/18	0%	1152	1486E,1515G-70, 1478I
1159	Determine operational vs. operational model	20.0	Mon 6/2/18	Fri 8/3/18	0%	1153	1486E,1515G-70, 1478I
1160	SC PA2 - Fulfillment Model Current State Assessment Completed	0.0	Fri 7/27/18	Fri 7/27/18	0%	1154	1486E,1515G-70, 1478I
1161	Master Data Information Services Capable PA2	400.0	Mon 6/2/17	Fri 8/3/18	0%		
1162	SD-PA2 (Development Operations and BPA Enablement)	400.0	Mon 6/2/17	Fri 8/3/18	0%		
1163	Workforce Overview Management Tool installation and configuration	100.0	Mon 6/2/18	Fri 8/3/18	0%		
1164	SSS ETL Integration - Tool installation and configuration	145.0	Mon 11/13/17	Fri 8/3/18	0%		
1165	Other Tools	1.0	Mon 6/2/17	Mon 6/2/17	0%		
1166	Device Resource Management - Pipeline Design/Build and Remote Management	0.0	Fri 8/3/18	Mon 6/2/18	0%		
1167	Planning for O&M Roll-Out in Prod	81.0	Wed 2/7/18	Wed 6/2/18	0%		
1168	PA2 DevOps Planning	0.0	Mon 6/2/18	Fri 8/3/18	0%	1168	
1169	Pipeline Design	20.0	Mon 6/2/18	Fri 8/3/18	0%	1168	1170
1170	Field Implementation - GIS Data - Dev	20.0	Mon 6/2/18	Fri 8/3/18	0%	1168	1171
1171	Planning for UDS roll-out in PROD	20.0	Mon 6/2/18	Fri 8/3/18	0%	1170	1172
1172	Pipeline Support and Management	0.0	Mon 6/2/18	Fri 8/3/18	0%	1171	
1173	Release Planning PA2	100.0	Mon 6/2/18	Fri 8/3/18	0%		
1174	Transition Plan Draft	22.0	Fri 8/3/18	Mon 6/2/18	0%		
1175	Transition Services Definition	10.0	Fri 8/3/18	Fri 8/3/18	0%		
1176	Transition Services SOW	10.0	Fri 8/3/18	Fri 8/3/18	0%		
1177	Transition Services Work Management	10.0	Fri 8/3/18	Fri 8/3/18	0%		
1178	Transition Services UAT	10.0	Fri 8/3/18	Fri 8/3/18	0%		
1179	Transition Services Network	10.0	Fri 8/3/18	Fri 8/3/18	0%		
1180	Workstream handover to NG DevOps team for steady state	0.0	Thu 5/24/18	Fri 8/3/18	0%		
1181	PA2 Application (Enhancements) Infrastructure	0.0	Mon 6/2/18	Fri 8/3/18	0%		
1182	SC Prod	20.0	Mon 6/2/18	Fri 8/3/18	0%	1181	
1183	SC PA2 - DevOps Support 1	0.0	Mon 6/2/18	Fri 8/3/18	0%	1182	
1184	SC PA2 - DevOps Support 2	0.0	Mon 6/2/18	Fri 8/3/18	0%	1183	
1185	SC PA2 - DevOps Support 3	0.0	Mon 6/2/18	Fri 8/3/18	0%	1184	
1186	SC PA2 - DevOps Support 4	0.0	Mon 6/2/18	Fri 8/3/18	0%	1185	
1187	SC PA2 - DevOps Support 5	0.0	Mon 6/2/18	Fri 8/3/18	0%	1186	
1188	SC PA2 - DevOps Support 6	0.0	Mon 6/2/18	Fri 8/3/18	0%	1187	
1189	SC PA2 - DevOps Support 7	0.0	Mon 6/2/18	Fri 8/3/18	0%	1188	
1190	SC PA2 - DevOps Support 8	0.0	Mon 6/2/18	Fri 8/3/18	0%	1189	
1191	SC PA2 - DevOps Support 9	0.0	Mon 6/2/18	Fri 8/3/18	0%	1190	
1192	SC PA2 - DevOps Support 10	0.0	Mon 6/2/18	Fri 8/3/18	0%	1191	
1193	SC PA2 - DevOps Support 11	0.0	Mon 6/2/18	Fri 8/3/18	0%	1192	
1194	SC PA2 - DevOps Support 12	0.0	Mon 6/2/18	Fri 8/3/18	0%	1193	
1195	SC PA2 - DevOps Support 13	0.0	Mon 6/2/18	Fri 8/3/18	0%	1194	
1196	SC PA2 - DevOps Support 14	0.0	Mon 6/2/18	Fri 8/3/18	0%	1195	
1197	SC PA2 - DevOps Support 15	0.0	Mon 6/2/18	Fri 8/3/18	0%	1196	
1198	SC PA2 - DevOps Support 16	0.0	Mon 6/2/18	Fri 8/3/18	0%	1197	
1199	SC PA2 - DevOps Support 17	0.0	Mon 6/2/18	Fri 8/3/18	0%	1198	
1200	SC PA2 - DevOps Support 18	0.0	Mon 6/2/18	Fri 8/3/18	0%	1199	
1201	SC PA2 - DevOps Support 19	0.0	Mon 6/2/18	Fri 8/3/18	0%	1200	
1202	SC PA2 - DevOps Support 20	0.0	Mon 6/2/18	Fri 8/3/18	0%	1201	
1203	SC PA2 - DevOps Support 21	0.0	Mon 6/2/18	Fri 8/3/18	0%	1202	
1204	SC PA2 - DevOps Support 22	0.0	Mon 6/2/18	Fri 8/3/18	0%	1203	
1205	SC PA2 - DevOps Support 23	0.0	Mon 6/2/18	Fri 8/3/18	0%	1204	
1206	SC PA2 - DevOps Support 24	0.0	Mon 6/2/18	Fri 8/3/18	0%	1205	
1207	SC PA2 - DevOps Support 25	0.0	Mon 6/2/18	Fri 8/3/18	0%	1206	
1208	SC PA2 - DevOps Support 26	0.0	Mon 6/2/18	Fri 8/3/18	0%	1207	
1209	SC PA2 - DevOps Support 27	0.0	Mon 6/2/18	Fri 8/3/18	0%	1208	
1210	SC PA2 - DevOps Support 28	0.0	Mon 6/2/18	Fri 8/3/18	0%	1209	
1211	SC PA2 - DevOps Support 29	0.0	Mon 6/2/18	Fri 8/3/18	0%	1210	
1212	SC PA2 - DevOps Support 30	0.0	Mon 6/2/18	Fri 8/3/18	0%	1211	
1213	SC PA2 - DevOps Support 31	0.0	Mon 6/2/18	Fri 8/3/18	0%	1212	
1214	SC PA2 - DevOps Support 32	0.0	Mon 6/2/18	Fri 8/3/18	0%	1213	
1215	SC PA2 - DevOps Support 33	0.0	Mon 6/2/18	Fri 8/3/18	0%	1214	
1216	SC PA2 - DevOps Support 34	0.0	Mon 6/2/18	Fri 8/3/18	0%	1215	
1217	SC PA2 - DevOps Support 35	0.0	Mon 6/2/18	Fri 8/3/18	0%	1216	
1218	SC PA2 - DevOps Support 36	0.0	Mon 6/2/18	Fri 8/3/18	0%	1217	
1219	SC PA2 - DevOps Support 37	0.0	Mon 6/2/18	Fri 8/3/18	0%	1218	
1220	SC PA2 - DevOps Support 38	0.0	Mon 6/2/18	Fri 8/3/18	0%	1219	
1221	SC PA2 - DevOps Support 39	0.0	Mon 6/2/18	Fri 8/3/18	0%	1220	
1222	SC PA2 - DevOps Support 40	0.0	Mon 6/2/18	Fri 8/3/18	0%	1221	
1223	SC PA2 - DevOps Support 41	0.0	Mon 6/2/18	Fri 8/3/18	0%	1222	
1224	SC PA2 - DevOps Support 42	0.0	Mon 6/2/18	Fri 8/3/18	0%	1223	
1225	SC PA2 - DevOps Support 43	0.0	Mon 6/2/18	Fri 8/3/18	0%	1224	
1226	SC PA2 - DevOps Support 44	0.0	Mon 6/2/18	Fri 8/3/18	0%	1225	
1227	SC PA2 - DevOps Support 45	0.0	Mon 6/2/18	Fri 8/3/18	0%	1226	
1228	SC PA2 - DevOps Support 46	0.0	Mon 6/2/18	Fri 8/3/18	0%	1227	
1229	SC PA2 - DevOps Support 47	0.0	Mon 6/2/18	Fri 8/3/18	0%	1228	
1230	SC PA2 - DevOps Support 48	0.0	Mon 6/2/18	Fri 8/3/18	0%	1229	
1231	SC PA2 - DevOps Support 49	0.0	Mon 6/2/18	Fri 8/3/18	0%	1230	
1232	SC PA2 - DevOps Support 50	0.0	Mon 6/2/18	Fri 8/3/18	0%	1231	
1233	SC PA2 - DevOps Support 51	0.0	Mon 6/2/18	Fri 8/3/18	0%	1232	
1234	SC PA2 - DevOps Support 52	0.0	Mon 6/2/18	Fri 8/3/18	0%	1233	
1235	SC PA2 - DevOps Support 53	0.0	Mon 6/2/18	Fri 8/3/18	0%	1234	
1236	SC PA2 - DevOps Support 54	0.0	Mon 6/2/18	Fri 8/3/18	0%	1235	
1237	SC PA2 - DevOps Support 55	0.0	Mon 6/2/18	Fri 8/3/18	0%	1236	
1238	SC PA2 - DevOps Support 56	0.0	Mon 6/2/18	Fri 8/3/18	0%	1237	
1239	SC PA2 - DevOps Support 57	0.0	Mon 6/2/18	Fri 8/3/18	0%	1238	
1240	SC PA2 - DevOps Support 58	0.0	Mon 6/2/18	Fri 8/3/18	0%	1239	
1241	SC PA2 - DevOps Support 59	0.0	Mon 6/2/18	Fri 8/3/18	0%	1240	
1242	SC PA2 - DevOps Support 60	0.0	Mon 6/2/18	Fri 8/3/18	0%	1241	
1243	SC PA2 - DevOps Support 61	0.0	Mon 6/2/18	Fri 8/3/18	0%	1242	
1244	SC PA2 - DevOps Support 62	0.0	Mon 6/2/18	Fri 8/3/18	0%	1243	
1245	SC PA2 - DevOps Support 63	0.0	Mon 6/2/18	Fri 8/3/18	0%	1244	
1246	SC PA2 - DevOps Support 64	0.0	Mon 6/2/18	Fri 8/3/18	0%	1245	
1247	SC PA2 - DevOps Support 65	0.0	Mon 6/2/18	Fri 8/3/18	0%	1246	
1248	SC PA2 - DevOps Support 66	0.0	Mon 6/2/18	Fri 8/3/18	0%	1247	
1249	SC PA2 - DevOps Support 67	0.0	Mon 6/2/18	Fri 8/3/18	0%	1248	
1250	SC PA2 - DevOps Support 68	0.0	Mon 6/2/18	Fri 8/3/18	0%	1249	
1251	SC PA2 - DevOps Support 69	0.0	Mon 6/2/18	Fri 8/3/18	0%	1250	
1252	SC PA2 - DevOps Support 70	0.0	Mon 6/2/18	Fri 8/3/18	0%	1251	
1253	SC PA2 - DevOps Support 71	0.0	Mon 6/2/18	Fri 8/3/18	0%	1252	
1254	SC PA2 - DevOps Support 72	0.0	Mon 6/2/18	Fri 8/3/18	0%	1253	
1255	SC PA2 - DevOps Support 73	0.0	Mon 6/2/18	Fri 8/3/18	0%	1254	
1256	SC PA2 - DevOps Support 74	0.0	Mon 6/2/18	Fri 8/3/18	0%	1255	
1257	SC PA2 - DevOps Support 75	0.0	Mon 6/2/18	Fri 8/3/18	0%	1256	
1258	SC PA2 - DevOps Support 76	0.0	Mon 6/2/18	Fri 8/3/18	0%	1257	
1259	SC PA2 - DevOps Support 77	0.0	Mon 6/2/18	Fri 8/3/18	0%	1258	
1260	SC PA2 - DevOps Support 78	0.0	Mon 6/2/18	Fri 8/3/18	0%	1259	
1261	SC PA2 - DevOps Support 79	0.0	Mon 6/2/18	Fri 8/3/18	0%	1260	
1262	SC PA2 - DevOps Support 80	0.0	Mon 6/2/18	Fri 8/3/18	0%	1261	
1263	SC PA2 - DevOps Support 81	0.0	Mon 6/2/18	Fri 8/3/18	0%	1262	
1264	SC PA2 - DevOps Support 82	0.0	Mon 6/2/18	Fri 8/3/18	0%	1263	
1265	SC PA2 - DevOps Support 83	0.0	Mon 6/2/18	Fri 8/3/18	0%	1264	
1266	SC PA2 - DevOps Support 84	0.0	Mon 6/2/18	Fri 8/3/18	0%	1265	
1267	SC PA2 - DevOps Support 85	0.0	Mon 6/2/18	Fri 8/3/18	0%	1266	
1268	SC PA2 - DevOps Support 86	0.0	Mon 6/2/18	Fri 8/3/18	0%	1267	
1269	SC PA2 - DevOps Support 87	0.0	Mon 6/2/18	Fri 8/3/18	0%	1268	
1270	SC PA2 - DevOps Support 88	0.0	Mon 6/2/18	Fri 8/3/18	0%	1269	
1271	SC PA2 - DevOps Support 89	0.0	Mon 6/2/18	Fri 8/3/18	0%	1270	
1272	SC PA2 - DevOps Support 90	0.0	Mon 6/2/18	Fri 8/3/18	0%	1271	
1273	SC PA2 - DevOps Support 91	0.0	Mon 6/2/18	Fri 8/3/18	0%	1272	
1274	SC PA2 - DevOps Support 92	0.0	Mon 6/2/18	Fri 8/3/18	0%	1273	
1275	SC PA2 - DevOps Support 93	0.0	Mon 6/2/18	Fri 8/3/18	0%	1274	
1276	SC PA2 - DevOps Support 94	0.0	Mon 6/2/18	Fri 8/3/18	0%	1275	
1277	SC PA2 - DevOps Support 95	0.0	Mon 6/2/18	Fri 8			

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-96
Page 20 of 27

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-44-1
Page 20 of 27

Item Name	Category	Start	End	Complete	Indications	Amount
1420	Grid	01/01/2019	01/01/2019	0%	1420	1420
1421	Support	01/01/2019	01/01/2019	0%	1421	1421
1422	Module 4 - Customer Engagement #3 (MA, NH, NY/CA)	274	Mon 10/22/18	0%		181151.4
1423	Change Management	274	Mon 10/22/18	0%		
1424	Refresh Change Impact Assessment	01.0	Mon 10/22/18	0%		
1425	Refresh Stakeholder Analysis	01.0	Mon 10/22/18	0%		
1426	Refresh Identification of Needs	01.0	Mon 10/22/18	0%		
1427	Refresh Engagement Plan	01.0	Mon 10/22/18	0%		
1428	Refresh Training Needs	01.0	Mon 10/22/18	0%		
1429	Refresh Training Curriculum	01.0	Mon 10/22/18	0%		
1430	Refresh Training Strategy	01.0	Mon 10/22/18	0%		
1431	Assess Readiness - CI	15.0	Mon 10/22/18	0%		
1432	Assess Readiness - CA	15.0	Mon 10/22/18	0%		
1433	Assess Readiness - CI	15.0	Mon 10/22/18	0%		
1434	Assess Readiness - CA	15.0	Mon 10/22/18	0%		
1435	Control Center	20.0	Mon 10/22/18	0%		1478,1479
1436	Release 2 (SI) enhancements - MA	20.0	Mon 10/22/18	0%		1478,1479
1437	Release Development - Contact Center #2	20.0	Mon 10/22/18	0%		1478,1479
1438	Capacity 1	20.0	Mon 10/22/18	0%		1478,1479
1439	Capacity 2	20.0	Mon 10/22/18	0%		1478,1479
1440	Capacity 3	20.0	Mon 10/22/18	0%		1478,1479
1441	Release Test - Contact Center #2	1.0	Mon 10/22/18	0%		1478,1479
1442	Mock Conversion 1	1.0	Mon 10/22/18	0%		1478,1479
1443	Mock Conversion 2	1.0	Mon 10/22/18	0%		1478,1479
1444	End-to-End Product Test 1	1.0	Mon 10/22/18	0%		1478,1479
1445	End-to-End Product Test 1 Complete	1.0	Mon 10/22/18	0%		1478,1479
1446	Mock Conversion 3	1.0	Mon 10/22/18	0%		1478,1479
1447	End-to-End Product Test 2	1.0	Mon 10/22/18	0%		1478,1479
1448	End-to-End Product Test 2 Complete	1.0	Mon 10/22/18	0%		1478,1479
1449	Performance Test	1.0	Mon 10/22/18	0%		1478,1479
1450	Security Test	1.0	Mon 10/22/18	0%		1478,1479
1451	Operational Readiness Test	1.0	Mon 10/22/18	0%		1478,1479
1452	Release Development - Contact Center #2	24.0	Mon 11/20/18	0%		1478,1479
1453	Release Test	24.0	Mon 11/20/18	0%		1478,1479
1454	Mock Conversion	24.0	Mon 11/20/18	0%		1478,1479
1455	End-to-End Product Test 1	24.0	Mon 11/20/18	0%		1478,1479
1456	End-to-End Product Test 1 Complete	24.0	Mon 11/20/18	0%		1478,1479
1457	Performance Test	24.0	Mon 11/20/18	0%		1478,1479
1458	Security Test	24.0	Mon 11/20/18	0%		1478,1479
1459	Operational Readiness Test	24.0	Mon 11/20/18	0%		1478,1479
1460	Change Management - Contact Center #2	15.0	Mon 10/22/18	0%		1478,1479
1461	Refresh Change Impact Assessment	15.0	Mon 10/22/18	0%		1478,1479
1462	Refresh Stakeholder Analysis	15.0	Mon 10/22/18	0%		1478,1479
1463	Refresh Identification of Needs	15.0	Mon 10/22/18	0%		1478,1479
1464	Refresh Engagement Plan	15.0	Mon 10/22/18	0%		1478,1479
1465	Refresh Training Needs	15.0	Mon 10/22/18	0%		1478,1479
1466	Refresh Training Curriculum	15.0	Mon 10/22/18	0%		1478,1479
1467	Refresh Training Strategy	15.0	Mon 10/22/18	0%		1478,1479
1468	Assess Readiness - CI	15.0	Mon 10/22/18	0%		1478,1479
1469	Assess Readiness - CA	15.0	Mon 10/22/18	0%		1478,1479
1470	Release 3 (SI, MA, NY) enhancements - NY/CA	79.0	Mon 10/22/18	0%		1478,1479
1471	Release Development - Contact Center #3	20.0	Mon 10/22/18	0%		1478,1479
1472	Capacity 1	20.0	Mon 10/22/18	0%		1478,1479
1473	Capacity 2	20.0	Mon 10/22/18	0%		1478,1479
1474	Capacity 3	20.0	Mon 10/22/18	0%		1478,1479
1475	Release Test - Contact Center #3	1.0	Mon 10/22/18	0%		1478,1479
1476	Mock Conversion 1	1.0	Mon 10/22/18	0%		1478,1479
1477	Mock Conversion 2	1.0	Mon 10/22/18	0%		1478,1479
1478	End-to-End Product Test 1	1.0	Mon 10/22/18	0%		1478,1479
1479	End-to-End Product Test 1 Complete	1.0	Mon 10/22/18	0%		1478,1479
1480	Mock Conversion 3	1.0	Mon 10/22/18	0%		1478,1479
1481	End-to-End Product Test 2	1.0	Mon 10/22/18	0%		1478,1479
1482	End-to-End Product Test 2 Complete	1.0	Mon 10/22/18	0%		1478,1479
1483	Performance Test	1.0	Mon 10/22/18	0%		1478,1479
1484	Security Test	1.0	Mon 10/22/18	0%		1478,1479
1485	Operational Readiness Test	1.0	Mon 10/22/18	0%		1478,1479
1486	Release Development	24.0	Mon 10/22/18	0%		1478,1479
1487	Release Test	24.0	Mon 10/22/18	0%		1478,1479
1488	Mock Conversion	24.0	Mon 10/22/18	0%		1478,1479
1489	End-to-End Product Test 1	24.0	Mon 10/22/18	0%		1478,1479
1490	End-to-End Product Test 1 Complete	24.0	Mon 10/22/18	0%		1478,1479
1491	Performance Test	24.0	Mon 10/22/18	0%		1478,1479
1492	Security Test	24.0	Mon 10/22/18	0%		1478,1479
1493	Operational Readiness Test	24.0	Mon 10/22/18	0%		1478,1479
1494	Change Management - Contact Center #3	15.0	Mon 10/22/18	0%		1478,1479
1495	Refresh Change Impact Assessment	15.0	Mon 10/22/18	0%		1478,1479
1496	Refresh Stakeholder Analysis	15.0	Mon 10/22/18	0%		1478,1479
1497	Refresh Identification of Needs	15.0	Mon 10/22/18	0%		1478,1479
1498	Refresh Engagement Plan	15.0	Mon 10/22/18	0%		1478,1479
1499	Refresh Training Needs	15.0	Mon 10/22/18	0%		1478,1479
1500	Refresh Training Curriculum	15.0	Mon 10/22/18	0%		1478,1479
1501	Refresh Training Strategy	15.0	Mon 10/22/18	0%		1478,1479
1502	Assess Readiness - CI	15.0	Mon 10/22/18	0%		1478,1479
1503	Assess Readiness - CA	15.0	Mon 10/22/18	0%		1478,1479
1504	Release 4 (SI, MA, NY) enhancements - NY/CA	139.0	Mon 10/22/18	0%		1478,1479
1505	Release Development - Contact Center #4	20.0	Mon 10/22/18	0%		1478,1479
1506	Capacity 1	20.0	Mon 10/22/18	0%		1478,1479
1507	Capacity 2	20.0	Mon 10/22/18	0%		1478,1479
1508	Capacity 3	20.0	Mon 10/22/18	0%		1478,1479
1509	Release Test - Contact Center #4	1.0	Mon 10/22/18	0%		1478,1479
1510	Mock Conversion 1	1.0	Mon 10/22/18	0%		1478,1479
1511	Mock Conversion 2	1.0	Mon 10/22/18	0%		1478,1479
1512	End-to-End Product Test 1	1.0	Mon 10/22/18	0%		1478,1479
1513	End-to-End Product Test 1 Complete	1.0	Mon 10/22/18	0%		1478,1479
1514	Mock Conversion 3	1.0	Mon 10/22/18	0%		1478,1479
1515	End-to-End Product Test 2	1.0	Mon 10/22/18	0%		1478,1479
1516	End-to-End Product Test 2 Complete	1.0	Mon 10/22/18	0%		1478,1479
1517	Performance Test	1.0	Mon 10/22/18	0%		1478,1479
1518	Security Test	1.0	Mon 10/22/18	0%		1478,1479
1519	Operational Readiness Test	1.0	Mon 10/22/18	0%		1478,1479

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-96
Page 21 of 27

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-44-1
Page 21 of 27

Item	Item Name	Location	Unit	Start	Complete	Indicators	Amount
1312	Moisture Commission 1	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1313	End-to-End Product Test 2/ UAT	21.0	Mon 8/26/19	8/26/2019	21.0	1567	1567
1314	End-to-End Product Test 2/ UAT Complete	21.0	Fr 9/20/19	9/20/2019	21.0	1568	
1315	Performance Test	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1316	Security Test	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1317	Operational Readiness Test	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1318	Release Development	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1319	NYCA Deployment	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1320	Deliver Training	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1321	NYCA Deployment	21.0	Fr 10/18/19	10/18/2019	21.0	1568	1568
1322	Change Management - Contact Center R2	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1323	Create Training Material	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1324	Plan Training Delivery	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1325	Deliver Training	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1326	Operational Readiness	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1327	Release 2.00 enhancements - MAJ	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1328	Release Development - Customer Interaction R2	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1329	Capacity 1	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1330	Capacity 2	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1331	Capacity 3	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1332	Release Test - Customer Interaction R2	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1333	Moisture Commission 1	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1334	End-to-End Product Test 1	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1335	End-to-End Product Test 1 Complete	21.0	Fr 2/1/19	2/1/2019	21.0	1543	
1336	Moisture Commission 1	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1337	End-to-End Product Test 2/ UAT	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1338	End-to-End Product Test 2/ UAT Complete	21.0	Fr 2/1/19	2/1/2019	21.0	1544	
1339	Performance Test	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1340	Security Test	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1341	Operational Readiness Test	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1342	Release Development	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1343	Moisture Commission	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1344	Deliver Training	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1345	NYCA Deployment	21.0	Fr 10/18/19	10/18/2019	21.0	1568	1568
1346	Change Management - Contact Center R2	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1347	Create Training Material	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1348	Plan Training Delivery	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1349	Deliver Training	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1350	Operational Readiness	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1351	Release 2.00 enhancements - MAJ	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1352	Release Development - Customer Interaction R2	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1353	Capacity 1	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1354	Capacity 2	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1355	Capacity 3	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1356	Release Test - Customer Interaction R2	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1357	Moisture Commission 1	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1358	End-to-End Product Test 1	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1359	End-to-End Product Test 1 Complete	21.0	Fr 2/1/19	2/1/2019	21.0	1543	
1360	Moisture Commission 1	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1361	End-to-End Product Test 2/ UAT	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1362	End-to-End Product Test 2/ UAT Complete	21.0	Fr 2/1/19	2/1/2019	21.0	1544	
1363	Performance Test	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1364	Security Test	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1365	Operational Readiness Test	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1366	Release Development	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1367	Moisture Commission	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1368	Deliver Training	21.0	Mon 8/26/19	8/26/2019	21.0	1567	
1369	NYCA Deployment	21.0	Fr 10/18/19	10/18/2019	21.0	1568	1568

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-96
Page 23 of 27

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-44-1
Page 23 of 27

Item	Item Name	Location	Unit	Start	Complete	Indications	Comments
1027	Develop plan to disposition assets / obsolete inventory	RI-6	Mon 10/22/18	01/12/19/18	0%	105460	1074,1075,1076
1031	Develop inventory coordination plan per the inventory positioning strategy	RI-6	Mon 10/22/18	01/12/19/18	0%	105460	1074,1075,1076
1037	SC - PA3 - Inventory Strategy and Implementation Plan Complete	RI-6	01/12/19/18	01/12/19/18	100%	1071	
1038	Rollout Inventory Operational Implementation Plan	RI-6	Mon 12/17/18	04/18/19	0%		
1039	Disposition assets / obsolete inventory	RI-6	Mon 12/17/18	04/18/19	0%	1047,1048,1049,1	
1040	Update inventory implementation	RI-6	Mon 12/17/18	04/18/19	0%	1047,1048,1049,1	
1041	Conduct inventory review in line with the inventory coordination plan	RI-6	Mon 12/17/18	04/18/19	0%	1047,1048,1049,1	
1047	Complete Rollout	RI-6	Mon 10/22/18	04/18/19	0%		
1048	Develop Contractual Capability Buildout	RI-6	Mon 10/22/18	04/18/19	0%		
1049	Develop traction material	RI-6	Mon 10/22/18	04/18/19	0%	1061	1060
1050	SC - PA2 - Contractual Material Complete	RI-6	01/12/19/18	04/18/19	100%	1079	
1051	Integrated Supply Model evaluation and Strategy	RI-6	Mon 10/22/18	04/18/19	0%		
1052	Develop Integrated Supply Model Strategy and Implementation Plan	RI-6	Mon 10/22/18	04/18/19	0%		
1053	Determine material for GSE	RI-6	Mon 10/22/18	04/18/19	0%	10670	
1054	Contract Execution	RI-6	Mon 10/22/18	04/18/19	0%	10670	1066
1055	Develop business case and strategy	RI-6	Mon 10/22/18	04/18/19	0%	10670	1067
1056	SC - PA2 - Integrated Supply Model Launch Marketing Complete	RI-6	01/12/19/18	04/18/19	100%	1084	
1067	SC - PA2 - Integrated Supply Model Strategy and Implementation Plan	RI-6	01/12/19/18	04/18/19	0%	1085	
1068	Module 4 - Information Services Enabling PA3	RI-6	Mon 10/22/18	04/18/19	0%		
1069	DevOps (Development Operations and Risk Assessment)	RI-6	Mon 10/22/18	04/18/19	0%		
1070	Transition and Training	RI-6	Mon 10/22/18	04/18/19	0%		
1071	Conduct DevOps operational support for GSE applications - Metrics, Software, GIS, OLS, RM & DM	RI-6	Mon 10/22/18	04/18/19	0%		
1072	Execute and test the DevOps infrastructure based on application team's input & feedback	RI-6	Mon 10/22/18	04/18/19	0%		
1073	Enable and implement Centralized monitoring and logging tools for DevOps	RI-6	Mon 10/22/18	04/18/19	0%		
1074	Plan/Update the DevOps toolchain on monthly basis	RI-6	Mon 10/22/18	04/18/19	0%		
1075	Integrate Test Automation tools into the DevOps toolchain	RI-6	Mon 10/22/18	04/18/19	0%		
1076	Integrate security vulnerability analyzer into DevOps toolchain	RI-6	Mon 10/22/18	04/18/19	0%		
1077	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1078	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1079	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1080	Develop API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1081	Document business model and field tech's feedback on Mobile app rollout from PA3	RI-6	Mon 10/22/18	04/18/19	0%		
1082	Execute GSE Mobile app rollout plan	RI-6	Mon 10/22/18	04/18/19	0%		
1083	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1084	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1085	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1086	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1087	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1088	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1089	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1090	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1091	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1092	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1093	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1094	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1095	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1096	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1097	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1098	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1099	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1100	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1101	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1102	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1103	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1104	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1105	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1106	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1107	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1108	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1109	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1110	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1111	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1112	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1113	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1114	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1115	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1116	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1117	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1118	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1119	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1120	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1121	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1122	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1123	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1124	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1125	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1126	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1127	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1128	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1129	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1130	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1131	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1132	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1133	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1134	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1135	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1136	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1137	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1138	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1139	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1140	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1141	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1142	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1143	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1144	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1145	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1146	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1147	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1148	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1149	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1150	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1151	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1152	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1153	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1154	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1155	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1156	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1157	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1158	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1159	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1160	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1161	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1162	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1163	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1164	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1165	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1166	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1167	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1168	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1169	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1170	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1171	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1172	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1173	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1174	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1175	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1176	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1177	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1178	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1179	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1180	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1181	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1182	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1183	API-PA3 Application (Enhancement) Infrastructure	RI-6	Mon 10/22/18	04/18/19	0%		
1184	API-PA3 Application (Enhancement) Infrastructure						

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-96
Page 24 of 27

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-44-1
Page 24 of 27

Item	Item Name	Location	Start	End	Complete	Deliverables	Revision
1328	Prepare for and hold October Meeting	12 F	Mon 10/15/18	Thu 10/26/18	Yes		392
1329	Prepare for and hold November Meeting	12 F	Mon 10/29/18	Thu 11/01/18	Yes		392
1330	Prepare for and hold December Meeting	12 F	Fri 11/30/18	Mon 12/17/18	Yes		392
1331	Milestones - Operating Model Design P&A	100 F	Mon 10/15/18	Thu 10/26/18	Yes		
1332	MILESTONE: Business/Operations Governance Final Draft	70 F	Mon 10/15/18	Thu 10/26/18	Yes		
1333	Finalize development of current governance structure	20 F	Mon 10/15/18	Thu 10/26/18	Yes		
1334	Develop enhanced governance structure	20 F	Mon 10/15/18	Fri 11/02/18	Yes	1341	1344
1335	Align all shared governance to operating model & metric hierarchy	20 F	Mon 10/15/18	Fri 11/02/18	Yes	1344	1345
1336	Develop meeting cadence	20 F	Mon 10/15/18	Fri 11/02/18	Yes		
1337	MILESTONE: Full Organization Deployment Strategy/Plan Complete	70 F	Mon 10/15/18	Thu 11/01/18	Yes		
1341	MILESTONE: Business/Operations Governance Standup and Transitional	70 F	Mon 10/15/18	Thu 11/01/18	Yes		
1342	Define event reporting processes	20 F	Mon 10/15/18	Thu 11/01/18	Yes	1348	1350
1343	Define event and decision makers	20 F	Mon 10/15/18	Fri 11/02/18	Yes	1348	1350
1344	Define strategic decision processes	20 F	Mon 10/15/18	Fri 11/02/18	Yes	1348	1352
1345	MILESTONE: Organization Development Complete - Part 1	60 F	Mon 10/15/18	Fri 11/02/18	Yes	1351	1352
1346	MILESTONE: Organization Development Complete - Part 2	60 F	Mon 10/15/18	Fri 11/02/18	Yes	1351	1352
1347	MILESTONE: Organization Development Complete - Part 3	60 F	Mon 10/15/18	Fri 11/02/18	Yes	1351	1352
1348	MILESTONE: OPERCOM Issue 2 Complete	10 F	Thu 10/18/18	Thu 10/18/18	Yes		
1349	MILESTONE: OPERCOM Issue 3 Complete	10 F	Fri 10/19/18	Fri 10/19/18	Yes		
1350	MILESTONE: OPERCOM Issue 4 Complete	10 F	Mon 10/22/18	Thu 10/25/18	Yes		
1351	Definition Release 4	100 F	Mon 10/22/18	Thu 10/25/18	Yes		
1352	Milestones - Work Management and Field Enablement P&A	100 F	Mon 10/22/18	Thu 10/25/18	Yes		
1353	Milestones P&A - Release 4	100 F	Mon 10/22/18	Thu 10/25/18	Yes		
1354	Construction Work, Leak Inspection and Leak repair, Service, SC Integration	100 F	Mon 10/22/18	Fri 10/26/18	Yes	1356	1355
1355	SC Integration	100 F	Mon 10/22/18	Fri 10/26/18	Yes	1356	1355
1356	SC Governance and Library (All regions)	100 F	Mon 10/22/18	Fri 10/26/18	Yes	1356	1356
1357	Powerline Integration and Enhancement (All regions)	100 F	Mon 10/22/18	Fri 10/26/18	Yes	1356	1356
1358	Business Architecture Design and Release Planning (All Regions)	100 F	Mon 10/22/18	Fri 10/26/18	Yes	1356	1356
1359	Release Development	100 F	Mon 10/15/18	Fri 11/02/18	Yes	1361	1362,1366
1360	Testing & Conversion	100 F	Mon 10/15/18	Fri 11/02/18	Yes	1364	
1361	Release Deployment Planning and Dress Rehearsal	100 F	Mon 10/15/18	Fri 11/02/18	Yes	1364	
1362	Code Freeze	20 F	Fri 10/19/18	Fri 10/19/18	Yes	1366	1368,1372,1373,1374
1363	Content	20 F	Mon 10/22/18	Fri 10/26/18	Yes	1367	1368
1364	Go-Live	20 F	Fri 10/19/18	Fri 10/19/18	Yes	1368	1370
1365	Support	60 F	Mon 10/22/18	Fri 10/26/18	Yes	1368	
1366	W&E P&A - Release 2	60 F	Mon 10/22/18	Thu 10/25/18	Yes		
1367	Capability Definition	20 F	Mon 10/22/18	Fri 10/26/18	Yes	1367	
1368	Alpha Enhancements (All)	20 F	Mon 10/22/18	Fri 10/26/18	Yes	1367	
1369	Release Deployment Planning and Dress Rehearsal	20 F	Mon 10/22/18	Fri 10/26/18	Yes	1367	1375
1370	Code Freeze	20 F	Fri 10/26/18	Fri 10/26/18	Yes	1375	1377
1371	Content	20 F	Mon 10/22/18	Fri 10/26/18	Yes	1375	1377
1372	Go-Live	20 F	Fri 10/26/18	Fri 10/26/18	Yes	1375	1378,1379,1381,1382
1373	Support	60 F	Mon 10/22/18	Fri 10/26/18	Yes	1375	
1374	W&E P&A - Release 3	60 F	Mon 10/22/18	Thu 10/25/18	Yes		
1375	Capability Definition	20 F	Mon 10/22/18	Fri 10/26/18	Yes	1375	
1376	Alpha Enhancements (All)	20 F	Mon 10/22/18	Fri 10/26/18	Yes	1375	
1377	Release Deployment Planning and Dress Rehearsal	20 F	Mon 10/22/18	Fri 10/26/18	Yes	1375	1383
1378	Code Freeze	20 F	Fri 10/26/18	Fri 10/26/18	Yes	1382	1384,1386,1388,1389,1390
1379	Content	20 F	Mon 10/22/18	Fri 10/26/18	Yes	1383	1385
1380	Go-Live	20 F	Fri 10/26/18	Fri 10/26/18	Yes	1384	1386
1381	Support	60 F	Mon 10/22/18	Fri 10/26/18	Yes	1384	
1382	W&E P&A - Release 4	60 F	Mon 10/22/18	Thu 10/25/18	Yes		
1383	Capability Definition	20 F	Mon 10/22/18	Fri 10/26/18	Yes	1383	
1384	Alpha Enhancements (All, NY)	20 F	Mon 10/22/18	Fri 10/26/18	Yes	1383	
1385	Release Deployment Planning and Dress Rehearsal	20 F	Mon 10/22/18	Fri 10/26/18	Yes	1383	1391
1386	Code Freeze	20 F	Fri 10/26/18	Fri 10/26/18	Yes	1386	1390,1392
1387	Content	20 F	Mon 10/22/18	Fri 10/26/18	Yes	1391	1393
1388	Go-Live	20 F	Fri 10/26/18	Fri 10/26/18	Yes	1392	1394
1389	Support	60 F	Mon 10/22/18	Fri 10/26/18	Yes	1393	
1390	Milestones - Asset Management P&A, Scope and Capability Definition (Reference Only)	100 F	Fri 10/26/18	Fri 10/26/18	Yes		
1391	Asset Analysis Integration	100 F	Mon 10/22/18	Fri 11/02/18	Yes		1397
1392	SC Integration	100 F	Mon 10/22/18	Fri 11/02/18	Yes		1396
1393	SC Governance and Library	100 F	Fri 10/26/18	Fri 10/26/18	Yes	1396	
1394	SC Integration	100 F	Fri 10/26/18	Fri 10/26/18	Yes	1396	
1395	Support	20 F	Fri 10/26/18	Fri 10/26/18	Yes	1399	1400
1396	CE P&A - Part 1: Use Support and Enhancements	200 F	Mon 10/15/18	Thu 10/25/18	Yes		
1397	Large Commercial & Landlord Interactions	200 F	Mon 10/15/18	Thu 10/25/18	Yes		
1398	Release Planning	100 F	Mon 10/15/18	Fri 11/02/18	Yes	1404	1405,1407,1408,1409
1399	Release Development	100 F	Mon 10/15/18	Fri 11/02/18	Yes	1404	
1400	Capability 1	100 F	Mon 10/15/18	Fri 11/02/18	Yes	1404	
1401	Capability 2	100 F	Mon 10/15/18	Fri 11/02/18	Yes	1404	
1402	Code Freeze	100 F	Mon 10/15/18	Fri 11/02/18	Yes	1404	
1403	Content	100 F	Mon 10/15/18	Fri 11/02/18	Yes	1404	
1404	Release Test	100 F	Mon 10/15/18	Fri 11/02/18	Yes	1404	
1405	Go-Live/Conversion 1	100 F	Mon 10/15/18	Fri 11/02/18	Yes	1404	
1406	Go-Live/Conversion 2	100 F	Mon 10/15/18	Fri 11/02/18	Yes	1404	
1407	End-to-End Product Test 1	100 F	Mon 10/15/18	Fri 11/02/18	Yes	1404	1404

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4770
Attachment DIV 7-49-96
Page 27 of 27

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Attachment AG-21-44-1
Page 27 of 27

Item	Item Name	Division	Unit	Start	Completion	Indicators	Comments
1064	Deployment Readiness Assessment Tool Development	01-F	Mon 10/1/21	01/01/22	0%		
1065	Generate and Track Performance of Employment Plans	01-F	Mon 10/1/21	01/01/22	0%	1065	
1066	Execute Program Processes/ Methodologies	030-F	Fri 01/15/21	Fri 01/01/21	0%	1066	
1067	Prepare for P22 Planning Session	01-F	Fri 01/15/21	Fri 01/01/21	0%	1067	
1068	Prepare for P23 Planning Session	01-F	Fri 01/15/21	Fri 01/01/21	0%	1068	
1069	Prepare for P24 Planning Session	01-F	Fri 01/15/21	Fri 01/01/21	0%	1069	
1070	Update Annual Program Processes/ Methodologies	01-F	Mon 10/1/21	Mon 10/1/21	0%		
1071	Update Annual Program Processes/ Methodologies	01-F	Mon 10/1/21	Mon 10/1/21	0%		
1072	Control Range (CR)	030-F	Mon 10/1/21	01/01/22	0%	1072	
1073	Define Updated Risk & Control Matrix (U 2021)	01-F	Mon 10/1/21	01/01/22	0%	1073	1064
1074	Define Updated Risk & Control Matrix (U 2021)	01-F	Mon 10/1/21	01/01/22	0%	1074	1064
1075	Define Updated Risk & Control Matrix (U 2021)	01-F	Mon 10/1/21	01/01/22	0%	1075	1064

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-45
March 13, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-45

Request:

Referring to page 35 of Exhibit NG-GBE-1, please identify the “two System Integrators” to which the GBE Panel refers.

Response:

The two System Integrators are PriceWaterhouseCoopers Advisory Services LLC (“PWC”) and Accenture LLP (“Accenture”). PWC is accountable for the development and deployment of Maximo, GIS/Esri and infrastructure solutions and Accenture is accountable for the development and deployment of Salesforce.com. PWC has overall accountability for solution integration.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-46
March 15, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-46

Request:

Referring to page 35 of Exhibit NG-GBE-1, please identify how many National Grid employees will be (or have been) assigned to work on the development and implementation of the GBE program.

Response:

As of March 7, 2018, there are currently 73 National Grid employees working full time on Gas Business Enablement. Of these, 33 have transferred from the business and 40 are new hires. There are also 13 contractors working on behalf of National Grid. There is a resource plan that anticipates that this number will increase to between 130 – 160 National Grid resources.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-47
March 12, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-47

Request:

Referring to page 43 of Exhibit NG-GBE-1, please provide a complete and detailed explanation of how National Grid determined that an additional \$61 million in contingency funds was necessary for the GBE Program.

Response:

Please refer to the response to Information Request AG-19-2 for an explanation on how the \$61 million contingency was determined.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-48
March 15, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-48

Request:

Referring to page 45 of Exh. NG-GBE-1. Explain whether any of the programs or components of the two workstreams—Scheduling, Dispatch and Mobility and Customer Engagement—were included in any of the Company’s Grid Modernization proposals currently pending under docket D.P.U. 15-120.

Response:

The Company’s Grid Modernization proposals did not include any of the programs or components of the two workstreams – Scheduling, Dispatch and Mobility and Customer Engagement.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-49
March 15, 2018
H.O. Pieper
Page 1 of 2

Information Request AG-21-49

Request:

Please provide copies of all cost benefit analyses done by or for the Companies used to justify the investment in the GBE program.

Response:

The primary driver for Gas Business Enablement (“GBE”) is asset replacement with the objective to replace and consolidate aging systems infrastructure. However, a broad range of both tangible and non-tangible benefits are anticipated as a result of the systems upgrade.

Gas Safety and Compliance – By having a holistic view of assets and work, the Company will be able to better prioritize investment and work. The Company will have more robust processes and systems for capturing information from the field. Modern systems also will allow better validation of data at time of entry and give better access to important data for the right people to make it easier for them to do their jobs.

Customer Satisfaction – Giving the call center visibility to the circumstances occurring on actual job sites, giving front-line employees access to relevant customer history and enabling customers to book their own appointments online are all capabilities that will provide a significant enhancement to the level of service the Company is providing today.

Operational Effectiveness – Having use of seamlessly integrated systems, a reduced reliance on paper and local spreadsheets, and mobile devices for front-line employees that can be taken from the truck to the point of work, will help enhance the effectiveness and efficiency of the Company’s operation.

The GBE benefits case included a cost benefit analysis performed on the Enhanced Capabilities investment as referenced in Attachment AG 21-15-1..

The Gas Business Enablement Program is expected to deliver the following “tangible” customer benefits:

- Enhanced Customer Information. Increased information will be available to customers from the Company’s call center representatives, who will have more information on field activities, such as the status of customer-driven work requests or the locations of field crews.

Prepared by or under the supervision of: Anthony H. Johnston and Reihaneh Irani-Famili

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-49
March 15, 2018
H.O. Pieper
Page 2 of 2

- Self-Serve Information. Customers will have the ability to access more information without the need to call the call centers through self-service routes, which will enable quick and convenient provision of information. The Company's website and customer applications will provide this enhanced functionality.
- Appointment Booking. An enhanced ability to book appointments for work will exist, as appointment availability will be linked directly to resource capacity and a scheduling engine as compared to the manual process today.
- Appointment Management. The flexibility to manage appointments either through the call center or directly through self-service channels will be developed. Because the appointments will be linked to actual availability, it will be much easier to re-schedule appointments in real-time.
- Customer Notifications. Improved customer notifications from the Company will be available in relation to work that is being completed, including providing the name(s) of the technician(s) performing the work. These notifications will keep customers informed of the status of work, particularly when there is an unforeseen delay, and will also provide them with enhanced security as they will know who to expect from the Company.
- Appointment Windows. Potential for more appointment windows and reduced timeframe for current 4- and 8-hour customer commitment windows through the enhanced scheduling platform.

The Company expects that the delivery of these customer benefits will be evidenced through customer satisfaction and employee-engagement scores, as the program is implemented in each jurisdiction.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-21-50
March 15, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-21-50

Request:

Please provide an itemization and quantification of the total expected capital costs associated with the estimated cost of the GBE program. Please also provide the workpapers, calculations, formulas, assumptions, and other supporting documentation used to determine the amount of the total expected capital costs that are expected to be charged to each of the Companies in Massachusetts.

Response:

Please refer to the response to Information Request AG-21-13 and Attachment AG-21-13-1 page 2 “Total CapEx by Workstream (Roll Up)” which shows total projected expenditures by fiscal year for FY17-23 by work stream and cost type. The section under the heading “Total CapEx by Work Stream (Roll Up)” presents a fiscal year total by work stream. The section under heading “Total CapEx by Work Stream by Cost Type (Roll Up)” presents a further work stream breakdown by cost type.

Please see Attachment DPU NG 1-12-1 GBE Boston Opex tab and DPU NG 1-13-1 GBE Colonial Opex tab for the allocators utilized for each workstream which is how the projected capital costs are expected to be charged to each of the Massachusetts operating companies.

Please note that the costs for the Gas Business Enablement program were developed on a total cost basis and then allocated to capital and operating and maintenance expenditure based on the Company’s accounting policy which was developed in accordance with US GAAP ASC 350.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-20-17
March 13, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-20-17

Request:

Referring to the response to DPU-NG 1-6, please quantify the total Gas Business Enablement capital benefits allocable to Boston Gas Company and Colonial Gas Company. The response should provide all supporting workpapers and calculations.

Response:

Please refer to Attachment AG-20-17-1 for a list of benefits for Boston Gas Company and Colonial Gas Company. Column three provides how the benefits were calculated for both companies. In addition to capital benefits the attachment also quantifies operating and maintenance and total benefits.

Boston Gas Company and Colonial Gas Company each d/b/a National Grid
Gas Business Enablement (GBE)
Total Boston Gas Company Benefits Forecasted as a Result of GBE Implementation
For Fiscal Years Ending March 31, 2019 through 2027

Initiative Description	Benefit Description	Benefit Calculation and Baseline	Benefit Type	CAPEX	OPEX	TOTAL
Work Management & Field Enablement	Clerical / Back Office Productivity Improvement	25% Improvement in productivity; 69 clerks @ rate of \$25.09/Hr	Type I	\$ 265,882	\$ 565,000	\$ 830,882
Work Management & Field Enablement	CMS Collections Jobs - Reduction in Mileage	14% reduction in travel distance (assumed equal to travel time reduction); Base of 184,607 jobs/year x 2.30 miles per job = 425,312 miles; 59,544 miles reduction @ \$0.69/miles	Type II	\$ -	\$ 41,085	\$ 41,085
Work Management & Field Enablement	CMS Collections Jobs - Reduction in Travel Time	14% reduction in Travel Time (Analysis Conducted on CMS Data using OptimoRoute Software); Base of 184,607 jobs/year with an average travel time of 14 min; 2,584,513 minutes of total travel time; 361,832 minutes benefit @ rate of \$34.93/Hr	Type II	\$ -	\$ 209,268	\$ 209,268
Work Management & Field Enablement	CMS Planned Jobs - Reduction in Available Time via Autodispatch	3.1% Improvement in productivity; Base of 14,950 work days (All Operating Companies - number of CMS Field Techs both Gas & Electric) with 43+ minutes available (i.e. the time required to complete another job on average) @ \$18.05/job. Using general allocator, 23.29% of this Enterprise wide benefit calculation applied to Boston Gas	Type II	\$ 56,552	\$ 6,284	\$ 62,836
Work Management & Field Enablement	CMS Planned Jobs - Reduction in Mileage	2.5% reduction in travel distance; Base of 409,475 jobs/year x 4.17 miles per job = 1,466,384 miles; 36,660 miles reduction @ \$0.69/mile	Type II	\$ 2,530	\$ 22,766	\$ 25,295
Work Management & Field Enablement	CMS Planned Jobs - Reduction in Travel Time	2.5% reduction in travel time; Base of 409,475 jobs/year with an average travel time of 14 min; 95,544 hours of total travel time; 2,389 hours benefit @ rate of \$34.93/Hr	Type II	\$ 8,343	\$ 75,091	\$ 83,434
Work Management & Field Enablement	CMS Planned Jobs - Reduction in UTCs	2.5% reduction in Unable To Complete (UTC) jobs; Base of 58,237 UTC jobs with an average job time of 10 min; 643,948 minutes of total travel time; 16,099 minutes benefit @ rate of \$34.93/Hr	Type II	\$ 937	\$ 8,435	\$ 9,372
Engineering, Design, Estimating & Mobility	Complex Jobs - Engineering Productivity Improvement	6.3% Improvement in productivity in NE ; Base of 40 FTE; 3763 hours saved per year @rate of \$52.53/Hr. 65% of this NE benefit calculation applied to Boston Gas	Type II	\$ 89,729	\$ 38,455	\$ 128,184
Work Management & Field Enablement	Damage Prevention - Reduced Travel Mileage	2.5% reduction in travel distance; Base of 130,880 jobs x 4.17 miles per job = 546,410 miles; 13,660 miles reduction @ \$0.69/mile	Type I	\$ 1,791	\$ 7,635	\$ 9,426
Work Management & Field Enablement	Damage Prevention - Reduced Travel Time	2.5% reduction in travel time; Base of 130,880 jobs; 14 mins of travel time per job; 1,832,320 minutes of total travel time; 45,808 minutes benefit @ rate of \$34.93/Hr	Type II	\$ 5,067	\$ 21,601	\$ 26,668
Integrated Supply & Demand Planning	Improved Project Delivery - Construction	10% cost reduction of addressable supply chain costs in construction project delivery. Addressable costs: 2% in cost associated with construction work delayed by Supply Chain; Base is \$1.237B in project spend. Using general allocator, 23.29% of this Enterprise wide benefit calculation applied to Boston Gas	Type II	\$ 514,662	\$ 76,904	\$ 591,566
Work Management & Field Enablement	Inspections - Reduced Travel Mileage	14% reduction in Travel Time (Analysis Conducted on CMS Data using OptimoRoute Software); Base of 21,666 jobs, 14 Minutes Travel Time per Job; 303,324 Minutes of Total Travel Time; 42,192 Minutes Benefit @ Rate of \$34.93/Hr	Type II	\$ 2,156	\$ 2,635	\$ 4,791
Work Management & Field Enablement	Inspections - Reduced Travel Time	14% reduction in travel distance (assumed equal to travel time reduction); Base of 21,666 jobs x 2.3 miles per job = 49,916 miles; 6,943miles reduction @ \$0.69/mile	Type II	\$ 11,053	\$ 13,510	\$ 24,563
Work Management & Field Enablement	M&C Productivity Improvements - Base	3.0% Improvement in Productivity; Base of 1,116,603 Straight Time Hours; 33,498 Hours Benefit (15 Minutes per Day) @ OT Rate of \$52.40/Hr. Note: benefits taken on OT.	Type I	\$ 789,809	\$ 965,322	\$ 1,755,132
Customer Interaction	Reduce Move Call Volume through Self-Service	15% reduction in move call volumes; Base of 748,125 yearly calls @ \$2.84/call	Type II	\$ -	\$ 318,915	\$ 318,915
Customer Interaction	Reduce Non-Move Call Volume through Self-Service	10% reduction in non-move call volumes; Base of 494,197 field related calls of which 61% are addressable; 30,024 avoided calls @ an average of \$4.12/call	Type II	\$ -	\$ 123,579	\$ 123,579
Regulatory/ Compliance	Reduced Compliance and Gas Safety Penalties	100% reduction in gas safety and compliance penalties; Base of \$545,068 average penalties over the past 3 years	Type II	\$ -	\$ 545,068	\$ 545,068
Engineering, Design, Estimating & Mobility	Reduced in mapping cycle time via digital field data entry	30% reduction in FTEs associated with manual mapping; Base is 13 FTEs serving the gas business @ \$64,302/year.	Type II	\$ 176,204	\$ 75,516	\$ 251,720
Asset - Advanced Analytics	Reduction / Redirection in Opex via AIPM	0.8% redirection of annual addressable O&M spend to other spend (Opex or Capex); Base is FY2017 Controllable O&M budget of \$76.3M .	Type I	\$ -	\$ 628,814	\$ 628,814
Engineering, Design, Estimating & Mobility	Reduction in Damages due to Data Quality Errors	44% reduction in mismark damages due to record errors; Average annual damage cost for mismarks due to record errors is \$313,015. 20% reduction in mismark damages due to locator errors (internal); Average annual damage cost for mismarks due to locator errors is \$1,089	Type I	\$ 61,739	\$ 75,459	\$ 137,198
Data Management	Reduction in Data Cleansing / Scrubbing Effort - Analysts	7.5% Improvement in productivity; Base of 52 FTE @ rate of \$32.44/Hr	Type II	\$ 36,645	\$ 207,657	\$ 244,302
Work Management & Field Enablement	Reduction in Field Tech Communications	25% reduction in # of call aheads placed by technicians; 409,475 jobs x 1 min/call x 1 call/job; 102,369 minutes benefits @rate of \$34.93/Hr	Type II	\$ 5,960	\$ 53,636	\$ 59,596
Work Management & Field Enablement	Reduction in Meter Verification Jobs	37.5% reduction in number of meter verification jobs; Base of 3,032 jobs; 94,082 minutes of total time to complete meter verifications annually (including travel time); 35,281 minutes benefits @ rate of \$34.93/Hr	Type II	\$ -	\$ 20,537	\$ 20,537
Customer Interaction	Reduction in Service Quality Penalties	17.5% reduction in service quality penalties; Base of \$233,450 average service quality penalties over the past 3 years	Type II	\$ -	\$ 40,854	\$ 40,854
				\$ 2,029,060	\$ 4,144,024	\$ 6,173,083

Boston Gas Company and Colonial Gas Company each d/b/a National Grid
Gas Business Enablement (GBE)
Total Colonial Gas Company Benefits Forecasted as a Result of GBE Implementation
For Fiscal Years Ending March 31, 2019 through 2027

Initiative Description	Benefit Description	Benefit Calculation and Baseline	Benefit Type	CAPEX	OPEX	TOTAL
Work Management & Field Enablement	Clerical / Back Office Productivity Improvement	25% Improvement in productivity; 17 clerks @ rate of \$25.09/Hr	Type I	\$ 65,507	\$ 139,203	\$ 204,710
Work Management & Field Enablement	CMS Collections Jobs - Reduction in Mileage	14% reduction in travel distance (assumed equal to travel time reduction); Base of 40,524 jobs/year x 2.30 miles per job = 93,361 ; 13,071 miles reduction @ \$0.69/miles	Type II	\$ -	\$ 9,019	\$ 9,019
Work Management & Field Enablement	CMS Collections Jobs - Reduction in Travel Time	14% reduction in Travel Time (Analysis Conducted on CMS Data using OptimoRoute Software); Base of 40,524 jobs/year with an average travel time of 14 min; 567,334 minutes of total travel time; 79,427 minutes benefit @ rate of \$34.93/Hr	Type II	\$ -	\$ 45,937	\$ 45,937
Work Management & Field Enablement	CMS Planned Jobs - Reduction in Available Time via Autodispatch	3.1% Improvement in productivity; Base of 14,950 work days (All Operating Companies - number of CMS Field Techs both Gas & Electric) with 43+ minutes available (i.e. the time required to complete another job on average) @ \$18.05/job. Using general allocator, 5.21% of this Enterprise wide benefit calculation applied to Colonial Gas	Type II	\$ 12,651	\$ 1,406	\$ 14,056
Work Management & Field Enablement	CMS Planned Jobs - Reduction in Mileage	2.5% reduction in travel distance; Base of 89,885 jobs/year x 4.17 miles per job = 321,889 miles; 8,047 miles reduction @ \$0.69/mile	Type II	\$ 555	\$ 4,997	\$ 5,553
Work Management & Field Enablement	CMS Planned Jobs - Reduction in Travel Time	2.5% reduction in travel time; Base of 89,885 jobs/year with an average travel time of 14 min; 20,973 hours of total travel time; 524 hours benefit @ rate of \$34.93/Hr	Type II	\$ 1,831	\$ 16,483	\$ 18,315
Work Management & Field Enablement	CMS Planned Jobs - Reduction in UTCs	2.5% reduction in Unable To Complete (UTC) jobs; Base of 12,784 UTC jobs with an average job time of 10 min; 141,354 minutes of total travel time; 3,534 minutes benefit @ rate of \$34.93/Hr	Type II	\$ 206	\$ 1,852	\$ 2,057
Engineering, Design, Estimating & Mobility	Complex Jobs - Engineering Productivity Improvement	6.3% Improvement in productivity in NE ; Base of 40 FTE; 3763 hours saved per year @rate of \$52.53/Hr. 14% of this NE benefit calculation applied to Colonial Gas	Type II	\$ 20,072	\$ 8,602	\$ 28,675
Work Management & Field Enablement	Damage Prevention - Reduced Travel Mileage	2.5% reduction in travel distance; Base of 47,609 jobs x 4.17 miles per job = 198,763 miles; 4,969 miles reduction @ \$0.69/mile	Type I	\$ 651	\$ 2,777	\$ 3,429
Work Management & Field Enablement	Damage Prevention - Reduced Travel Time	2.5% reduction in travel time; Base of 47,609 jobs; 12 mins of travel time per job; 666,526 minutes of total travel time; 16,663 minutes benefit @ rate of \$34.93/Hr	Type II	\$ 1,843	\$ 7,858	\$ 9,701
Integrated Supply & Demand Planning	Improved Project Delivery - Construction	10% cost reduction of addressable supply chain costs in construction project delivery. Addressable costs: 2% in cost associated with construction work delayed by Supply Chain; Base is \$1.237B in project spend. Using general allocator, 5.21% of this Enterprise wide benefit calculation applied to Colonial Gas	Type II	\$ 115,131	\$ 17,203	\$ 132,334
Work Management & Field Enablement	Inspections - Reduced Travel Mileage	14% reduction in Travel Time (Analysis Conducted on CMS Data using OptimoRoute Software); Base of 2,074 jobs, 14 Minutes Travel Time per Job; 29,036 Minutes of Total Travel Time; 4,039 Minutes Benefit @ Rate of \$34.93/Hr	Type II	\$ 206	\$ 252	\$ 459
Work Management & Field Enablement	Inspections - Reduced Travel Time	14% reduction in travel distance (assumed equal to travel time reduction); Base of 2,074 jobs x 2.3 miles per job = 4,778 miles; 665 miles reduction @ \$0.69/mile	Type II	\$ 1,058	\$ 1,293	\$ 2,351
Work Management & Field Enablement	M&C Productivity Improvements - Base	3.0% Improvement in Productivity; Base of 177,186 Straight Time Hours; 5,316 Hours Benefit (15 Minutes per Day) @ OT Rate of \$52.40/Hr. Note: benefits taken on OT.	Type I	\$ 125,329	\$ 153,180	\$ 278,509
Customer Interaction	Reduce Move Call Volume through Self-Service	15% reduction in move call volumes; Base of 135,159 yearly calls @ \$2.84/call	Type II	\$ -	\$ 57,616	\$ 57,616
Customer Interaction	Reduce Non-Move Call Volume through Self-Service	10% reduction in non-move call volumes; Base of 108,482 field related calls of which 61% are addressable; 6,591 avoided calls @ an average of \$4.12/call	Type II	\$ -	\$ 27,127	\$ 27,127
Regulatory/ Compliance	Reduced Compliance and Gas Safety Penalties	100% reduction in gas safety and compliance penalties; Base of \$121,932 average penalties over the past 3 years	Type II	\$ -	\$ 121,932	\$ 121,932
Engineering, Design, Estimating & Mobility	Reduced in mapping cycle time via digital field data entry	30% reduction in FTEs associated with manual mapping; Base is 3 FTEs serving the gas business @ \$64,302/year.	Type II	\$ 39,417	\$ 16,893	\$ 56,310
Asset - Advanced Analytics	Reduction / Redirection in Opex via AIPM	0.8% redirection of annual addressable O&M spend to other spend (Opex or Capex); Base is FY2017 Controllable O&M budget of \$10.4M .	Type I	\$ -	\$ 85,999	\$ 85,999
Engineering, Design, Estimating & Mobility	Reduction in Damages due to Data Quality Errors	44% reduction in mismatch damages due to record errors; Average annual damage cost for mismarks due to record errors is \$68,728. 20% reduction in mismatch damages due to locator errors (internal); Average annual damage cost for mismarks due to locator errors is \$239	Type I	\$ 13,552	\$ 16,564	\$ 30,117
Data Management	Reduction in Data Cleansing / Scrubbing Effort - Analysts	7.5% Improvement in productivity; Base of 12 FTE @ rate of \$32.44/Hr	Type II	\$ 8,198	\$ 46,453	\$ 54,651
Work Management & Field Enablement	Reduction in Field Tech Communications	25% reduction in # of call aheads placed by technicians; 89,885 jobs x 1 min/call x 1 call/job; 22,471 minutes benefits @rate of \$34.93/Hr	Type II	\$ 1,308	\$ 11,774	\$ 13,082
Work Management & Field Enablement	Reduction in Meter Verification Jobs	37.5% reduction in number of meter verification jobs; Base of 666 jobs; 20,652 minutes of total time to complete meter verifications annually (including travel time); 7,744 minutes benefits @ rate of \$34.93/Hr	Type II	\$ -	\$ 4,508	\$ 4,508
Customer Interaction	Reduction in Service Quality Penalties	17.5% reduction in service quality penalties; Base of \$40,800 average service quality penalties over the past 3 years	Type II	\$ -	\$ 7,140	\$ 7,140
				\$ 407,517	\$ 806,069	\$ 1,213,586

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-20-18
March 13, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-20-18

Request:

Referring to the response to DPU-NG 1-6 Attachment, Page 1, please provide all supporting documentation and workpapers for the annual benefits associated with the following initiatives:

Asset – Advanced Analytics, Integrated Supply & Demand Planning,
Regulatory/ Compliance,
Work Management & Field Enablement - Clerical / Back Office Productivity Improvement,
Work Management & Field Enablement - M&C Productivity Improvements – Base.

Response:

Please refer to Attachments AG-20-18-1 and AG-20-18-2.

Workstream	Initiative	Ref ID for PPT	Ref ID to PC Model	Value Lever	Type of Work	Benefit and Baseline	Benefits	% Capex	% Opex	Capex Benefits	Opex Benefits	Jurisdiction	Boston Gas	Colonial Gas	Brooklyn Union Gas-KEDNY	X3 Gas East Corp-KEDJ	Niagara Mohawk Power Corp	Narragansett Electric Co	Benefit Type	Timing (Deployment of Capability, Start of Benefit Realization)	Notes	Source Files / Information & Contacts	
Work Management	Work Management & Field Enablement	14	2	Field Productivity Improvement via Improved Platforms	All M&C Work Types	3.0% Improvement in Productivity; Base of 4,693,250 Straight Time Hours; 140,798 Hour Benefit (15 Minutes per Day) @ OT Rate of \$52.40/Hr. Note: benefits taken on OT	\$ 7,377,085	45%	55%	\$ 3,325,688	\$ 4,057,397	All	\$ 1,755,132	\$ 278,509	\$ 1,935,513	\$ 1,203,157	\$ 1,628,185	\$ 576,589	Type 2	Capex/IV Savings	End of FY3, Q4 (FY4, Q1 Start)	Increase field worker productivity through better technology - work management, scheduling, field mobility, etc.	- HRIS extract for resource counts (Wynn DeRamos) - Overtime hours extract (Philip Jeffrey / Brian Zhou/NY; James Loschavo NE) - Available productive hours (Corporate FRBA)
		19	24	Improved Clerical / Back Office Productivity	All M&C and CMS Jobs	25% Improvement in productivity; 177 clerks @ rate of \$25.05/Hr	\$ 2,331,393	32%	68%	\$ 682,046	\$ 1,449,348	All	\$ 830,882	\$ 204,710	\$ 337,170	\$ 264,919	\$ 313,086	\$ 180,627	Type 1	Efficiency	End of FY3, Q4 (FY4, Q1 Start)	Reduced manual tasks such as time entry, work package completion, information updates, etc. completed by clerks.	- HRIS extract for resource counts - clerical resources in Ops Support (Wynn DeRamos) - Estimate of reduction (Accenture Leading Practice & Analysis / Mark Scaparoni, Danielle Mortisey)
Asset Management	Asset - Advanced Analytics	5	33	Reduction / Redirection in Opex via AI/ML	M&C - All Opex Jobs	0.8% reduction of annual addressable O&M spend to other spend (Opex or Capex); Base is FY2017 Controllable O&M budget of \$260M	\$ 1,980,000	0%	100%	\$ -	\$ 1,980,000	All	\$ 628,814	\$ 85,999	\$ 614,864	\$ 210,711	\$ 328,242	\$ 111,371	Type 1	Cost Savings	End of FY4, Q4 (FY5, Q1 Start)	O&M Savings for utilizing Capital and reducing same or more asset risk. 1-2% reduction for addressable spend categories. Decrease in system maintenance cost as well as more reliable gas system. Addressable preventative & corrective maintenance improvement 1%.	
Compliance	Compliance & Technical Training		46	Reduced Compliance and Gas Safety Penalties	M&C - All Jobs	100% reduction in gas safety and compliance penalties; Base of \$13,520,000 average penalties over the past 3 years	\$ 13,520,000	0%	100%	\$ -	\$ 13,520,000	Based on Fines	\$ 545,068	\$ 121,932	\$ 4,766,687	\$ -	\$ 7,900,000	\$ 187,133	Type 2	Cost Avoidance	Improved compliance / gas safety is addressed by many facets of the program; the benefits are grouped here vs. splitting out across multiple initiatives.	- Compliance penalties - various files (Patric O'Brien, Stacey Donnelly, Deb Byron) - Estimate of decrease service quality penalties (Dan McNamara / Johnny Johnston)	

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

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

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

Field Techs ⁴

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

Assumptions / Sources / Notes

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

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

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

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

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

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

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

Benefit by Operating Company

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

Assumptions / Sources / Notes

- 1 # of Clerks derived from HRIS extract provided by J'Wynn DeRamos; resources with Clerk or "CLK" in their titles in M&C, CMS, and Ops Support / Work Support were counted in this analysis
- 2 Estimate of % productivity improvement as result of new platforms and mobile devices provided by Danielle Morrissey and Mark Scaparotti
- 3 Clerk rate provided by NG Finance; hourly rate assumes an average for that category of employee if there were multiple titles / levels (e.g., Clerk, CMS Clerk, etc.)
- 4 Benefits for business case / threshold, target, and stretch provided / agreed by Johnny Johnston

Reduction / Redirection in Opex

	FY2017 Controllable O&M ¹	% of Total Opex	% Reduction ²	Benefits
Boston Gas	\$ 76,358,000	32%	0.82%	\$ 628,814
Colonial Gas	\$ 10,443,000	4%	0.82%	\$ 85,999
Brooklyn Union Gas (KEDNY)	\$ 74,664,000	31%	0.82%	\$ 614,864
Keyspan Gas East (KEDLI)	\$ 25,587,000	11%	0.82%	\$ 210,711
NiagaraMohawk Gas	\$ 39,859,000	17%	0.82%	\$ 328,242
Narragansett Gas	\$ 13,524,000	6%	0.82%	\$ 111,371
Total	\$ 240,435,000			\$ 1,980,000

Assumptions / Sources / Notes

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

2 Estimated \$6M benefit provided by Phil Di Giglio

Reduced Compliance and Gas Safety Penalties

	KEDNY ¹					KEDLI ¹					NIMO ¹					MA ¹					Rhode Island ¹				
	2013	2014	2015	3 Year Average	Total at Risk (2016)	2013	2014	2015	3 Year Average	Total at Risk (2016)	2013	2014	2015	3 Year Average	Total at Risk (2016)	2013	2014	2015	3 Year Average	Total at Risk	2013	2014	2015	3 Year Average	Total at Risk
Records Violations- High Risk	X	X	X								X	X	X												
Records Violations- Other	X	X	X																						
HEFPA											X		X												
Warning Tags											X	X	X												
Internal Corrosion												X													
20 Year Regulator Inspections												X													
Inactive Services													X												
Public Building Inspection													X												
Leak Classification or Mitigation	X	X	X								X	X	X												
Leak Repair or Surveillance	X	X	X								X	X	X												
Warning Tag Classification			X								X	X	X												
MA Gas Compliance Work Plan													X												
Corrosion- Annual Inspection	X	X	X																						
Service Atmospheric Inspection	X		X																						
Pressure Charts - Company Name		X																							
Total Compliance	\$ 2,700,000	\$ 5,400,000	\$ 6,200,000	\$ 4,766,667	\$ 18,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000,000	\$ 9,000,000	\$ 5,700,000	\$ 7,900,000	\$ 9,000,000	\$ 486,000	\$ 160,000	\$ 1,355,000	\$ 667,000	\$ -	\$ 267,400	\$ 75,000	\$ 219,000	\$ 187,133	

Operating Company ²	3 Year Average	Benefits ³
Boston Gas Company	\$ 545,068	\$ 545,068
Colonial Gas Company	\$ 121,932	\$ 121,932
Brooklyn Union Gas-KEDNY	\$ 4,766,667	\$ 4,766,667
KS Gas East Corp-KEDLI	\$ -	\$ -
Niagara Mohawk Power Corp	\$ 7,900,000	\$ 7,900,000
Narragansett Electric Co	\$ 187,133	\$ 187,133
Total	\$ 13,520,800	\$ 13,520,800

General Allocators	All	MA
Boston Gas	23.29%	82%
Colonial Gas	5.21%	18%
Brooklyn Union Gas (KEDNY)	30.10%	
Keyspan Gas East (KEDLI)	21.55%	
NiagraMohawk Gas	12.44%	
Narragansett Gas	7.41%	
Total	100.00%	29%

Assumptions / Sources / Notes
¹ KEDNY, KEDLI, and NIMO gas safety and compliance metrics source: Patric O'Brien, Director Asst. General Counsel; MA metrics: Amy Smith, Director Pipeline Safety; RI metrics: Deb Byron, Lead Program Manager Pipeline Safety
² Boston Gas and Colonial Gas benefits split based on general allocator %s (Boston Gas - 82%, Colonial Gas - 18%)
³ 100% reduction in penalties agreed by Johnny Johnston



**Gas Business Enablement
Program**

Business Case – Benefits Summary

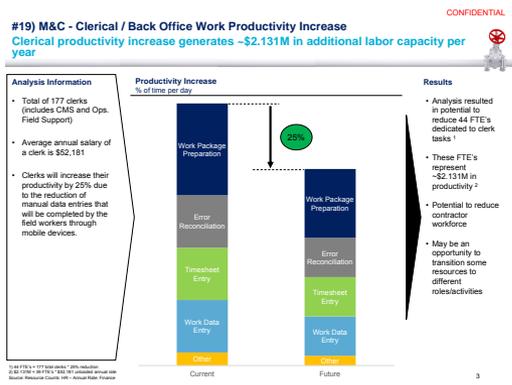
March 31, 2017

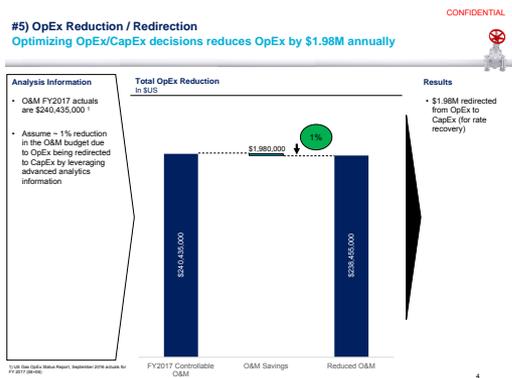
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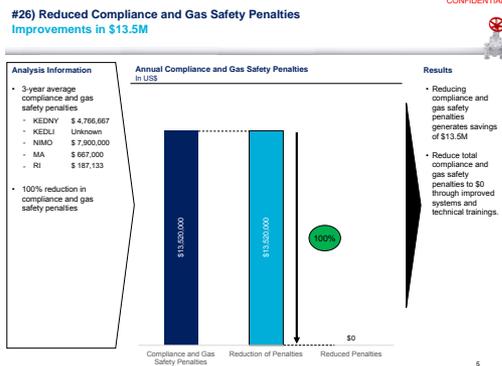


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Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-20-19
March 12, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-20-19

Request:

Referring to the response to DPU-NG 1-6 Attachment, Page 1, please provide a complete description of the benefits associated with “Regulatory/ Compliance.” The response should itemize the associated benefits and explain how those benefits were quantified.

Response:

The estimated benefits for the 100% reduction in Regulatory/Compliance penalties relating to gas safety and compliance were calculated based on a 3-year average (2013 – 2015) of penalties. A total forecasted benefit of \$667,000 is shown by Operating Company below:

Operating Company	3-Year Average Penalties
Boston Gas	\$ 545,068
Colonial Gas	\$121,932
Total	\$667,000

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-20-20
March 13, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-20-20

Request:

Referring to the response to DPU-NG 1-6 Attachment, please provide workpapers allocating the Total Benefits Forecasted as a Result of GBE Implementation to Boston Gas Company and Colonial Gas Company.

Response:

Please refer to Attachment AG-20-17-1 for the total benefits forecasted to Boston Gas Company and Colonial Gas Company.

Boston Gas Company and Colonial Gas Company
each d/b/a National Grid
D.P.U. 17-170
Information Request AG-24-2
April 9, 2018
H.O. Pieper
Page 1 of 1

Information Request AG-24-2

Request:

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

Response:

Please see the following attachments for the sanction papers and associated updates to the US Senior Executive Sanctioning Committee regarding the GBE Program.

Attachment AG 24-2-1 – May 30, 2017 US SESC Presentation

Attachment AG 24-2-2 – May 30, 2017 US SESC Sanction Paper

Attachment AG 24-2-3 – September 25, 2017 US SESC Presentation

Attachment AG 24-2-4 – September 25, 2017 US SESC Sanction Paper

Attachment AG 24-2-5 – March 26, 2018 US SESC Presentation

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Gas Business Enablement (GBE)

Place your chosen image here. The four corners must just cover the arrow tips. For covers, the three pictures should be the same size and in a straight line.

SESC Presentation
May 30, 2017

Johnny Johnston

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Project Scope

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

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

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

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Implementation Approach

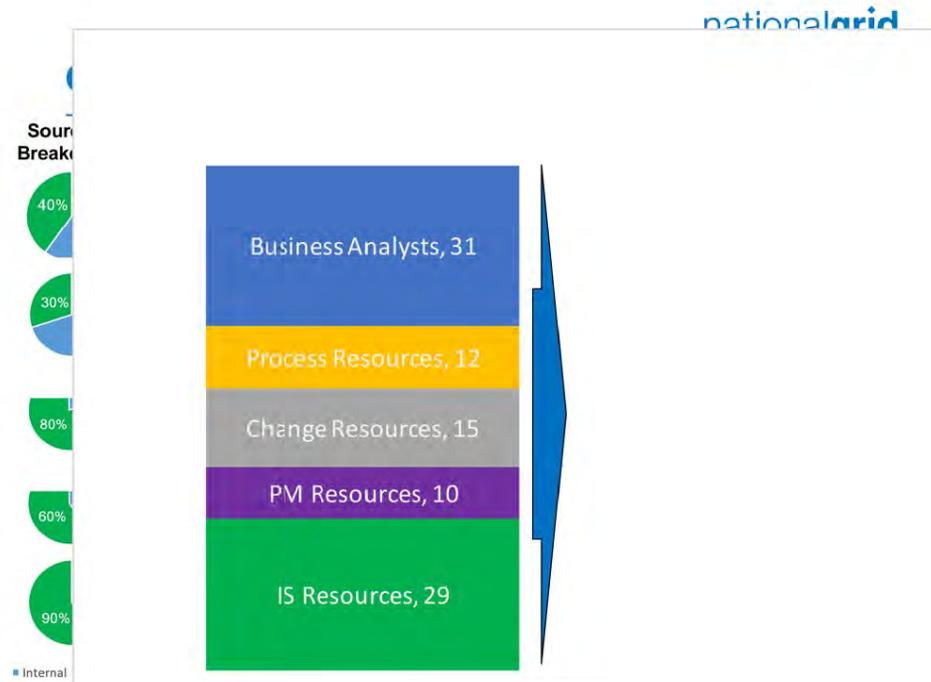
- Leverage standard industry technology packages
- Development of the core backbone solution first with incremental enhanced capabilities to follow
- Phased approach based on geography and work type. For example, Rhode Island – I&R. This will enable quicker initial deployments and avoid a ‘big bang’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

3

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GBE Resources over the life of the program







Key Milestones

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



Implementation Risks

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



Financials

- This paper notes sanction of Gas Business Enablement (INVP4572) in the amount of \$84.5 million for the FY 2018 portion of the program. (\$56.5 Capex, \$28.0 Opex, \$0.0 Removal)
- In February 2017, National Grid Plc
 - Approved the FY 2018 funding associated with this request
 - Endorsed the proposed \$458.142 million anticipated roadmap, with an incremental \$61.000 contingency
 - Endorsed the annual sanctioning approach, which will include periodic reviews of program progress, deliverables, and funding requirements over multiple sanctions, with Delegation of Authority (DoA) to the GBE Steering Group.
- Note the RTB impact of \$17.676M in FY22 (per annum) for an estimated 5 years. RTB impact begins in FY19 at \$7.105M and increases through FY22 to \$17.676M.

8

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Financials (cont.)

- Program Benefits
 - Primary benefit is a reduction in operational risk by replacing aging information systems which are at or nearing end of life.
 - The core system will also drive a broad range of benefits including improvements in gas safety and compliance, customer engagement and operational effectiveness
 - Estimated total potential Type I and Type II quantifiable financial benefits of \$39.615 million are anticipated once fully embedded (by FY2024)

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Regulatory Recovery

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

10