

PUC 5-23

Request:

Please provide a copy of the NorthStar Report (analyzing the rollout of US Foundation Program aka SAP) referenced in NYPSC Cases 17-E-0238 and 17-E-0239 Testimony of Staff Gas Business Enablement Panel, on page 19. For each conclusion and recommendation listed in the Report, please explain how the Gas Business Enablement program as proposed has addressed those conclusions and incorporated any recommendations.

Response:

The NorthStar Report reflects the observations, findings and conclusions, and related recommendations for improvements arising out of NorthStar Consulting Group's management and operations audit of National Grid USA's three New York State gas utilities as of the time of the audit. The audit and report covered many areas of analysis beyond the US Foundation Program (USFP). A copy of that report is included in this response as Attachment PUC 5-23-1 (the report's findings and conclusions with respect to the USFP implementation begin on Page IV-12).

The New York Department of Public Service Staff Gas Business Enablement Panel found seven conclusions relevant to Gas Business Enablement implementation, as noted in NYPSC Cases 17-E-0238 and 17-E-0239 Testimony of Staff Gas Business Enablement Panel, on Pages 19-20, a copy of which is provided as Attachment PUC 5-23-2. These conclusions are set forth below, with a description of how Gas Business Enablement has addressed or is addressing each. National Grid is confident that the program has fully addressed these conclusions.

- 1) National Grid USA was unprepared for the complexity and magnitude of the USFP and should have had discussions with other utilities to gain industry experience before implementation.*

In the early stages of planning and business case development, the Gas Business Enablement team conferred with three peer utility companies to gain insight and lessons learned from their experiences implementing similarly complex information technology projects. These lessons learned have informed the program's development of strategy, delivery approach, and methods as well as governance and management frameworks. Lessons learned and how they validated, or were incorporated into, the Gas Business Enablement plan are shown in Attachment PUC 5-23-3. The Gas Business Enablement Program team continues to engage with other companies either

directly or through peer networks, user forums, and other venues to leverage new thinking and learnings.

- 2) *National Grid USA's financial processes lacked sufficient internal controls, and while the USFP was expected to solve this issue, the end result was that the SAP program implemented through the USFP did not solve the internal control issue.*

The Gas Business Enablement Program has deployed a Risk and Controls Team comprised of subject matter experts from our systems integration partner, PriceWaterhouseCoopers (PwC), the Finance function's Controls Evaluation Team, and the Gas Business Operational Controls team. This team works with the Gas Business Enablement project team and the Gas Business and Finance function to ensure that program solutions fully align with and support National Grid's operational and finance risk and controls frameworks. It is not within the Gas Business Enablement Program scope to improve National Grid's finance controls processes. However, the program is committed to supporting the various Finance controls improvement initiatives currently underway.

- 3) *National Grid USA was unable to quantify the incremental benefits from the USFP, such as improved operational efficiencies, consolidation and cost reductions, and therefore it was difficult to measure program success.*

As a precursor to sanctioning of the Gas Business Enablement Program, a high-level design, strategic roadmap, and formal business case, including both costs and benefits, were developed. The Gas Business Enablement team has developed a value framework to baseline, measure, and track improvements in operational performance metrics as a result of the program. Quantifiable targets were defined, calendared, and categorized as either direct cost savings or indirect benefits, such as future cost avoidances or redirection of resources. These benefits have further been incorporated into various governance and contractual documents as measures of program success. Please see Attachment PUC 5-21 provided with the Company's response to PUC 5-21 for the estimates of total U.S. benefits (Type I and Type II, and capital and operating expense benefits) for the Gas Business Enablement Program (see Page 1 of the attachment) and the estimates for the Company only (see Page 2 of the attachment).

- 4) *National Grid USA did not focus sufficiently on the individual utilities.*

The NorthStar audit raised concerns that the "enterprise" level approach adopted by USFP did not sufficiently recognize jurisdictional priorities and requirements, nor did it isolate the negative

impacts of a problematic system deployment. The Gas Business Enablement Program and its deployment roadmap are founded on scaled agile principles and methodologies which yield a fundamentally different approach to deployment than the USFP. The program solution will be standardized across all jurisdictions to the greatest degree possible for operating efficiencies but will be deployed based on an operating company basis. The solution will be deployed in multiple releases designed to shorten the time between program mobilization and delivery of new functionality and benefit capture. This will also allow deployments to be customized to meet the need of the operating company in terms of training, timing, etc. Should an issue be encountered, any negative impacts will be limited and lessons learned can be incorporated into project plans before the next deployment.

5) The staffs at National Grid's New York utilities were not able to generate the reports needed for managers to make informed decisions due to lack of training or ability.

The NorthStar Report observed two USFP issues related to reporting: misalignment between reporting needs and delivered functionality; and slow adoption of delivered functionality. The Gas Business Enablement Program is addressing these issues in two ways. The program agile method engages field users and managers early in the requirements gathering and design process and regularly throughout the build, test, and deployment processes. This helps ensure that needed functionality is captured and correctly built and delivered. The program is providing functional training not only to end users, but also to managers and other leaders on how to effectively lead change in their organizations. This will significantly mitigate adoption-related challenges.

6) Zero-based budgeting was not used to forecast operations and maintenance (O&M) budgets.

The Gas Business Enablement Program budget was built using zero-based budgeting methods. Program costs were developed with Accenture, one of the top system integrators, utilizing a bottom-up approach, and validated by comparison to actual experience on other programs of similar size and scope. PwC was selected as a business assurance partner for National Grid to validate that the program scope meets National Grid's requirements for cost effectiveness. PwC concluded that the cost estimate for the program:

- (i) Was appropriate compared with the total costs of other industry benchmarks of similar scale projects; and
- (ii) The 4.5 year deployment duration in the roadmap is achievable.

- 7) *The capital review and planning process for National Grid USA focuses too heavily on spending variances and not enough on the underlying drivers of these variances.*

The Gas Business Enablement Program utilized zero-based budgeting to forecast both capital and O&M budgets. This, combined with fixed price vendor contracts and oversight by the Gas Business Enablement Steering Committee, will enable National Grid to have clear visibility on the drivers of spending variances. It is also important to note that the program will enable the gas business to identify underlying capital spending variances. The specific Gas Business Enablement initiatives that will enable National Grid to more accurately estimate capital spending include: deployment of a graphic work design tool and compatible unit libraries, the Asset Investment Planning and Management tool, asset integrity management tools, and enterprise asset system and financial system integrations. Many of these same tools can be leveraged to provide greater insight into project spending variances to identify the underlying drivers of those variances.

A COMPREHENSIVE MANAGEMENT AND OPERATIONS AUDIT OF NATIONAL GRID USA'S NEW YORK GAS COMPANIES

CASE 13-G-0009

Submitted to the:

New York Public Service Commission

Three Empire State Plaza
Albany, NY 12223-1350

FINAL REPORT

JULY 25, 2014



NORTHSTAR CONSULTING GROUP

MANAGEMENT CONSULTANTS

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I. EXECUTIVE SUMMARY

NorthStar Consulting Group, Inc. (NorthStar) was retained by the New York State (NYS) Public Service Commission (PSC) to conduct a management and operations audit of National Grid USA's (NGUSA) three New York gas utilities. This chapter of the report provides an executive summary of our findings and recommendations, with a focus on several broad findings that cross functional areas and have a significant impact on the operations of the NY gas utilities and their ratepayers, and the PSC's regulation of the three utilities: Niagara Mohawk Power Corporation (NMPC), The Brooklyn Union Gas Company (KEDNY), and KeySpan Gas East Corporation (KEDLI).

A. NATIONAL GRID BACKGROUND

National Grid plc (NG-plc), an international electric and gas company, is headquartered in London, England. NG-plc's business segments include UK Transmission, UK Gas Distribution, US Regulated and "other" activities. NG-plc's wholly owned subsidiary NGUSA, is a public utility holding company with regulated subsidiaries engaged in the generation of electricity and the transmission, distribution and sale of both natural gas and electricity in the US, with operations in Massachusetts, Rhode Island and NYS.

In NYS, NGUSA owns NMPC, a gas and electric utility, acquired by National Grid in 2002 (Case 01-M-0075), and KEDNY and KEDLI both purchased by National Grid in 2007 (Case 06-M-0878). Collectively KEDLI, KEDNY and NMPC are referred to as the New York gas companies. In FY2013, NGUSA represented 56.6 percent of NG-plc's revenue, and the NY gas companies comprise 25.9 percent of the US revenue.

While KEDLI, KEDNY and NMPC operate under three distinct tariffs, they do not operate as stand-alone utilities. Instead, they are geographic service areas under NGUSA. Most of NGUSA's managerial resources are employees of National Grid USA Service Company, Inc. (ServCo), another subsidiary of NGUSA. ServCo is the actual organization that provides services and general and administrative support to all the NGUSA utilities, including the three NY gas companies. While NGUSA and ServCo are separate legal entities, practically they are overlapping organizations between which management rarely distinguishes. Neither NGUSA nor ServCo are regulated by the PSC. The services provided by ServCo include:

- Network Strategy
- Operations
- Supply Procurement
- Safety, Health and Environmental (SHE)
- Strategy, Business Development & Technology
- Legal
- Regulation and Pricing
- Finance
- Audit

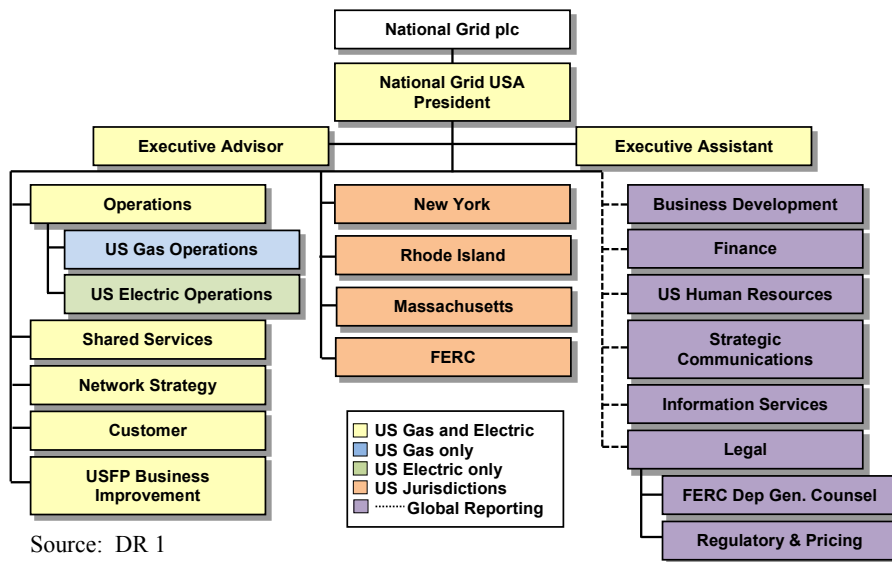


- Corporate Affairs
- Customer
- Human Resources
- Information Services & Security
- Shared Services

Structurally, NGUSA operates with a matrix organization, headed by the President of NGUSA, as shown in **Exhibit I-1**.¹ In addition to the NGUSA functional executives reporting to the NGUSA President and the ServCo functional units, the organization includes regional presidents for each of the states which have regulated operating companies, including NY. Some functions have global reporting relationships and only report indirectly to NGUSA.

Under this “jurisdictional model”, the NY Jurisdictional President has a small staff of direct reports and interfaces through a matrix reporting structure with ServCo functional representatives regarding the services ServCo provides to the NY utilities. **Exhibit I-2** shows the NY leadership team and the liaisons with each of the NGUSA functional areas.

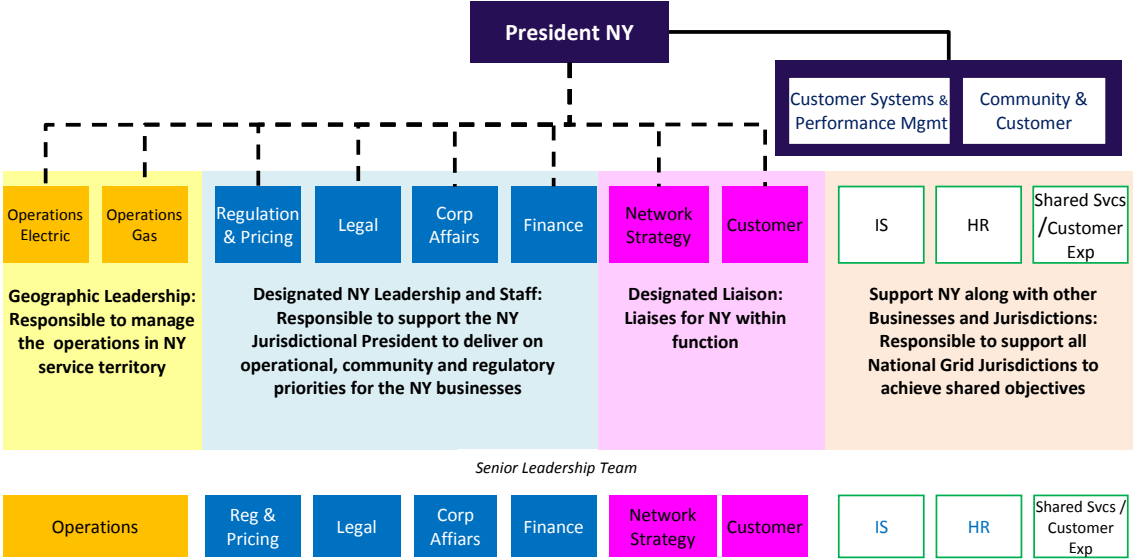
Exhibit I-1
NGUSA Jurisdictional Organization Model



¹ The President of NGUSA ServCo is also the SVP of NGUSA Shared Services – both positions reporting directly to the NGUSA President. Nearly all managers are employees of ServCo, including the President of NGUSA.



Exhibit I-2
New York Jurisdictional Organization Model



Source: DR 275

B. KEY AUDIT FINDINGS

During the conduct of this audit NGUSA was dealing with ongoing challenges arising from the implementation of the SAP enterprise resource planning (ERP) system that went operational in early November 2012 – nearly simultaneous with Superstorm Sandy. The US Foundations Program (USFP) developed to implement SAP has continued to impact the finance, accounting, payroll and operations functions, and has stressed the organization while it was also handling the execution of the audit. At the same time, NGUSA’s US Finance group was also dealing with the remediation of repeated findings of significant deficiencies and material weaknesses in financial reporting.

As NGUSA faced these issues it afforded NorthStar an invaluable window into NGUSA’s corporate governance and management decision-making processes, and led to the identification of opportunities for improvement across virtually every area of the audit.

NGUSA’s NY gas operations perform well overall in providing gas service in a reliable manner. However, the generally strong NY gas operations are handicapped by a number of corporate management issues, including:

- A very small management team that does not provide sufficient management hierarchy for objective oversight.
- Insufficient control or authority by the NY Jurisdictional President over NY operations.



- Administrative support functions that are focused almost exclusively on overall corporate financial performance, rather than providing information and analysis to support the utility operations which fundamentally drive that performance.
- An executive and senior management culture characterized by fraternal agreement, “good news” management, and a reluctance to speak out in opposition to the group.
- Ineffective governance with little objectivity and minimal authority.

These management themes and their impacts were evidenced throughout the organization in every area reviewed as part of the audit. The USFP and financial systems and reporting challenges are both largely the result of these pervasive management issues.

1. NGUSA’s current jurisdictional organization model does not yet meet the needs of NY gas customers.

- The matrix organizational structure does not provide effective management hierarchy (oversight) or authority over core utility functions and key support activities. The management culture is characterized as “fraternal”, more focused on “good news”, with a reluctance to speak out in opposition to the management group.
- Operationally, NGUSA functions, through NGUSA ServCo, as a single multi-state, unregulated utility.
- The NY Jurisdictional President has no functional direct reports, only limited staff resources and has to work through matrix relationships.
- The budgets are developed by ServCo at a functional level for all of NGUSA, allocated to operating companies and presented to, and in final form approved by, the NY Jurisdictional President.
- The “virtual utility” created by NGUSA’s jurisdictional organization model results in all but one of the NY Leadership team being members of the same ServCo organization. They are not employees of the NY gas companies nor do they have direct reporting responsibility to the NY Jurisdictional President. Therefore, the budgeting and financial management exercise is merely theoretical as service providers and clients are in fact the same.

2. The governance structure for NGUSA, ServCo and the NY gas companies offers little objectivity regarding decisions, and minimal authority.

- The NG-plc Board of Directors (BOD) consists of very talented, high quality individuals, with a number of independent directors in compliance with British corporate expectations. The NG-plc BOD is appropriately focused almost entirely on NG-plc level financial performance and global strategy, and relies on the US Executive Director (NGUSA President) for information and issues impacting or arising from US operations.



- Actions of the subsidiary BODs demonstrate limited decision-making and therefore limited accountability for results.
- The BODs for NGUSA, its subsidiaries and senior management are comprised of virtually the same individuals. All Directors but one are employees of ServCo and report to the NGUSA President. There are no outside or truly independent directors, from outside NGUSA or even from NG-plc or National Grid's UK operations.
- The NGUSA/ServCo executive and senior management group is a relatively small group of managers with overlapping roles and responsibilities. This relatively small group of managers controls at least four tiers of corporate enterprise and numerous operating entities.² It's not reasonable to think that they can adequately differentiate all their corporate roles.
- Boards below NG-plc are not fully functional and do not formally address matters of critical importance to the US operations, including:
 - Budgets and business plans were mentioned three times in five years in the BOD minutes.
 - USFP was mentioned four times prior to go live (related to sanctioning) and only once after go live.
 - Superstorm Sandy was mentioned three times, in November regarding the strong safety performance, and in January and February 2013, regarding costs and insurance coverage.
 - Significant deficiency and material weakness issues were not mentioned in the BOD minutes.
- Other than budget variances, financial issues that are critical at lower corporate levels, do not "roll-up" to higher levels such as the NG-plc BOD, therefore they do not receive sufficient levels of senior management attention.

3. USFP, Stabilization and Remediation efforts continue to undermine US Finance.

- Pre-implementation, NGUSA did not benefit from the rest of the industry's SAP lessons learned. NGUSA did not use vendors with a strong track record of US utility industry experience in SAP platform implementation and to date has had almost no interface with other US utilities that implemented SAP.
- While problems with system and company readiness were identified by particular groups within NGUSA prior to implementation, that information was subsumed by a push to go live. The overly optimistic risk scoring and executive expectations for USFP in its early stages continues with stabilization work.
- During the initial SAP development process, there was minimal interaction with operations personnel regarding desired information or reports. USFP implemented a

² See Exhibit II-1 and Exhibit III-5



complex field time reporting system without investigating its feasibility given how work is actually performed.

- Even after SAP implementation, NGUSA's approach to management reporting relies heavily on complex Excel spreadsheets, an approach that is both labor-intensive and subject to errors.
 - The financial reporting material weakness issues which persisted over a number of years are also evidence of financial control issues. Despite information from internal sources and the independent auditors to the contrary, no problems with financial controls were identified in several internal Sarbanes-Oxley (SOX) and Internal Audit Department (IAD) reviews.
 - NGUSA has operated without detailed budgets for the better part of two years thereby limiting management's ability to make informed financial and operational decisions.
- 4. NG-plc has accepted financial responsibility for USFP/SAP issues that exceed program plans provided to and accepted by the PSC. These costs are significant, and careful documentation and review will be required to assure they are not passed on to ratepayers.**
- NGUSA presented its SAP business case justification to the PSC in the recent NMPC rate case (12-E-0201 and 12-G-0202). The information was provided in the direct testimony of the Information Services Panel.³ The lack of clear definitions and cost tracking in its business case makes it difficult to determine allowed costs.
 - Operating and depreciation expenses are projected to increase dramatically from recent levels, both in areas categorized as SAP-related and for other IS initiatives..
 - Even with NG-plc stockholders accepting the USFP/SAP overrun costs, the growth in NGUSA IS depreciation expenses combined with the recent and projected Finance/IS/ Corporate Cost Center operating expenditures is extraordinary.
- 5. Service Level Agreements (SLAs) presented to the PSC in September 2013 do not provide sufficient controls to meet the needs of the NY Jurisdictional President, the PSC or NY ratepayers.**
- SLAs are not the result of arms-length transactions, and are not market based. Presently, there are no consequences from the ServCo under/over spending, delivering less than planned work or reallocating costs among functional areas.
 - Lacking true SLAs between individual NY gas companies (or collectively the NY jurisdiction) and ServCo prevents the NY Jurisdictional President from directly controlling costs, services or quality, or imposing penalties for non-performance.

³ DR 525 page 32 at line 12



- The individual functions that provide services are budgeted each year in aggregate and provide the NY gas companies with a set budget figure, allocated from the functional budget amount. Any challenge of costs or level of service may occur at the senior management level but amounts to little more than cost-leveling and reallocations among the numerous regulated utilities.
- Regulatory oversight is relegated to ratemaking as ServCo is not regulated by the PSC.

The governance and organizational challenges summarized above impact almost all functions that provide service to the NY gas utilities. Their resolution is critical to the ability of NGUSA to provide the best service to its gas customers, and to the PSC's ability to regulate the provision of that service. At the same time, the audit identified a range of issues and opportunities for improvement in the other functional areas included in the audit's scope of work. Selected findings from other areas of the audit are summarized below.

- While the reliability and safety of NGUSA's NY gas system are good, weaknesses in the conversion of capital plans to work plans, lack of compliance with the Project Management Playbook and the unavailability of performance data at the right organization levels make it difficult for NGUSA to identify and resolve inefficiencies in the field operations and construction areas. (Discussed in Chapters V, VI, and VII.)
- Because there is no long term strategic plan for NGUSA in total or for the NY gas utilities, initiatives and management and operational priorities are established without a guiding framework. Evaluation of jurisdictional, operating company and management performance is based on short term activities. (Discussed in Chapters III and XI.)
- In the Energy Procurement area, the lack of structured review of short-term gas supply decisions and metrics to measure procurement performance, and inconsistent documentation of long-term decisions limit opportunities to identify and pursue process and performance improvement activities. (Discussed in Chapters VIII and IX.)

The audit findings and conclusions led to 31 recommendations for improvements in organization, operations, processes, and documentation. The recommendations are listed in the next section, with additional details provided in the chapters.



C. SUMMARY OF RECOMMENDATIONS

Chapter	#	Recommendation
III	1	Reconstitute the NGUSA BOD by: 1) limiting the number of members who are also part of the US Executive Team, NGUSA Officers and Senior Managers to no more than two; 2) appointing at least one qualified truly independent Director who is not employed by any National Grid company; 3) filling the remainder of Director seats with either NG UK or NG-plc executives, or other independent, qualified individuals. Define the roles and responsibilities of the NGUSA BOD to include those typical of a corporate BOD, including review of financial performance and external auditor reports, review of risks, approval of both capital and operating budgets, and the ability and expectation to challenge and reject recommended projects and actions.
III	2	Reconstitute the BODs for KEDLI, KEDNY, and NMPC by: 1) limiting the number of members who are part of the New York Jurisdictional team, regardless of reporting relationship, to no more than one Director; and 2) filling the remaining two Director positions with executives from the other US jurisdictions or NGUSA who do not have responsibilities for New York operations. Define the roles and responsibilities of the subsidiary boards to include review of operating and financial performance, review of relevant external auditor statements, approval of service levels and budgets (e.g., SLAs), and approval of specific plans impacting their service territory, such as rate filings, major capital projects, and significant customer programs.
III	3	Continue to evolve the Jurisdictional organization model to establish a clear command and control structure for the NY Jurisdictional President, as described by NGUSA executives during the audit. (Details in chapter)
III	4	Establish a Chief Risk Officer within the NGUSA organization, reporting to the President NGUSA, with responsibility and appropriate authority for coordinating, reviewing and challenging the results of all the various risk assessment groups, including the CRT, the CET/SOX compliance, Ethics and Compliance, and IAD to identify risk trends, track and manage financial and operating risks with materiality below NG-plc levels, and monitor that the plans prepared by the risk owners are appropriate and represent the best cost solution. (Details in chapter)
III	5	Prepare a true strategic plan for NGUSA's New York operations to serve as a road map for investments, programs and operations in the state. The strategic plan should build on the state energy policy and Connect21 whitepapers and incorporate other PSC, state and federal energy and regulatory initiatives. The initial strategic plan should be presented to the NGUSA BOD and the PSC within six months, and should be updated and presented annually thereafter.
III	6	Conduct, or contract with qualified outside auditor for, an investigation into the cost impacts of the LIPA separation on remaining NY operating company ratepayers, and provide a report to the PSC staff within six months. (Details in chapter)
IV	1	Prepare a report for submittal to the PSC staff within six months that fully documents the capital and O&M costs associated with USFP, USFP Stabilization, Finance Remediation and other financial and IS system related initiatives so that ratepayers are protected from SAP-related costs in excess of levels agreed upon in the previous NMPC and KEDNY rate cases (and for KEDLI by default). (Details in Chapter)



Chapter	#	Recommendation
IV	2	Develop improved SLAs to govern the relationship between the jurisdictional operating companies and ServCo. For products and services provided to NYS utilities from ServCo, SLAs must emulate commercial agreements and should include: <ul style="list-style-type: none"> - Improved dialogue among the various National Grid management teams. - Detailed metrics addressing product and service units, volumes provided, timeframe, quality and unit prices. - Tracking mechanisms including quantifiable and meaningful KPIs - Standardized reports across all NGUSA entities - Enforcement via payment only for product and service units actually provided - Jurisdictional management authority to terminate and change service providers.
V	1	Develop an integrated natural gas system-wide plan. The system plan should include all reliability work, mandated replacements, growth projects and system planning work identifiable over a five-year period. (Details in chapter)
V	2	Update the companies' IMPs in § Part 192.911. (Details in Chapter)
V	3	Update procedural documentation/manuals to comply with § 192.614 and § 192.615. (Details in chapter)
VI	1	Address deficiencies identified in the Project Management group's adherence to the Playbook project documentation requirements. This should include: <ul style="list-style-type: none"> - Update the Project Management Documentation Policy to identify the requirements and responsibilities for records management on project-managed projects, - Continue periodic audits of project files by Internal Audit or an external auditor.
VI	2	Develop an estimating program for gas projects that is consistent with that used for NGUSA's electric utilities.
VI	3	Implement a WBS system to organize and manage gas projects as part of the implementation of Primavera P6.
VI	4	Institute a process to track, monitor and report complex project status, including: budget variances, committed costs and actual costs to date, estimated cost at completion, projected year-end expenditures, schedule variance, pending and approved scope changes, and progress-to-date.
VI	5	Institute controls to ensure project change control logs are updated on a timely basis and that accurate change order information is contained in the Project Summary Reports. Include a review of the change order logs and the change order portion of the Project Summary Report as part of the periodic audits of project files recommended in Recommendation VI-1.
VI	6	Resolve data issues regarding the KPIs for materials services and the fleet metrics reports.
VII	1	Develop and implement, within the existing work management processes and systems, a program to track and manage crew and individual worker productivity. (Details in chapter)
VII	2	Develop a manpower planning program. (Details in chapter)
VIII	1	Establish a process to retain day-ahead forecasts of send out volumes, and of weather and other input assumptions for each of the operating companies. On a regular basis, conduct comparisons of forecast to actual send out volumes under forecast and actual weather conditions. Develop a process for assessing and reporting on the performance of the day-ahead model.
VIII	2	Re-evaluate the residential forecasting model to identify opportunities to improve accuracy in forecasting during warm winters and to reduce variations from year-to-year in forecast results.



Chapter	#	Recommendation
VIII	3	Due to the complexity of the forecasting platform, improve reporting of forecast results and model performance on a level that is easily understood by upper management, internal customers and users, and outsiders. Examples include forecasts of number of customers by rate class, sales by rate class, separate reporting of firm vs non-firm customers, and reporting accuracy.
VIII	4	Analyze the treatment of energy efficiency goals in the sales, send out and design day forecasting processes and models to identify opportunities to improve accuracy and minimize impacts of over-forecasting future savings. In collaboration with PSC staff, determine an appropriate approach for handling energy efficiency program goals and achieved savings in future modeling.
IX	1	Modify policies and procedures regarding the documentation and approval for the procurement of long-term supply and delivery commitments (longer than one year). (Details in chapter)
IX	2	As part of the annual gas supply plan submitted to the PSC, or in a separate filing, specifically document the five-year supply/demand balance and capacity plans. For capacity contracts that are up for renewal during the five-year planning horizon, provide a discussion of the current expectations regarding those plans. If the long-term supply portfolio review, including contracts not expected to be renewed, shows the need for new capacity to meet design day requirements, provide information on options being explored. Update information provided in previous plans regarding new capacity and capacity renewals.
IX	3	Add a representative from the Energy Procurement group to the NY Leadership Team as a regular full participant.
IX	4	Modify policies and procedures covering the monthly and daily procurement forecasting and “set up” processes for each of the operating companies. (Details in chapter)
IX	5	Develop a gas supply performance review process, including a monthly metrics scorecard and associated reporting that assesses the overall performance of the Energy Procurement group in managing the gas supply portfolio. (Details in chapter)
IX	6	Conduct a thorough investigation of the allocation and assignment of costs, particularly labor costs, from Energy Procurement to the NY gas utilities to identify the reasons for the NY Gas utilities receiving an apparent disproportionate share of costs. Verify that costs charged to the NY gas utilities by other parts of the Customer functional areas, including the Analytics Modeling and Forecasting group that prepares the forecasts used for gas supply planning and procurement, are appropriate and supportable. Modify cost assignments, time reporting and allocation procedures to resolve any identified inconsistencies. Document the results of the investigation and resulting recommendations to the PSC within six months.
X		No Recommendations
XI	1	With the FY 2016 planning cycle (beginning in FY15), modify the performance management process to replace Elevate 2015 and better align NG-plc, NGUSA, NY jurisdiction, and NY Operating Company goals and objectives with a more robust set of performance metrics. (Details in chapter)
XI	2	Continue to evolve the SLAs to include additional KPIs addressing each of the major functions performed, include measures of efficiency, cost-effectiveness and unit costs, provide greater budgetary detail, include financial penalties for failure to achieve performance targets, relate the service company employee performance evaluation process to the SLAs, require more frequent reporting, incorporate the results of the benchmarking exercises, and improve performance targets.



II. AUDIT BACKGROUND

On February 13, 2013, the New York Public Service Commission (PSC or Commission) issued a Request for Proposal (RFP) in Case 13-G-0009 for consultants to perform a Comprehensive Management and Operations Audit of National Grid USA's (NGUSA) gas utilities operating in New York State (NYS). NorthStar Consulting Group, Inc. was selected to perform the audit in June 2013.

The New York gas companies consist of the gas operations of Niagara Mohawk Power Company (NMPC) acquired by National Grid in 2002 (Case 01-M-0075), The Brooklyn Union Gas Company (KEDNY), and KeySpan Gas East Corporation (KEDLI) both purchased by National Grid in 2007 (Case 06-M-0878). Collectively KEDLI, KEDNY and NMPC are referred to as the New York gas companies.

This audit provides the opportunity to gain valuable insight into National Grid's operations and management. The audit has been conducted in a constructive manner, characterized by frank and open discussion of findings, conclusions and recommendations. NorthStar's final report provides a comprehensive, independent and objective evaluation of current performance, specifically with respect to National Grid's construction program planning and execution, and related processes, and provides recommendations for performance improvements.

A. NATIONAL GRID OVERVIEW

National Grid plc (NG-plc), an international electric and gas company, was incorporated on July 11, 2000, and is headquartered in London, England. NG-plc's business segments include UK Transmission, UK Gas Distribution, US Regulated and "other" activities. NG-plc owns the electricity transmission system in England and Wales and is the national electricity transmission system operator, responsible for both the English and Welsh transmission systems and for the two high voltage transmission networks in Scotland, which it does not own.

National Grid North America Inc. (referred to as NGNA), formerly National Grid Holdings Inc., is a Delaware corporation that was created on May 16, 2001 to finance acquisitions in the US. NGNA is an indirectly-owned subsidiary of NG-plc. NGNA is the intermediate holding company of NGUSA and acts as a funding company on behalf of the NG-plc for certain subsidiaries' borrowings.

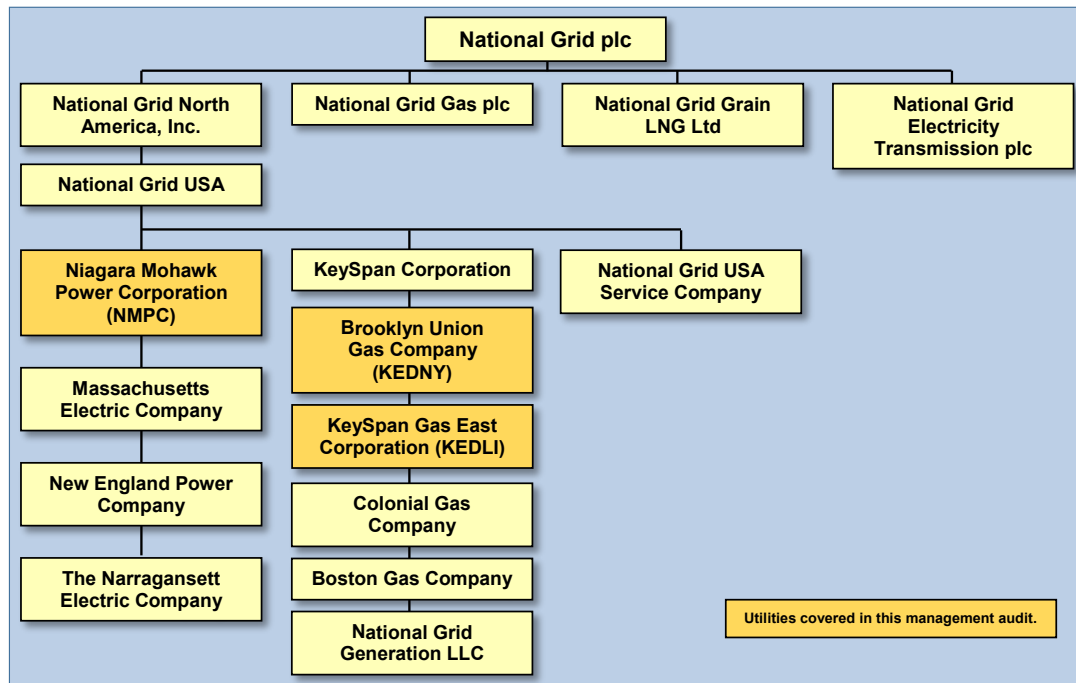
NGUSA is a public utility holding company with regulated subsidiaries engaged in the generation of electricity and the transmission, distribution and sale of both natural gas and electricity in the US. NGUSA's gas operations in the US provide services to approximately 3.5 million customers in upstate New York, New York City, Long Island, Massachusetts and Rhode Island. In FY2013, NGUSA represented 56.6 percent of NG-plc's revenue, and the NYS gas businesses comprise 25.9 percent of the US revenue. NGUSA's gas operations



have primary offices in Brooklyn, Hicksville, Syracuse, and Albany, New York and in Waltham, Massachusetts.

Exhibit III-1 provides an overview of the corporate structure.

Exhibit II-1
Overview of Relevant National Grid Corporate Structure



Source: <http://investors.nationalgrid.com/debt-investors/group-structure.aspx> and various DR responses.

NGUSA's wholly-owned New England subsidiaries include:

- New England Power Company
- The Narragansett Electric Company
- Massachusetts Electric Company
- Nantucket Electric Company
- Boston Gas Company
- Colonial Gas Company.

NGUSA's wholly-owned New York subsidiaries include:

- NMPC
- National Grid Generation, LLC
- Brooklyn Union Gas Company/KEDNY
- KeySpan Gas East Corporation/KEDLI.

NGUSA also owns a number of related businesses, such as Liquefied Natural Gas (LNG) storage and gas transmission pipelines. National Grid LNG owns a 600,000 barrel LNG



facility in Providence, Rhode Island. NGNA's consolidated financial statements also include a 26.25 percent interest in Millennium Pipeline Company LLC (Millennium) and a 20.4 percent interest in Iroquois Gas Transmission System.

On July 3, 2012, NGUSA sold its New Hampshire electric and gas distribution businesses (Granite State Electric Company and Energy North Natural Gas Inc.) to Liberty Energy Utilities (New Hampshire) Corp., a subsidiary of Algonquin Power & Utilities Corporation. Seneca-Upshur Petroleum, Inc. (Seneca), a National Grid subsidiary engaged in gas production and development activities primarily in West Virginia, was sold in October 2011.¹

Historically, certain of NGUSA's subsidiaries provided services to the Long Island Power Authority (LIPA) under the following contractual arrangements.

- The Management Service Agreement (MSA), which expired on December 31, 2013, provided operation, maintenance, construction and significant administrative services relating to LIPA's electric transmission and distribution system. In January 1, 2014, the contract transitioned to Public Service Enterprise Group Long Island LLC (PSEG-LI). Pursuant to the MSA, NGUSA provided transition assistance.
- The Power Supply Agreement (PSA) provides LIPA with electric generating capacity, energy conversion and ancillary services from NGUSA's Long Island generating units. In 2013, the PSA was extended for a new fifteen year term.
- The Energy Management Agreement, which expired on May 28, 2013, provided for management of all aspects of the fuel supply for NGUSA's Long Island generating facilities.

New York Gas Operations

In FY2013 the NY gas utilities - KEDLI, KEDNY and NMPC - served approximately 1,920,000 natural gas customers in three defined service territories that include parts or all of nineteen New York counties. NMPC's NY gas distribution territory is shown in **Exhibit III-2**. The gas distribution territory of KEDNY and KEDLI are shown in **Exhibit III-3**.

¹ National Grid North America Inc. and Subsidiaries (formerly National Grid Holdings Inc.) Consolidated Financial Statements For the years ended March 31, 2013 and March 31, 2012
(<http://investors.nationalgrid.com/~media/Files/N/National-Grid-IR/reports/ngy/ngy13-ngna-march-2013.pdf>)



Exhibit II-2
NMPC – NY Natural Gas Distribution Service

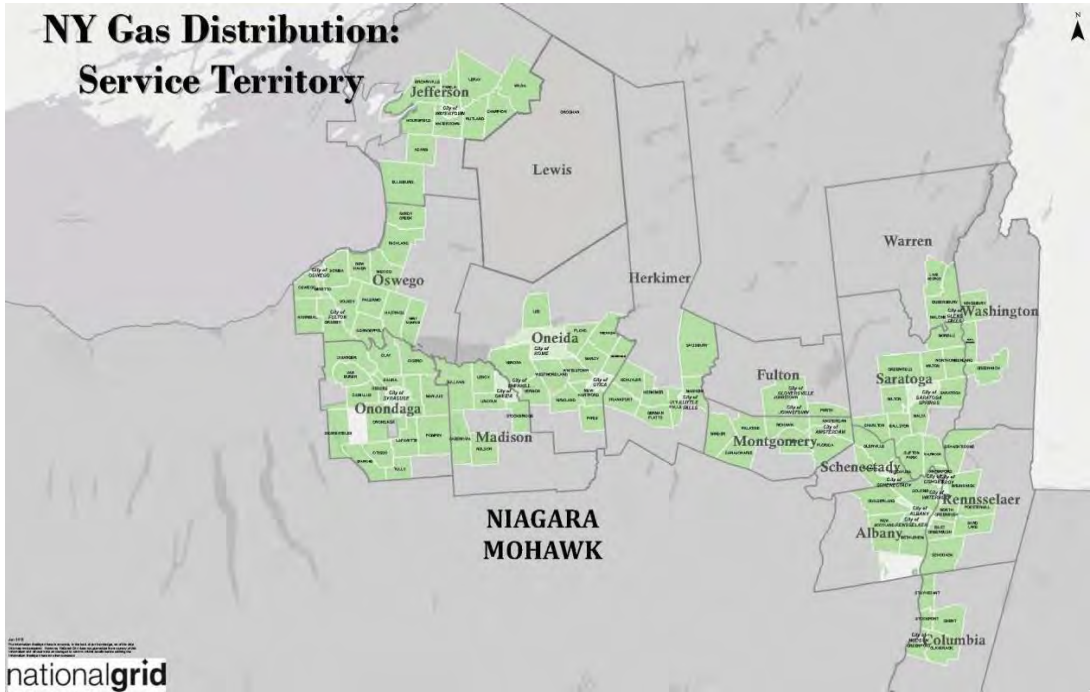


Exhibit II-3
KEDNY and KEDLI Natural Gas Distribution Service



KEDLI, KEDNY and NMPC operate under three distinct tariffs, but do not operate as traditional stand-alone utilities. Most employees providing services to National Grid's customers are employees of National Grid USA Service Company, Inc. (ServCo). ServCo is the actual organization providing support and services to all the utilities that are part of NGUSA, including the three NY gas utilities.

In January 2011, National Grid announced a new US organization structure which would transition from its then existing global line-of-business (LOB) organization, instituted in 2007, to a more state-focused management structure. The LOB structure was aligned to NG-plc's three core international businesses: electricity distribution and generation, natural gas distribution, and electricity and gas transmission. Under the LOB structure, gas distribution operations in the US reported to an executive in the UK, while electric distribution operations reported to an executive located in the US. Under the new structure, the President of NGUSA assumed responsibility for all US business segments. Regional presidents were appointed for each of the states, including NY, and were charged with responsibility for managing the relationships with state regulators and the Federal Energy Regulatory Commission (FERC).² Under this "jurisdictional model", the NY Jurisdictional President has a small staff of direct reports and interfaces through a team of matrix reports with ServCo regarding the services it provides to the NY utilities. These services include:

- Network Strategy
- Operations
- Procurement
- Safety, Health and Environmental (SHE)
- Strategy, Business Development & Technology
- Legal
- Regulation and Pricing
- Finance
- Audit
- Corporate Affairs
- Customer
- Human Resources
- Information Services & Security
- Shared Services

Prior Audits

National Grid has been the subject of a number of prior audits that are referred to throughout this report. In 2009, NorthStar completed a comprehensive management and operations review of NMPC's electric operations for the PSC. The audit addressed the eight elements of the feedback loop: corporate mission, objectives, goals and planning; load forecasting; supply procurement; system planning; capital and operations and maintenance (O&M) budgeting; program and project planning and management; work management; and, performance and results management. NorthStar's report set forth 44 recommendations aimed at promoting improvement in NMPC's operations. As part of the audit, NorthStar

² http://www.nationalgridus.com/aboutus/a3-1_news2.asp?document=5803



recommended an organizational realignment to provide greater visibility into NMPC's operations.

In 2010, the PSC commenced an independent audit of affiliate cost allocations, policies and procedures of NGUSA as applied to its New York companies, ServCo and other affiliates. The audit was driven by two primary concerns:³

- NorthStar's 2009 audit determined that National Grid had no effective means of managing and controlling the level and costs of services provided by its affiliate service providers.
- In the 2010 NMPC electric rate case, the Department of Public Service (DPS) Staff presented testimony detailing alleged internal control deficiencies, misallocation of costs and questionable transactions included in service company charges to NMPC. These inaccurate cost allocations were reflected in the rates that the company had proposed, and, if no other adjustment had been made, would have been reflected in the 2011 revenue requirement.

The PSC audit was conducted by Overland Consulting (Overland) and provided 10 recommendations primarily related to the accounting systems and internal controls of the National Grid service companies, their allocation of costs, and the New York utilities' control and monitoring of these costs.

In September 2010, National Grid commissioned Liberty Consulting Group (Liberty) to conduct a comprehensive review of its cost allocation process. Liberty was hired following questions about National Grid's cost allocation processes which surfaced during the upstate New York electricity and Massachusetts gas rate cases in August 2010. After a five month review, Liberty issued its final report including recommendations on National Grid's US accounting systems and practices, an increased focus on financial reporting by jurisdiction rather than by line of business, improving controls and training related to cost allocation, and moving toward a single, consolidated financial platform and cost allocation methodology.⁴

On January 17, 2013, the PSC ordered National Grid's New York utilities to implement certain recommendations from the Overland audit intended to enable more active management and control of service company costs, including periodic competitive benchmarking of the costs of services purchased from affiliates to the cost of obtaining the services from alternative sources. The PSC also commenced a new proceeding to determine if adjustments to the rates charged by the New York utilities were necessary as a result of misallocated charges for services rendered by affiliated service companies.⁵

³ [http://www3.dps.ny.gov/pscweb/WebFileRoom.nsf/Web/D5EE876B45915A9E85257AF6005D3FBE/\\$File/pr13004.pdf?OpenElement](http://www3.dps.ny.gov/pscweb/WebFileRoom.nsf/Web/D5EE876B45915A9E85257AF6005D3FBE/$File/pr13004.pdf?OpenElement)

⁴ <http://www.nationalgrid.com/annualreports/2011/operating-and-financial-review/operating-environment/regulatory-environment/regulatory-environment---us-regulation.html>

⁵ Fact verification July 15, 2014



B. SCOPE AND OBJECTIVES

The audit scope is based on a framework of a series of elements or functions which can be viewed as a feedback loop. This framework begins with the element of Corporate Mission, Objectives, Goals and Planning and ends with Performance Measurement. In addition to the elements of the feedback loop, the audit scope also included “Information Systems”. The feedback loop typically facilitates changes and improvements that will result in better performance. NorthStar’s audit assessed National Grid’s efficiency and effectiveness in meeting its performance goals and the extent to which there are opportunities for improvement.

This audit scope included the following nine elements:

- Corporate mission, objectives, goals and planning
- Load forecasting
- Supply procurement
- System planning
- Capital and operations and maintenance (O&M) budgeting
- Program and project planning and management
- Work management
- Performance and results management
- Information systems

This report presents NorthStar’s observations, findings and conclusions, and related recommendations for improvements as of the time of the audit. The term “currently” when used in the report should be interpreted to mean “as of the time of the audit technical review”, which was completed by March 31, 2014.

C. METHODOLOGY

NorthStar prides itself on performing independent and objective management audits. In this context, we planned and conducted the audit to maximize DPS Staff participation, and worked closely with the DPS project manager and National Grid throughout the engagement.

The RFP and proposal identified a time schedule for the audit assuming a start date of July 10, 2013, submission of a draft report in March 19, 2014 and final report on or before April 16, 2014. The schedule was subsequently modified, with the initial Draft Report submitted to the Staff on May 9, 2013. A Fact Verification and Confidentiality review was performed by National Grid during June and July and the Final Report was submitted to the DPS on July 25, 2014.

The audit was conducted in three phases:

- Phase I. Orientation and Planning
- Phase II. Technical Review and Customer Benefit Analysis (CBA) Development
- Phase III. Report Development



Phase I. Orientation and Planning

The objectives in the first phase of the audit were to confirm our understanding of the audit objectives and scope and the DPS' expectations from the audit; finalize contractual, project management and other administrative matters; perform preliminary data collection; and develop and obtain approval of our detailed work plan which guided our activities during the remainder of the audit. Work activities included in this phase were:

- Finalized logistical and contractual arrangements with DPS Staff and National Grid. Specifics regarding project logistics, key contacts, interfaces, schedules and communications were established as well as agreement on protocols for the audit, including the following:
 - Procedures for requesting and tracking interviews and documents.
 - Working paper and documentation requirements.
 - Procedures for adhering to auditing standards.
 - Policies and procedures for treating confidential information.
 - Quality control and reporting procedures.
- Met with DPS Staff to discuss any concerns regarding National Grid and any additional issues or areas to be considered, and further explored the Staff's objectives for the audit.
- Reviewed responses to initial document requests.
- Attended a National Grid orientation presentation and conducted initial interviews.
- Prepared the final work plan and obtained DPS approval. The work plan was approved on October 28, 2013, and included detailed evaluative criteria, tasks, activities, consultant assignments and hours, and a revised audit schedule.

Phase II. Technical Review and CBA Development

In this phase, the audit team performed its principal investigation, data collection and other technical review activities for each of the audit elements. In general, our audit tasks and activities included the following:

- Review and analysis of documents and other data requested from National Grid.
- Interviews with appropriate National Grid personnel.
- Field observations.
- Testing for compliance with National Grid, industry and other standards.

NorthStar's audit activities included more than 700 information requests and over 200 interviews. In formulating conclusions, the audit team focused on substantive issues. National Grid's management practices were evaluated against existing rules and regulations as well as sound, generally accepted business practices. We applied a standard of reasonableness which regulators and courts have accepted in a wide range of evaluations of management performance, that is, one that does not require perfection, is not based on



outcomes, and does not rely on hindsight. The audit conclusions reflect areas where National Grid is appropriately managing as well as areas where improvement is required.

During this phase NorthStar also developed CBAs for each of the audit recommendations. The CBAs provide a detailed description of the expected costs and benefits resulting from the implementation of NorthStar's recommendations, and, where applicable, a five-year payback analysis. Capital and O&M costs are separately identified and include: labor costs, outside services, materials and equipment, systems and other costs. Some recommendations may result in modifications to existing practices and do not result in increased costs. Benefits may include: increased productivity, improved reliability, reduced expenses, reduced capital requirements, reduced full time equivalents (FTEs) – internal labor or contractors, improved practices and processes, improved schedule adherence, improved work quality, optimized organization, or improved analytics. While all recommendations have defined benefits, not all have readily quantifiable cost savings. The CBAs were submitted to National Grid for review and validation of the costs and other assumptions.

Phase III. Report Development

Upon completion of the audit field work and analyses, NorthStar prepared draft and final reports. A preliminary draft report was prepared and submitted to the DPS project manager for review and comment on May 9, 2013. The report included an executive summary, a description of the audit process, and completed chapters that addressed each of the audit topic areas. Each of these focused chapters included an overview, evaluative criteria, findings, conclusions and recommendations. Preliminary CBA forms were submitted separately to the DPS project manager on May 16, 2014. Based on feedback from the DPS Staff and fact verification by National Grid, NorthStar prepared and submitted a Final Draft Report to the DPS project manager July 25, 2014.

D. ORGANIZATION OF THE REPORT

The report is organized to provide an orderly flow of topics and conclusions that reflect the issues identified by the audit, rather than by the ordering of the elements in the feedback loop. The remainder of the report is organized as follows:

- Chapter III: Governance and Executive Management
- Chapter IV: Capital and O&M Budgeting
- Chapter V: System Planning
- Chapter VI: Project Management
- Chapter VII: Work Management
- Chapter VIII: Load Forecasting
- Chapter IX: Supply Procurement
- Chapter X: Customer Information Systems
- Chapter XI: Performance Management



III. GOVERNANCE AND EXECUTIVE MANAGEMENT (ELEMENT 1)

This chapter addresses corporate mission, objectives, goals and planning. Much of the discussion in this chapter focuses on the governance and organization of National Grid as it relates to the New York gas utilities within the National Grid corporate structure provided in **Chapter II – Audit Background**. In addition, this chapter examines three of the key responsibilities of a corporation's management and Board of Directors (BOD): strategic planning, risk management, and internal controls.

A. BACKGROUND

Effective executive management and governance have the following attributes:

- An experienced and knowledgeable BOD with appropriate committees to provide effective oversight and direction.
- Top management with the right number of people with the right skills.
- A proper organizational focus and direction supported by effective corporate planning.
- Effective communications among executives on important business, legal and regulatory issues and comprehensive reports on cost and performance results.

For public companies, the BOD provides overall guidance, direction and oversight of the management of the company, and impartial review of management decisions. The value of a BOD is maximized by the presence of independent Directors not associated with the corporation. Independent Directors provide an outside view of the company and can add business perspective and offer suggestions from other industries. Often independent Directors are retired or senior executives from similar sized firms in the same industry, supplier industries and key customer groups or from financial or legal backgrounds where they have a breadth of industry experience. Many companies with a strong tie to specific communities include community or regional non-profit leaders on their boards to provide adequate representation of the needs of their customers on the BOD.

Generally, BOD responsibilities include oversight of three major business areas: operations, decision-making and innovation.

- Operational management focuses on performing the work and producing expected results. Operational oversight therefore includes approval of operating and capital budgets as well as the issuance of financial instruments.
- Decision-making responsibilities include directing performance, goal setting and maintaining the course of the business.
- Innovation provides the vision for the future of the enterprise.



Subsidiary corporations of a larger entity must have a BOD to fulfill their legal responsibilities. Subsidiary boards often are comprised entirely of inside Directors, typically the senior management of the subsidiary itself, the parent company, or other subsidiaries. Subsidiary boards generally meet infrequently, often by phone, and engage in limited discussions, taking action by consensus so the item can be moved up to the parent BOD.

Strategic planning provides a roadmap of a company's overall direction and plans for the future, and how it expects to achieve that future. A company's strategic planning process should include identification of industry and economic trends, development of tactical/operational plans, and budgeting and financial planning. A strategic planning process can be a highly structured and complex process, involving outside consulting resources and detailed data collection, modeling and outputs. This level of sophistication is not essential and there are many possible methods that organizations can use to develop quality strategic plans. Successful strategic planning requires clear and strong leadership from both the Executive and the BOD, an active process to involve and obtain input from all parts of the organization, ongoing corporate commitment to the plan and explicit monitoring of progress towards the goals.

Enterprise Risk Management (ERM) is the process through which a corporation's BOD and management teams identify the risks faced by the company, quantify and prioritize those risks, and proactively undertake activities to mitigate or manage those risks. Typically, the mechanism used to identify and monitor risks and risk-mitigation strategies is referred to as a "risk matrix." Organizations will and should pursue a variety of risk mitigation strategies depending on the size, type and potential impact of the various risks. For example, organizations may purchase insurance policies against the risk (the traditional risk management approach), introduce processes and training to protect against the event occurring (e.g., field safety protocols and training), develop contingency plans (e.g., for storm response), require credit checks to verify suppliers capabilities to deliver, purchase financial hedges, or any number of other activities to protect the organization against risks. Some risks may be determined to be so minor to the organization, or have such a low probability of occurrence, that the organization simply monitors the risk for any changes. For organizations that provide essential services, such as utilities, ERM should become part of the corporate culture, with risk considerations embedded in all that is done within the organization. As in any organization, the risks – financial and operational – associated with decisions and the options for managing those risks should be a clear part of corporate decision-making.

The relationship between the elements of corporate planning and planning horizons is illustrated in **Exhibit III-1**.



Exhibit III-1
Strategic Planning Components

Planning Horizon	Overall Direction	Qualitative Factors	Quantitative Factors	Performance Management
Near-Term Operational Plan (12-18 months)	Corporate Mission & Vision	<ul style="list-style-type: none"> Tactical Plans 	<ul style="list-style-type: none"> Operating Budgets 	<ul style="list-style-type: none"> Annual Targets
Mid-Term Business Plan (2-5 years)		<ul style="list-style-type: none"> Likely challenges Have-to and want-to activities Multi-year projects 	<ul style="list-style-type: none"> 5-year capital plan Net income projections Financing plans 	<ul style="list-style-type: none"> Measurable progress towards meeting mid-term objectives
Long-Term Strategic Plan (5-10 years)		<ul style="list-style-type: none"> Industry and market trends Strategies to reach desired future 	<ul style="list-style-type: none"> Strategies to meet large future needs 	<ul style="list-style-type: none"> Assure current goals consistent with future strategy

Source: NorthStar Consulting Group, Inc.

In 2012, National Grid had the following Vision Statement:

We...will be the foremost international electricity and gas company, delivering unparalleled safety, reliability and efficiency, vital to the wellbeing of our customers and communities. We are committed to being an innovative leader in energy management and to safeguarding our global environment for future generations.¹

In 2013, National Grid adopted the following concise statement of the corporate vision:²

Connecting you to your energy today, trusted to help you meet your energy needs tomorrow.

National Grid's vision has been translated into a six part strategy:³

To be a recognized leader in the development and operation of safe, reliable and sustainable energy infrastructure to meet the needs of our customers and communities and to generate value for our investors we will:

- Deliver operational excellence – achieve excellent levels of safety, reliability, security and customer service.
- Engage our people – Create an inclusive, high performance culture by developing all our employees.
- Stimulate innovation – Promote new ideas to work more efficiently and effectively.
- Engage externally – Work with external stakeholders to shape UK, EU and US energy policy.

¹ Attachment 11 to DR 99

² DR 98

³ DR 98. In 2012 the strategy has only the first four of these six elements (Attachment 11 to DR 99).



- Embed sustainability – Integrate sustainability into our decision making to create value, preserve natural resources and respect the interests of our communities.
- Drive growth – Grow our core businesses and develop future new business options.

NGUSA initiated its “Elevate 2015” program as a separate, but related strategy framework for the US operations. The four pillars of Elevate 2015 are:⁴

- Safety and Reliability
- Customer Responsiveness
- Stewardship
- Cost Competitiveness

Elevate 2015 has served as the framework for monitoring performance at the NGUSA functional level and for individuals, as is discussed in **Chapter XI – Performance Measurement**.

B. EVALUATIVE CRITERIA

The Evaluative Criteria for Element 1 cover a broad range of corporate and executive management areas, from the BOD to risk management and the impact of the loss of the LIPA contract. For National Grid it is necessary to assess these criteria at all levels of the corporation – NG-plc, NGUSA, and each of the three gas utilities that are the focus of this audit. In addition, it is necessary to include ServCo and the organizational structure established by NGUSA to manage the New York utilities (NY Jurisdiction).

The Evaluative Criteria include the following:

- Can the National Grid Gas New York management structure effectively influence corporate decision-making within National Grid USA?
- Has National Grid USA’s organizational restructuring addressed previous audit recommendations and have communication paths and executive reporting effectiveness been improved?
- Are the needs of New York ratepayers discretely and adequately addressed as a product of the organizational restructuring?
- Are the governance, organizational structure, missions and relationships within National Grid Gas appropriate, particularly as they relate to the construction program planning process?
- Is the level and type of involvement and communication between National Grid USA, the New York Jurisdictional management and the Operating Companies appropriate and does it provide sufficient representation of regional issues and protection of specific ratepayer interests?
- Are the processes and controls governing affiliate relationships and transactions between National Grid Gas, its operating companies, National Grid USA, and

⁴ Initial presentation to NorthStar, August 20, 2013.



National Grid Service Company appropriate and do they provide sufficient protections to NYS ratepayers?

- Are National Grid Gas' Enterprise Risk Management (ERM) programs and processes sufficiently robust, and do they incorporate an expected level of detail and type of risk?
- Does National Grid Gas and National Grid USA comply with procedures and practices related to the scope of the audit, e.g., internal controls, internal audit function and the Sarbanes-Oxley Act (SOX)?
- Are organizational responsibilities for planning priorities and budgeting allocations appropriate for each NYS gas business?
- Has National Grid USA developed an appropriate approach to competitive issues for new customers and markets such as natural gas expansion, natural gas vehicles, and in response to national, state and local regulatory trends?
- Does National Grid USA give adequate consideration to new markets, how would the costs for entry into these markets be funded, and would entry into those markets help or hinder competition?
- Will the loss of the Long Island Power Authority (LIPA) contract negatively affect National Grid USA generally, the KeySpan companies specifically, or the NYS customers in terms of cost of service, meter reading processes, and customer service?
- Would the consolidation of KEDNY and KEDLI be feasible and be likely to provide benefits to ratepayers in excess of the costs of consolidation?

C. FINDINGS AND CONCLUSIONS

1. The NG-plc BOD is highly qualified and performs its duties appropriately, but governance issues limit effective control over US operations.

- The NG-plc BOD includes twelve individuals, eight of whom are Non-Executive, or independent Directors. The Executive members of the Board are the Chief Executive Officer (CEO) NG-plc, the NG-plc Finance Director, and the Presidents of each the US and UK operating companies. The Non-Executive Board members have backgrounds consistent with National Grid's operations, and are knowledgeable regarding NGUSA's performance and issues.⁵
- As recommended by the prior management audit, NG-plc added an additional Non-Executive Director from the US with a strong background in utility regulation to the NG-plc BOD.⁶ Ms. Nora Mead Brownell joined the Board June 1, 2012. She has served on the Pennsylvania Public Utilities Commission and the Federal Energy Regulatory Commission (FERC), and as President of the National Association of Regulatory Utility Commissioners.⁷

⁵ DR 70, DR 182, Interviews

⁶ Case No. 08-E-0827, Comprehensive Management Audit of Niagara Mohawk Power Corporation d/b/a National Grid's Electric Business.

⁷ DR 70, DR 182



- The NG-plc BOD has five committees, listed below. The committee structure and assignment of responsibilities are consistent with standard practice. The committees meet on a regular basis and execute their responsibilities appropriately.⁸
 - Audit Committee
 - Finance Committee
 - Nominations Committee
 - Remuneration Committee
 - Safety, Environment, and Health Committee
 - In addition to these Board oversight Committees, there is an Executive Committee which is authorized to take necessary actions between full Board meetings. It comprises the CEO; all the Executive Directors; the Group General Counsel and Corporate Secretary; the Chief Information Officer; and the Global Directors of Corporate Strategy, Corporate Affairs, and Human Resources.⁹
 - The BOD meets monthly, except for August and October, and holds at least two meetings annually in the US.
 - Based on NorthStar's review of Board Packets and BOD minutes, and interviews of the Board members, the NG-plc BOD executes its responsibilities appropriately. However, as discussed further below, the composition of the NGUSA BOD duplicates the executive management for NGUSA. As a result, information and recommendations regarding NGUSA operations and performance submitted to the NG-plc BOD have not been evaluated by anyone who was not directly involved in making the decisions and operating the business.
- 2. In practice, NGUSA operates as a single, traditionally structured utility for four jurisdictions with the domestic US, with liaisons to coordinate communication with regulators and key customers in each jurisdiction.**
- The previous management audit concluded that National Grid's Line of Business (LOB) organizational structure, with electric distribution and electric transmission operations reporting to two different LOB executives, did not promote and protect NMPC ratepayers' interests.¹⁰ Under the LOB structure, gas operations reported to yet a third executive, located in the UK.
 - Currently, National Grid's US operations are organized under a functional matrix structure reporting to the NGUSA President.¹¹ **Exhibit III-2** illustrates the organization of National Grid's management personnel as of June 2013. This organization is structured by function and includes the management of all activities supporting US operations, including the New York gas companies.

⁸ DR 184

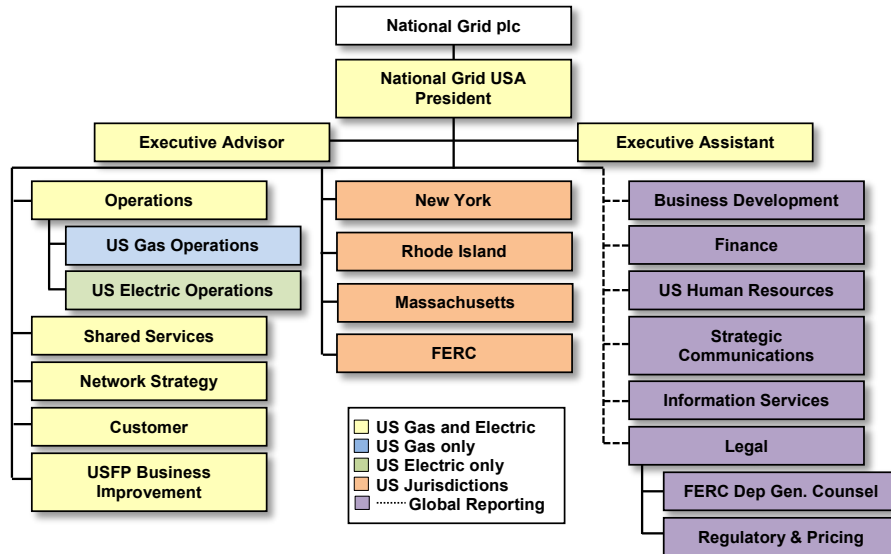
⁹ DR 184

¹⁰ Case No. 08-E-0827, Comprehensive Management Audit of Niagara Mohawk Power Corporation d/b/a National Grid's Electric Business.

¹¹ DR 1



Exhibit III-2 NGUSA Jurisdictional Organization Model



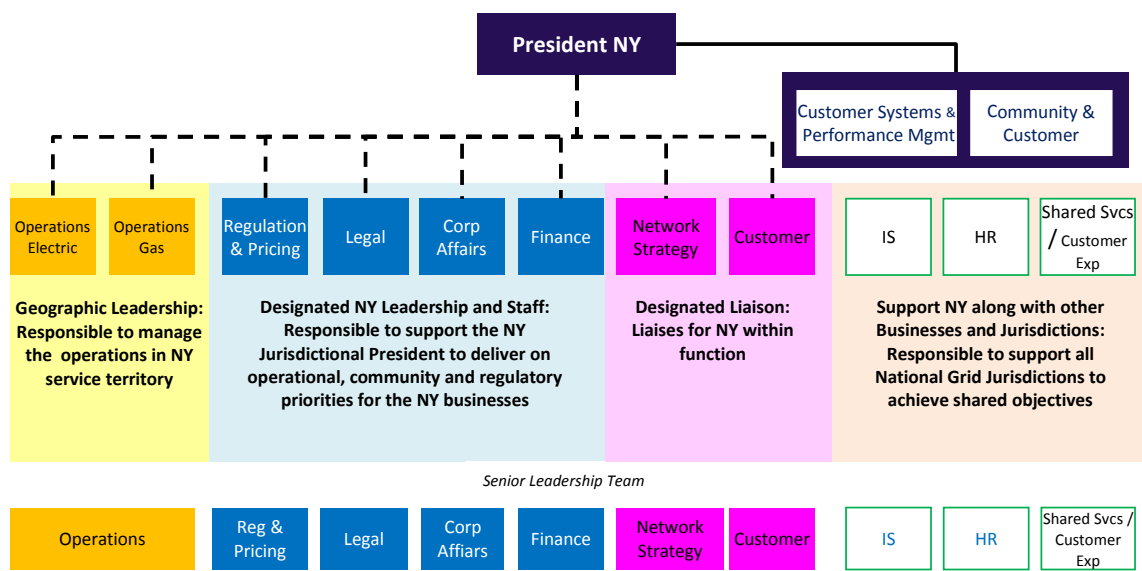
Source: DR 1 (June 2013). In Fact Verification, National Grid noted that the Legal Department is now the Legal and Regulatory Department and no longer shows the subgroups.

- As a product of its matrix structure, National Grid does not have separate organizations for the New York gas companies. National Grid calls this organization the “jurisdictional model.”
- Under this model, each of the functional Senior Vice Presidents is responsible for providing services to the four Jurisdictions: New York, Rhode Island, Massachusetts, and FERC.
- The Jurisdictional Presidents (JP) coordinate with the US service functions through designated functional representatives to obtain the services that are provided to their ratepayers. This process is illustrated in **Exhibit III-3** for the NY Jurisdiction.¹²
- Jurisdictional Presidents have the title of “President” but are not the chief officer of a utility organization reporting to them.
- In practice, NGUSA operates as a single integrated utility organization, as illustrated in **Exhibit III-4**.

¹² DR 275

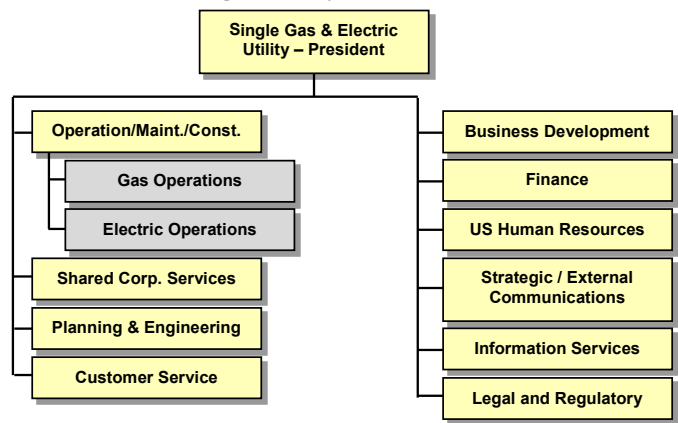


Exhibit III-3
New York Jurisdictional Organization Model



Source: DR 275

Exhibit III-4
Single Utility Structure



Source: NorthStar Consultants, Inc.



3. The NY Jurisdictional President represents regional interests, but does not have “command and control” authority over the NY gas utilities’ operations, personnel or performance.

- The NY Jurisdictional President coordinates with approximately 16 different individuals (shown in **Exhibit III-3**) that lead New York operations. These 16 NY functional representatives collectively constitute the NY Management Team but nearly all are members of and employees of NGUSA Service Company with their respective direct reporting relationships. Since all the functional representatives report to a NGUSA Service Company officer, the NY Jurisdictional President does not have direct organizational authority over these functions. Organizationally, conflicting needs among Jurisdictions and among shared corporate services must be resolved by NGUSA Service Company.
- Only three staff functions report directly to the NY Jurisdictional President: Community and Customer Relations, Policy and Performance Management. Resources include six direct reports and approximately thirty personnel in total (the two boxes in the upper right corner of Exhibit III-3).
 - NY Performance Management is the primary point of contact for day-to-day coordination with functional representatives. This individual also oversees other regular reports and activities on behalf of the NY Jurisdictional President. Two FTEs comprise this unit: the VP of NY Performance Management and one individual.¹³
 - The Director, Strategy NY Jurisdiction works with the NY Jurisdictional President on longer range projects and policy matters, along with handling some regular meetings and reporting.¹⁴
 - The other four individuals who report directly to the NY Jurisdictional President are Community and Customer Relations personnel, who are responsible, along with a staff of approximately 25, for maintaining relationships with key customers and stakeholders, assisting key customers with large growth projects, and coordinating community relations activities.¹⁵
- Gas and Electric Operations (include maintenance and construction) report to the NGUSA Executive Vice President Operations and then to the NGUSA President. Two Vice Presidents in this organization are assigned exclusively to NY day-to-day operations.
- Approximately 5,500 personnel are directly employed by one of the three NY operating companies. They are managed by and report up through the NGUSA ServCo management structure. The bulk of these resources are engaged in the

¹³ IR 228

¹⁴ IR 133

¹⁵ IR 24



delivery of utility service to customers – either field personnel (construction, maintenance, meter reading) or providing direct support to engineering.¹⁶

- The NY Jurisdictional President is an active participant in the capital and O&M budgeting process, and approves the budget presented to NGUSA and NG-plc. However, budgets must balance the corporate financial guidelines provided and revenue.¹⁷
 - Operating expenses related to running the utilities are controlled by the ServCo functional organization. A large portion of these expenses are allocated across all jurisdictions.
 - Capital budgets are closely tied to the system's needs, and the execution of capital projects is under the control of Operations, not the Jurisdictional President.
- The NY Jurisdictional President does not have financial staff under his direct authority to evaluate charges and financial performance. While the individual responsible for NY financial reporting is called the New York CFO, he reports directly to the NGUSA CFO, and has only a matrix reporting relationship to the NY Jurisdictional President.¹⁸

4. While the current NGUSA structure is an improvement over National Grid's previous model, it still does not provide NY regulators with sufficient regulatory access to the operations or performance of the New York utilities.

- The NY Jurisdictional President provides the PSC with a single individual who represents National Grid with the DPS and before the PSC. In this structure, there is consistency of message and continuity of information both to and from the company. This is an improvement over the previous LOB structure, where DPS and the PSC dealt with a different individual for electric utility transmission matters, electric distribution matters and for matters concerning each of the gas utilities.
- However, the actual operation of the NY gas (and electric) utilities is performed by ServCo, which is not regulated by the PSC.¹⁹ The NY Jurisdictional President is a liaison between NGUSA, operating as a single multi-state utility, the PSC and other stakeholders. The effectiveness of the NY Jurisdictional President to influence NGUSA/ServCo functional decisions over which he has no actual authority is a product of the individual's ability not that of the organizational position held.
- Neither NGUSA nor NGUSA ServCo are regulated by the PSC. While NGUSA currently embraces the concept of complete transparency and cooperation, the practical ability of the PSC to access data and compel behavior is limited by technology (SAP) and multi-state utility operations (management and allocations).

¹⁶ DR 577

¹⁷ See Chapter IV for additional discussion of the budgeting process.

¹⁸ DR 1, DR 143, DR 275

¹⁹ PSC website. National Grid is regulated by the Securities and Exchange Commission for financial matters and by FERC for electric and natural gas transmission rates.



- The Service Level Agreements (SLAs) filed by NGUSA with the PSC in September 2013 are insufficient for regulatory oversight as currently written. Among the many current shortcomings, discussed further in **Chapter IV – Capital and O&M Budgeting**, the SLAs do not require invoices with supporting materials to be provided by ServCo to the utilities/NY jurisdiction, and access by the PSC to data and other materials supporting the costs charged to NY operating companies is reliant on prior decisions rather than being imbedded in the SLAs, which are supposed to be the governing document for transactions between the NY utilities and ServCo. Additionally, the SLAs do not include quantification of the services to be provided, unit costs, delivery schedules, or consequences for non-performance. The costs for services are in most cases based on an allocation from the ServCo function rather than a negotiation of services desired for the NY jurisdiction.

5. NGUSA executive management has committed to continued evolution of the Jurisdictional organization model to provide the NY Jurisdictional President control over operating company activities and performance.

- NGUSA Executive management has stated that customer and regulatory expectations are evolving at a pace and in a manner that cannot be accommodated by the existing operating model and while the original focus of Elevate 2015 can remain a guiding principle, there must be additional focus on operating company performance. Executive management believes that while there has been considerable progress since implementing the jurisdictional operating model in 2010, there are additional needs and there it intends to reassess the jurisdictional model.²⁰
- As proposed by NGUSA Executives, the objective of the reassessment is to provide true Jurisdictional President oversight over the operating companies. To accomplish this, the NGUSA Executive Team has indicated that:
 - A methodical review must be done to determine whether the service company or the operating company can most efficiently provide particular services. Geographically tied services versus multi-client services would be the guiding principle.
 - A review of employment will be based upon dedicated work versus multiple operating company assignments.
 - A review of what personnel should report to the Jurisdictional President instead of the NGUSA Service Company function will be done.
- As outlined to NorthStar, the reassessment will also include a determination of what additional personnel should report to the Jurisdictional President rather than the ServCo function, guided by the nature of the service being provided and its tie to the jurisdiction. Where personnel are moved to report to the jurisdiction rather than ServCo, steps will be taken to assure efficiencies from, for example, shared processes are not lost.

²⁰ DR 655



- In addition, NGUSA has recognized the need to strengthen SLAs and governance through improved dialogue, metrics, tracking, reporting and enforcement. According to NGUSA, through the enhanced SLAs, all ServCo functions will have direct obligations to the Operating Companies for quality performance at budgeted costs. Ultimately the Jurisdictional Presidents would have the option to collectively decide to purchase services elsewhere if they are not satisfied with ServCo performance.²¹
- Based on information provided during the audit, NorthStar believes the resulting organization would provide the NY Jurisdictional President direct oversight of the day-to-day operations within the NY utilities, and direct reporting relationships with the managers and support staff needed to plan, budget and monitor activities and performance of the NY utility operations. However, as the organization had not been determined as of the end of the audit, NorthStar cannot evaluate the actual or potential effectiveness of any reassignments or reorganization as it relates to the operations and performance of the NY utilities.

6. The current governance structure for NGUSA does not provide objective oversight of NGUSA management actions.

- As a separately incorporated entity, NGUSA has its own BOD and bylaws. The NGUSA BOD currently meets at least ten times each year. Prior to 2010, the NGUSA BOD handled most items requiring board action via written consent, rather than holding Board meetings.²²
- As shown in **Exhibit III-5**, the NGUSA BOD, US Executive Committee, US Leadership Team and the senior functional managers are nearly all the same individuals. It would be unreasonable to expect that this group could effectively separate roles and responsibilities for these functions or bring additional perspective, focused accountability for results, or decision-making objectivity to any specific management group versus another.²³
- US operations are overseen by an eleven-member Executive Committee, shown by position in **Exhibit III-5** and organizationally in **Exhibit III-6**.²⁴ There is also a slightly larger Leadership Team that is also part of advising the US President, whose members are also shown in the Exhibits. It is important to note that the functional matrix organization (Exhibit III-2) and the Executive Committee (Exhibits III-5 and III-6) are nearly identical, with the exception of a few managers who report to global functions (NG-plc) and three of the four Jurisdictional Presidents.

²¹ DR 655

²² DR 650

²³ DR 627 and DR 1

²⁴ DR 1 and DR 627. Position titles from Fact Verification, July 15, 2014

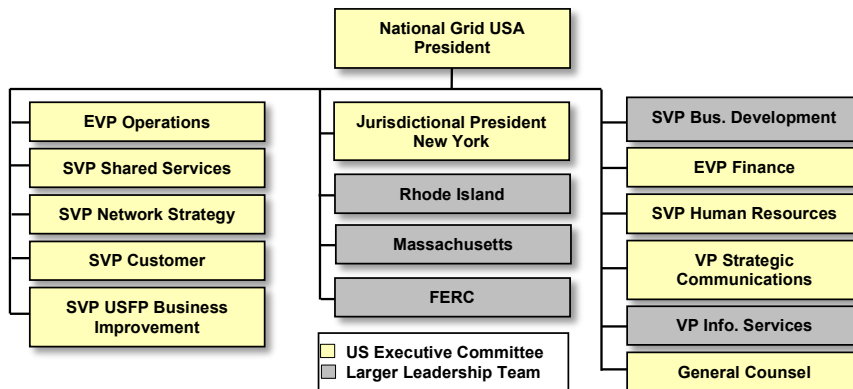


Exhibit III-5
NGUSA Directors and Executives

Position	NGUSA BOD	NGUSA ServCo BOD	US Executive Committee	US Leadership Team
President, NGUSA	President		X	X
EVP Operations	X		X	X
EVP, Finance	X	X	X	X
SVP, Network Strategy	X		X	X
SVP, Customer	X		X	X
General Counsel	X	X	X	X
SVP US Human Relations	X		X	X
SVP Shared Services		President	X	X
VP Strategic Communication			X	X
SVP USFP Business Improvement			X	X
VP Information Services				X
SVP Business Development				X
Jurisdictional Pres. New York			X	X
Jurisdictional Pres. Rhode Island				X
Jurisdictional Pres. Massachusetts				X
Jurisdictional Pres. FERC				X

Source: DR1, DR 627,

Exhibit III-6
National Grid USA Executive Committee and Leadership Team



Source: DR 1 and 167

- There are numerous problems with this type of Board composition, including:
 - Since the BOD reviews and approves decisions for which the members of the Board were responsible, this Board composition cannot be objective, by design.
 - There is no impartial assessment of whether decisions are in the best interest of ratepayers and shareholders, nor a different perspective to inform and challenge decisions and results.
 - Matters that may have been overlooked, or that might reflect poorly on the organization, are less likely to be identified and appropriately addressed.
 - Information that is relayed to NG-plc and the NG-plc BOD has not been tested for gaps. This is particularly important, because NG-plc executives and BOD focus



almost exclusively on matters with potential impacts on NG-plc financial performance. They must rely on NGUSA to identify issues needing corporate attention before they reach corporate financial materiality.

- Based on NorthStar's review of the NGUSA BOD minutes, the distinctions between the NGUSA BOD and the US Executive Committee are often blurred. Several matters that are governance-related and that should be handled annually were not consistently addressed. There are several instances where the NGUSA BOD receives items related to the US businesses after they had been presented to NG-plc. Often the topics and levels of discussions reported in the BOD minutes appear more appropriate for an Executive Team meeting.²⁵
- The NGUSA BOD currently has only one committee, the Standby Committee, which is comprised of the President, the US General Counsel and the COO.²⁶ The Standby Committee is authorized to act when it is not feasible to conduct a full BOD meeting.²⁷
- The Standby Committee would appear to be a reasonable backup to the NGUSA BOD, but its usefulness and need is questionable given the large, common group of governance resources.

7. The NGUSA BOD has limited functionality and decision-making authority.

- There are a number of areas where the National Grid plc Board takes the lead, thereby limiting functions of the NGUSA BOD. These areas include corporate governance, strategic direction, financial policy – including the budget and business plan – and the reputation of the Company and its businesses.²⁸ Maintaining these subject areas solely at the top of the governance structure rather than managing from the top reduces the functional role of subsidiary Boards.
- The NGUSA BOD approves a limited number of required governance actions, such as approval of dividend payments, appointment of officers and renewal of financing instruments. The BOD also approves the scope and Delegation of Authority (DOA) for a number of committees.
- From January 2010 through January 2014, the BOD is reported as taking action on business plans and budgets on only three instances.

²⁵ Review of DR 650

²⁶ Fact Verification, July 15, 2014.

²⁷ The NGUSA BOD has had other committees from time to time, however in May 2013 all committees were disbanded, including Finance, US Regulatory Compliance, US Environmental Oversight, and a short-term Special Transactions Committee that oversaw the sale of Granite State Electric Company. The other three committees were dissolved in May 2013. Several of these committees were reconstituted as standing committees (i.e., committees reporting to the NGUSA BOD whose members include non-board members), including the Process Safety Committee, Incident Reduction Committee, US Environmental Oversight Committee, US Regulatory Compliance Committee, US Business Conduct Committee, and US Sanctioning Committee

²⁸ http://www.nationalgrid.com/annualreports/2012/business_review/management_structure/



- In April 2010 the NGUSA BOD approved the NMPC (electric) business plan, prepared in response to the prior management audit. The BOD also discussed procedures for regular review of LOB “challenges,” and a desire for submittal of business plans for regulated entities that were responsive to relevant state commission requirements.
- In March 2012 the NGUSA BOD approved a US Business Plan and “noted” the NMPC Business Plan. The minutes do not report any Board discussion of goals or overall US strategy. The next month, the Board had to rescind their approval of the US Business Plan, because the NG-plc BOD had only adopted a one year budget, not the five year plan approved by NGUSA BOD.
- In November 2013 the NGUSA BOD approved the Business Plan for 2014, which had begun six months earlier on April 1, 2013.
- The minutes have no record of budget decisions by the BOD prior to March 2012.

8. The NGUSA BOD has given insufficient and untimely attention to critical issues impacting NYS ratepayers.

- The NGUSA BOD minutes mention Hurricane Sandy, which made landfall on October 29, 2012 significantly impacting the two downstate New York gas utilities, only three times. The first mention of Hurricane Sandy was on November 5, 2012 when the US Safety Update report related to the strong safety performance record during Hurricane Sandy and ensuing storm restoration work. There was no reported discussion of the impact of the storm on operations or financial performance. On January 7, 2013 insurance claims relating to Sandy costs were discussed, and the following month there was a discussion of the spending relative to Sandy recovery.²⁹
- The US Foundation Program (USFP), arguably the most significant project during the past five years, consolidating two legacy accounting systems with impacts throughout the business, received little NGUSA BOD attention, according to BOD minutes:³⁰
 - The minutes mention USFP or the Foundation Program four times prior to its rollout (September and October 2010, February 2011, and July 2012).
 - The February 4, 2011 BOD minutes include notice that the materials presented did not discuss the benefits to the utility operation companies, and that the project must assess the benefit to the operating companies so the jurisdictional heads could be assured of the consequent project benefits.³¹
 - There is no mention of any discussion of business or project readiness, or of any deferral of the rollout dates.
 - At the November 5, 2012 BOD meeting, the brief financial update noted that SAP had gone live that day.

²⁹ DR 650; November 12, 2012 minutes provided in Fact Verification.

³⁰ DR 650, See Chapter IV for additional discussion of the USFP SAP implementation project.

³¹ DR 650



- There is only one mention of SAP following the rollout. On January 7, 2013 it was noted that “a very considerable amount of management attention” was being devoted to the issue.³²
 - There is no mention in the NGUSA BOD minutes of any concerns regarding financial reporting for any subsidiaries. However, the External Auditors reported numerous significant deficiencies in financial reporting at the US subsidiary level to NGUSA management for FY09, FY10 and FY11.³³
 - All of these topics would have been subject to extensive discussion and monitoring by a BOD with responsibility for corporate management oversight. While discussions on these topics were undoubtedly occurring within the US Executive Team and, once they became significant, at the NG-plc BOD level, the lack of independence and impartiality within the NGUSA BOD resulted in an insufficient level of scrutiny on these issues.
- 9. The commonality of ServCo executive management and governance teams with the other NGUSA entities further diffuses accountability and attention to detail, and diminishes objectivity.**
- The overlap between NGUSA, leadership teams, executive committees, operating companies management and ServCo were shown in **Exhibit III-5**, above.³⁴
 - Executive management and governance of ServCo vis-à-vis the remainder of NGUSA is somewhat meaningless as the President of NGUSA ServCo is also the SVP of NGUSA Shared Services – both positions are the same individual and report directly to the NGUSA President.
 - In addition to this overlap, 67 officer positions of NGUSA operating companies are held by officers of ServCo.
 - The overlap and multiple roles for these management and executive individuals makes it impossible to effectively differentiate roles and responsibilities each individual has for each of multiple legal entities and organizational structures.
- 10. The governance structure for the New York operating companies does not provide sufficient oversight and focus on decisions directly related to these companies.**
- Each of the New York utilities are separate legal entities, with their own BODs and bylaws. Beyond satisfying legal requirements for BODs there is little functionality or apparent decision-making authority.

³² In Fact Verification, National Grid noted that the January 2012 BOD minutes reported that SAP issues had been discussed in the December US business headlines submitted to NG-plc.

³³ See Chapter IV for additional discussion of the material weakness issue

³⁴ DR 698



- New York gas company BOD meetings are held jointly, underscoring their “in common” approach to management issues.³⁵
- Currently, there are no committees of the Boards of Directors for the NY gas companies to oversee management performance and decision-making.³⁶
- NY gas companies Board roles and responsibilities are limited and not especially rigorous based on their Bylaws.³⁷
 - The number of meetings required to be held annually are not specified.
 - Boards do not appear to have any specific roles such as “chairman”.
 - NY gas company officer elections are routine and conducted at the April Board meetings.
- Board membership for the regulated NY gas companies does not appear to be an important business concern. Bylaws specify that Directors are elected annually. However, Directors are determined by written consent of the sole shareholder in lieu of a meeting. Minutes for all of the NY gas companies covering the last five years fail to note any Board member election.³⁸
- Each of the New York gas companies has a three member BOD as shown in **Exhibit III-7**.³⁹
 - In the case of NMPC, all three Directors sit on the NY Management Team.
 - For KEDNY, two of the three Directors are members of the NY Management Team.
 - Only one of the KEDLI Directors is a member of the NY Management Team.
- NY gas companies’ Board members, Officers and managers are all employees of National Grid USA Service Company with the exception of Keith McAfee who is an employee of NMPC. Board membership is shown in **Exhibit III-7**.⁴⁰

³⁵ DR 68 and 699

³⁶ DR 183

³⁷ DR 183

³⁸ DR 68 - Board of Directors minutes for the past five years.

³⁹ DR 183

⁴⁰ DR 72



**Exhibit III-7
NY Gas Companies Board Members**

Title of Incumbent	Appointment			Employer
	NMPC	KeySpan Gas KEDLI	Brooklyn Union Gas KEDNY	
NY, Jurisdictional President	Director/President		Director/President	NGUSA ServCo
VP Maintenance and Construction (NY Gas)			Director	NGUSA ServCo
SVP Regulatory & Pricing			Director	NGUSA ServCo
SVP US Gas Operations		Director/President		NGUSA ServCo
VP and NY CFO		Director		NGUSA ServCo
US General Counsel		Director		NGUSA ServCo
Director, Strategy NY	Director			NGUSA ServCo
VP Maintenance and Construction (NY Elec.)	Director			NMPC

Source: DR 72, 183, 275 and 629 (as of June 2013)

- When considering the number of executive committees, management teams, Board memberships and personnel common to all groups, the ability of the NY gas company BODs to represent the specific needs of NY ratepayers is highly limited.
 - With a majority of the board members being part of the NY Management Team, actions taken by these BODs are limited to affirming decisions already made by the management team.
 - Further, since the utilities are operated on a consolidated basis, questioning by the Board of any one utility regarding a decision can not affect most decisions.
- Decisions for which an operating company BOD might have responsibility are limited to rate case filings, third party marketing programs and other similar regulatory matters that are different for the individual utilities.

11. While National Grid's ERM process appears to be followed, the results of that process do not demonstrate an appropriate integration or validation at the NGUSA level.

- Risk Management within National Grid is ultimately the responsibility of the NG-plc BOD, and is highly focused at the NG-plc level. The process is executed and monitored by the Corporate Risk Team (CRT) which reports to the Global Strategy and Corporate Development group in the UK.⁴¹ The Group head of the CRT oversees the ERM process for both US and UK operations, with the support of dedicated Heads of UK and US Risk Management. The Head of US Risk Management is supported by two US Risk Advisors.⁴²

⁴¹ DR 271

⁴² IR 85, DR 143, Fact Verification (July 15, 2014)



- National Grid uses a typical ERM process that includes:⁴³
 - Each functional area reviews key risks and the actions being used to manage those risks quarterly. There are designated liaisons (Risk Champions and Risk Coordinators) within each functional area that are charged with completing the risk review.
 - The CRT then reviews and challenges these key risks with senior management from each functional area. Additionally the CRT reviews the risk register with each Jurisdictional President or his designee.
 - The risks are aggregated into a corporate-wide risk management database. The US Executive Team reviews and approves the overall US operations risk profile every quarter at meetings facilitated by the CRT.⁴⁴ The National Grid corporate risk profile is approved by the NG-plc BOD.
- Each business function retains ownership of the risks in its area, with review by the CRT and other control and management teams, including Internal Audit, Controls Excellence (SOX compliance), and Safety,⁴⁵
 - The business functions are responsible for assessing the magnitude and impacts of each risk within their area, using a risk scoring process established by the CRT.
 - The business functions also “ensure appropriate mitigations are in place” for risks in their areas.⁴⁶
 - The Corporate Risk Policy designates that the oversight of mitigation actions resides with the business functions, including verification that the mitigation strategies are in place and assuring that progress is being made.
- While there is a Head of US Risk Management and a US Risk Register, monitoring and implementation of risks and risk mitigation is dispersed throughout the NGUSA organization, with minimal coordination or integration with the results of other risk assessment processes, such as Internal Audit or SOX compliance. There are over forty individuals with ERM responsibilities in their function or business unit, as Risk Champion or Risk Coordinator, plus a contact for each of the jurisdictions.⁴⁷ The CRT is responsible for bringing together and reviewing the risk registers with functional and jurisdictional leads.⁴⁸ However, the CRT is a global group and is well separated from actual system operations.
- One output of the global ERM process is a grid that shows the relative ranking of the top ten to 12 risks for the US operations, using risk “globes.” **Exhibit III-8** is an example of the Risk Globe Grid.⁴⁹

⁴³ DR 69, DR 271

⁴⁴ DR 69 indicates this is done by the US Executive Team, but beginning in March 2012 the NGUSA BOD reviewed and “noted” the US Regional Risk register (DR 650).

⁴⁵ DR 69 and DR 271

⁴⁶ Attachment 1 to DR 271, p. 5.

⁴⁷ DR 274

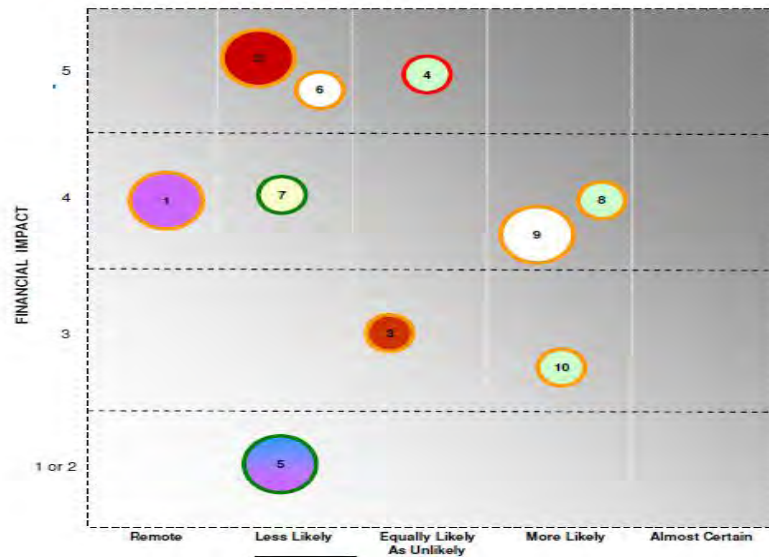
⁴⁸ DR 69

⁴⁹ DR 69



- The risk “globes” are sized based on the magnitude of the risk to National Grid's reputation – larger globes have potential international reputation risks, smaller globes have national reputation risk.
 - The globes are placed vertically on the grid based on the potential financial impact of the risk, with the top of the grid representing larger potential financial impacts.
 - The position of the globes horizontally is a measure of how likely the risk is of occurrence, from remote to almost certain.
- One example of the current ERM process limitations is the treatment of the risk of a gas operational emergency, which was placed in the “equally likely as unlikely” area of the globe matrix.⁵⁰ Clearly, National Grid manages its operations to keep the risk of gas operational emergencies very low (e.g., remote), not at a 50/50 probability.⁵¹

Exhibit III-8
Example of Risk Globe Grid



Source: DR 69

- A second example is the reporting of the risk associated with the USFP project.
 - Throughout the project's development phase, the successful implementation of the project was viewed as a US level risk, and “equally likely as unlikely” To be successful. Discussion documents associated with the globe matrix did not indicate a particular focus to mitigate the likelihood of an unsuccessful implementation.

⁵⁰ DR 272 and DR 273

⁵¹ In Fact Verification, National Grid reported the Target score for this event was remote, but that the business elected to leave the risk globe in its current location to highlight the importance of this risk. (July 15, 2014)



- After roll out, the statements regarding the risk associated with USFP became increasing concerned. Despite the growing experience with only partially successful fixes to USFP problems, the only change in the presentation of risk was changing the globe from the smaller “national” reputation risk to the larger “international” reputation impact.⁵²
- These two examples show that the risk assessments as reported through the Risk Globes may not reflect consistency in scoring, and many suggest an unwillingness to openly call attention to and objectively assess risks of discrete and problematic projects.

12. The NG-plc Annual Report includes the appropriate attestations by the Executive Management, Board of Directors and External Auditors regarding compliance with the internal control reporting requirements set forth in Section 404 of the Sarbanes-Oxley Act of 2002 (SOX).

- SOX requires the management of publically traded companies to assess and then attest to the effectiveness of its internal controls over processes related to financial reporting – in this case, the NGUSA consolidated financial statements. Since NGUSA is a wholly-owned subsidiary, the required management attestations are provided in the NG-plc annual financial statements.⁵³
 - In each of the past five years, the NG-plc annual financial statements have included the management statement that: “... management concluded that our internal control over financial reporting was effective as at 31 March [of each year].”⁵⁴
 - Similarly, the NG-plc annual financial statements have included each year a similar statement from its independent external auditors: “the Company maintained, in all material respects, effective internal control over financial reporting... based on [standard] criteria...”⁵⁵
- No attestation regarding SOX compliance is required or provided in the financial statements of NGUSA or any of the New York operating companies.⁵⁶

⁵² DR 272. In Fact Verification, National Grid stated that the financial and reputation impact scores were already as high as possible, but their response did not address the likelihood score.

⁵³ DR 571, Financial statements of National Grid plc accessed via <http://investors.nationalgrid.com> on March 31, 2014.

⁵⁴ National Grid plc., Annual Report and Accounts 2012/13, p. 179, and similar in prior reports.

⁵⁵ National Grid plc., Annual Report and Accounts 2012/13, p. 95, and similar in prior reports.

⁵⁶ Financial statements of National Grid North America Inc. accessed via <http://investors.nationalgrid.com> on March 31, 2014. DR 4 for audited financial statements for NMPC, KEDLI and KEDNY.



13. Significant deficiencies and material weaknesses beginning with the KeySpan acquisition, indicate a lack of governance and oversight by executive management related to activities and events that impact financial reporting.

- At least as far back as 2009, National Grid's External Auditor noted significant deficiencies and even some material weaknesses in the financial systems and controls across multiple operating companies.
- The SAS 114 report from the external auditors to the NGUSA Board of Directors for FY2010/11 identified 29 significant deficiencies relating to financial reporting among NGUSA and its subsidiaries, including five in the New York operating companies.⁵⁷ Based on NorthStar's review of presentations to the NG-plc Audit Committee, these findings were not reported to the NG-plc Audit Committee or BOD.
- NGUSA formed a project team to address the significant deficiencies and material weaknesses. It was believed that the problems arose from the use of two separate financial systems resulting from the KeySpan acquisition in 2007. With the initiation of the USFP to implement SAP as a single financial system for all of NGUSA, the focus on resolution of the deficiencies waned.⁵⁸
- The challenges resulting from the conversion to SAP did not resolve the significant deficiencies, and in fact increased the internal control problems, culminating in a letter from NGUSA's independent auditor.⁵⁹ The financial systems and control issues are discussed in greater detail in **Chapter IV – Capital and O&M Budgeting**.
- As discussed in the following Conclusions, neither the SOX control processes nor Internal Audit identified the magnitude of the problems nor were they able to direct sufficient management attention to resolution of these issues.

14. Roles and responsibilities within National Grid's overall internal control system are not well defined, do not appear to be well understood and lack formalized intermediate elements of typical standard SOX control processes.

- There are two policy documents addressing SOX compliance for NGUSA, both of which address principally governance and risk assessment:⁶⁰
 - The Internal Controls over Financial Reporting (ICOFR) Policy, which provides a broad overview of the control requirements, structure and roles and responsibilities.
 - The Financial & Regulatory Reporting (FRR) Risk Assessment Policy, which delineates the process to be used to identify and mitigate the top ten risks.

⁵⁷ DR 521

⁵⁸ DR 152, DR 559

⁵⁹ DR 521, DR 559

⁶⁰ DR 571



- These policy documents do not address key elements of the SOX internal control processes, including specification of intermediate responsibilities, signoff requirements and handoff points and designation of ultimate authority to mandate process and control changes. In the absence of specific designation of responsibility and accountability throughout the internal control process, gaps in controls may not be identified and therefore not brought to management attention or mitigated.
- The group with primary responsibility for establishing, maintaining and verifying the effectiveness of internal controls for financial reporting purposes is the Controls Excellence Team (CET), which reports to the NGUSA CFO.⁶¹
 - As of March 2014, the CET has 19 positions, five of which were vacant. Currently CET also had 15 contractor employees, with the increased staffing reported to be needed due to the large number of controls to test in FY2014.
 - The current Head of CET came from Internal Audit and has been leading CET for seven months.
- The FRR Risk Policy refers to a “SOX Steering Committee” comprising fourteen members. The SOX Steering Committee has responsibility for assessing, validating and signing off Top 10 FRR Risks, Mitigation Plans, and Risk Based Controls Scoping.⁶² The Steering Committee met four times from its establishment in October 2012 through October 2013
- Since November 2013, the Steering Committee has been meeting weekly to discuss certain exceptions and deficiencies noted as part of the SOX program testing and remediation plans, all related to the financial systems and control issues, discussed in **Chapter IV – Capital and O&M Budgeting**.⁶³
- While the FRR Risk Policy does provide an overview of the risk ranking processes, there is no indication of how risks that are not ranked in the “Top 10” are to be mitigated. Further, the policy documents do not indicate what decisions the Steering Committee can make or to whom those decisions are communicated.⁶⁴
- The FRR Risk Policy also refers to a “Risk and Controls Program Management Office.” There is no information in the policy document on the composition of this group, how it is established, or how it is to meet its responsibilities, which include:⁶⁵
 - Developing and implementing mitigation plans for the Top 10 risks
 - Monitoring and reporting on progress of mitigation plans
 - Escalating issues to obtain key decisions
 - Manage expectations

⁶¹ DR 143

⁶² Attachment 2, DR 571, DR 663

⁶³ DR 663

⁶⁴ DR 571

⁶⁵ DR 666 and DR 571. In Fact Verification, National Grid stated the PMO was a program management team elected by the Steering Committee to act on its behalf (July 15, 2014).



- The FRR Risk Policy identifies “Control Owners,” who are to “execute control activities”, and “Process Owners,” who “develop and implement risk mitigation plans and ensure the accuracy of documentation and remediation of gaps and issues.”⁶⁶
 - The policy does not indicate how the Control and Process Owners are to document the effectiveness of the internal financial system controls for which they are responsible.
 - Typical SOX compliance practice includes formal systems and processes that require affirmative confirmation by control and process owners of the effectiveness of the controls.⁶⁷ National Grid does not appear to have such a process.⁶⁸
- In addition to these groups, the Corporate Internal Audit Department (IAD) conducts periodic audits of financial systems and processes, which provide for additional independent review of financial controls.⁶⁹

15. National Grid does not apply its internal controls at a level of materiality relevant for operating company financial statements. As a result, there is no assurance that events that are material for an operating company are identified in a timely manner or receive sufficient management attention.

- Neither of the two SOX policy documents define or establish a basis for setting, “materiality” – the potential impact of inadequate controls on the accuracy of financial reporting.⁷⁰ National Grid reported that materiality was set at the NG-plc level, and that matters that did not demonstrate that level of materiality would not “roll up” or be included in the NG-plc reporting.⁷¹
- This high level of materiality virtually guarantees that a deficiency at a NY operating company level would not be reported to NG-plc, due to their relative size.
 - NMPC reports operating income of approximately 5.7 percent of NG-plc’s operating profit. KEDNY is approximately 4.2 percent of NG-plc, and KEDLI is approximately 3.1 percent.⁷²
 - Hypothetically, a misstatement of \$20M on KEDLI’s financial reports (an enormous misstatement of more than ten percent) would result in an impact of less than one-half of one percent at the NG-plc level.

⁶⁶ Attachment 2, DR 571

⁶⁷ NorthStar reviews of SOX compliance at other utilities.

⁶⁸ In Fact Verification, National Grid provided some additional procedure documents, one of which explicitly excluded SOX compliance and others that did not appear to provide for roll-up compliance verification and affirmation.

⁶⁹ DR 573

⁷⁰ DR 571

⁷¹ IR 216

⁷² DR 4 for KEDLI, KEDNY and NMPC operating profit in 2012, NG-plc Annual Report, 2012 Operating Profit of 3,539 M British pounds, reported in 2013 Annual Report. Converted to dollars at 1.67 dollars to 1 pound.



16. While the overall IAD processes appear to be appropriate, IAD has been less than effective in directing sufficient management attention to problems, particularly within the financial systems and organization.

- The US Internal Audit function comprises three Audit Managers and 12 auditors, under the direction of the VP US Audit. Currently one Manager and five Auditor positions are vacant and being filled with outside staff. The large number of vacancies was reported as due to auditors being reassigned to other roles within the company. The current Head of US Audit was hired from outside the company and has been in the position seven months.⁷³
- The Head of US Audit reports to the Global Audit Director. The Global Audit Director was reported as making all presentations to the Audit Committee, including discussions of US audit findings.⁷⁴ Given the very different regulatory and financial environment under which NGUSA operates compared to the UK operations, it is troubling that the Head of US Audit does not present and explain US audit results and their impact.
- The process used to identify and rank possible audit topics is typical, including soliciting input from executive management, the independent auditors, ERM, and past audits. There is appropriate attention paid to repetitive audits, with those audits on a three to seven year cycle, depending on potential risk.⁷⁵
- IAD has conducted over 130 audits over the past five years that were related to gas operations, affiliates, or service company matters.⁷⁶ NorthStar reviewed the reports from a sample of twenty of these audits, twelve of which were chosen at random and the other eight selected because the topic relating to financial reporting or the USFP project.
- Internal audits are typically given a grade – Good, Satisfactory, Needs Improvement or Unsatisfactory – determined by the auditors to represent their overall assessment of the audit results. The meaning of the grades is shown in **Exhibit III-9**. For some of the twenty audits reviewed by NorthStar, the contents of the audit reports were inconsistent with the overall positive grade for the given audit.⁷⁷

⁷³ DR 583, IR 217

⁷⁴ IR 217

⁷⁵ DR 572, IR 217

⁷⁶ DR 65

⁷⁷ DR 65



Exhibit III-9
Explanation of Audit Grades

Grade	Description
Good	High degree of assurance. Controls are fully in place, are rigorously tested on an ongoing basis and weaknesses or non-compliances noted, if any are relatively minor in nature and few in number.
Satisfactory	Reasonable degree of assurance. Controls are generally functioning as intended but some changes are necessary to make the control environment more effective and reduce the likelihood of non-compliances.
Improvement Needed	Less than satisfactory degree of assurance. Control weaknesses or non-compliances noted, subject the company to increased risk. Control weaknesses require immediate attention and prompt resolution by management.
Unsatisfactory	Limited or no assurance. Key controls have not been established or are not functioning as designed subjecting the company to significant risk. Significant control weaknesses noted must be resolved immediately.

Source: Fact Verification, July 15, 2014.

- Of particular concern were the results of two audits of financial systems:
 - The 2011-12 audit of Financial Statement Close Process that identified missing controls and resultant risks of inappropriate journal entries was graded “Satisfactory.” There was no mention in the report of the National Grid’s independent auditor’s findings of significant deficiencies in this same area.
 - The 2012 audit of Balance Sheet Account Reconciliation identified inconsistencies in the reconciliation reports, with no mention of the independent auditor’s findings of significant deficiencies in this area. This audit was also graded “Satisfactory.”
- The three audits of the USFP are also troubling in light of the actual experience:
 - USFP Governance (May 2011): found that management did not have a complete and current view of risks and related actions, that the USFP lacked visibility of concurrent initiatives across the US business and that there were potential gaps in the degree to which each business area was prepared to dedicate resources. This audit was graded “Needs Improvement.”
 - USFP Framework (September 2011): noted the review “indicated appropriate strategies are in place to address organizational readiness.” This audit was graded “Good”
 - USFP Vendor Management (February 2012): found no issues with the management of vendors assisting with USFP Development. This audit was graded “Good”
- Additionally, a 2012 audit of SLAs found that the SLA process was robust, but noted a lack of coordination with KPIs, with only five of 16 SLAs containing KPIs. Despite the lack of KPIs this audit was graded “Good.”
- Reports on the results of internal audits are described as being provided to the business owner and one level above that person, and to the independent auditors. The NG-plc CEO would be included on the distribution if the head of IAD deemed it



appropriate. There is no standard process for sharing the results of audits across the business, or to functional leads or Jurisdictional Presidents.⁷⁸

- This limited distribution makes unlikely that senior management would be aware of any problems identified by audits graded “Good” or “Satisfactory,” or even “Needs Improvement.”

17. Strategic planning within National Grid occurs primarily at the NG-plc level. Long-term planning for NGUSA has been only financial in nature and has not addressed strategic matters.

- Strategic planning for National Grid is a NG-plc responsibility within the Group Strategy and Corporate Development department. There is a team of three individuals in the US Strategy and Technology group, which reports to Group Strategy & Corporate Development, that are charged with assisting with the development of long term strategy for the US businesses.⁷⁹
- At the NG-plc level, strategic planning is appropriately focused on global trends and opportunities that build on the existing core business – the transmission and distribution of energy to consumers.⁸⁰ A key driver is the need to meet shareholder growth expectations.
- A “US Business Plan” is prepared annually. However, it is not a strategic plan. It is a ten-year financial plan, specifying targeted earnings driven by assumptions on the timing and outcome of rate case filings and the management of controllable costs (but without any specific cost reduction targets).⁸¹
- While National Grid represented in a description of the business planning process that the US Business Plan includes a “strategic route map” and that the “US Strategy group” manages the strategic planning process, none of the US Business Plans reviewed included discussion of strategic opportunities or challenges.
- The US Business Plans are also not true operational plans, because they do not address how the projected financial results are to be achieved or the impacts of uncertainties in assumptions or outcomes. There is no assignment of responsibilities (even to a functional level), no discussion of necessary actions, timelines or interim targets and no budget information. There is no assessment of uncertainties or risks and no discussion of the impact on financial targets of alternative outcomes.

⁷⁸ IR 217

⁷⁹ DR 100

⁸⁰ IR 61, National Grid plc website

⁸¹ DR 99 and DR 100



18. The annual stand-alone Business Plan for NMPC is prepared in response to a regulatory requirement and does not represent a true operational or strategic plan to guide decision-making. There are no stand-alone plans for KEDLI or KEDNY.

- As a result of a recommendation from the prior management audit, National Grid must present a business plan for the NMPC electric operations to the PSC annually.
- The NMPC Business Plan only exists as a presentation packet prepared for the PSC, with a strong budget focus.⁸² The packet is appropriate as a summary document to a specific audience. However, there is no underlying detailed plan for NMPC operations from which the presentation packet is drawn.
- The FY2013 packet identified ten “NMPC Priorities” which were tied to National Grid’s corporate strategy elements. Only one of the listed priorities mentions New York: “Position the company as a leader by taking an active role in developing the NY and US energy agenda.” The actions associated with this priority call for leadership and participation in several NYS energy initiatives and industry groups.⁸³
- The other New York-specific actions (not priorities) listed in the FY2013 packet are:
 - Addressing recommendations and findings from the management audit, the Overland audit and the Liberty study.
 - Fostering collaborative working relationship with DPS Staff
 - Delivering Energy Efficiency and economic development programs
 - Managing site remediation programs
- All other actions (25 items) are generic to standard utility operations (e.g., deliver capital investment programs as planned) or NGUSA activities (e.g., implement the USFP).
- As in the US Business Plan, there is no responsibly assigned for any of the 36 “actions that support our priorities,” or any other information on how these actions are to be executed.
- The Financial Plan portion of the packet presents a five year forecast of financial results. The costs are presented in aggregate – Direct Opex, Indirect Opex, and Non-Controllable Opex – with no further information on what makes up the costs or even cost categories. The financial forecasts assume the results of a rate case.
- National Grid stated its intention to have similar separate business plans for KEDLI and KEDNY with a targeted completion date of April 1, 2014. As of April 1, 2014 the company has completed drafts of these plans, but declined to share them with NorthStar. The new target completion data is October 2014.⁸⁴

⁸² Attachment 11 to DR 99, DR 700

⁸³ Attachment 11 to DR 99

⁸⁴ DR 212, DR 432 and DR 432 supplement.



19. While there has been some increased strategic focus recently, these efforts as yet are not producing a longer-term strategic plan for the New York gas utilities.

- For FY14, the NY Jurisdiction identified goals and initiatives, and monitored progress on the initiatives. The goals were tied to the Elevate 2015 principles and were very broad:⁸⁵
 - Safety and Reliability: Our customers trust everyone at National Grid to provide safe and reliable service every day.
 - Customer Responsiveness: Our customers depend on us to anticipate and provide timely response to their needs.
 - Stewardship: Our communities welcome our partnership and recognize us as a responsible leader.
 - Cost Competitiveness: Our customers experience the value of our service as we drive and demonstrate efficiency.
- The initiatives listed to achieve these goals are not measureable (e.g., support communities or improve awareness and support). However, progress was measured quarterly. No specific action plans associated with implementing the initiatives were provided, and there is no documentation connecting to either budgets or financial performance. However, the identification of state-wide initiatives, collected into a single source, and monitored for progress represents a small step towards developing a New York-focused strategy and plan.
- In May 2013, National Grid released a white paper on the New York State Energy Policy. The content of the white paper represented a long term view of National Grid's possible roles in promoting and supporting the state's energy objectives.⁸⁶ While it is not a complete "strategy" statement for the NY Jurisdiction, it provides a good start at the strategic assessment that is needed for a real strategic plan.
- In March 2014, National Grid released a whitepaper addressing NGUSA's perspective on the future of the energy and utility industries (termed, Connect21).⁸⁷ This initiative, together with the narrower New York Energy Policy whitepaper, could provide a foundation for a true NGUSA strategic plan.

20. National Grid has developed appropriate programs to meet near-term growth and conversions in New York. However, it has not developed a long-term strategic assessment of the impacts of innovation and new markets on the operating entities or their ratepayers.

- National Grid has several programs focusing on conversions and new developments that are functioning well. These programs include:

⁸⁵ DR 148, DR 701 (not responded to as of May 2, 2014)

⁸⁶ DR 430

⁸⁷ DR 504



- Oil-to-gas conversions in Brooklyn, driven by the city's requirement to remove fuel oil-fired boilers from regular use. National Grid has developed processes to assist building owners and contractors and to ensure that the utility is not a barrier to compliance.
 - Infill conversions in the NMPC service territory, where National Grid has identified areas of the service territory where existing distribution lines pass buildings currently not taking gas services. National Grid is actively pursuing these conversions and short extensions.
 - On Long Island, National Grid is experiencing rapid growth as a result of Sandy reconstruction activities, conversions and new developments in that area.⁸⁸
- Because NGUSA does not have a true strategic plan, there is no overall assessment of the opportunities from technological innovation or market trends, or of their possible impacts on the National Grid's New York gas systems or ratepayers.

21. National Grid does not have an estimate of the total cost or possible impact on rates of the loss of the LIPA contract.

- During the time when National Grid operated the LIPA electric distribution system, many utility operations on Long Island were conducted as joint gas/electric activities. These included: meter reading, billing, customer service offices, dispatch, warehouse and yard facilities, and general office space. With the loss of the LIPA contract, all these activities had to be separated into gas and electric functions, with the electric functions moving to PSEG-LI, and gas functions remaining with National Grid (KEDLI). The separation and transition process was lengthy and complex.⁸⁹
- The potential costs arising from the separation of the LIPA and KEDLI operations include:
 - Stranded costs associated with investments or activities specific to LIPA that cannot be eliminated or could not be transferred to PSEG-LI.
 - Incremental costs to replace systems or personnel that previously had enjoyed efficiencies of scale or that were transferred to LIPA and must be replaced.
 - Administrative and overhead costs that are spread across multiple operating companies through the general cost allocation processes.
 - Offsetting revenues from usage fees and rents, which partially offset the stranded costs, received from PSEG-LI for the ongoing use of previously joint assets.
- Documents from July 2013 provide a somewhat detailed estimate of the non-labor allocated (administrative and overhead costs) and some true stranded costs. The documents also include projected revenues but without any detail as to the source, and a single lump sum figure for labor stranded costs. At that time, the stranded costs were estimated at \$18.5M.⁹⁰

⁸⁸ Initial presentation, August 20, 2013 and numerous interviews

⁸⁹ NorthStar did not review the transition process or its results in general.

⁹⁰ Attachment 7, DR 140 (\$\$ figure confidential).



- A large portion of the estimated stranded costs appear to be at the NGUSA Service Company level and so would likely simply be reallocated across NGUSA.
 - Incremental customer-related costs were provided for selected functions, but not on an aggregate basis.⁹¹
 - There is no indication of any broad review of services or functions to verify that all possible cost impacts have been identified
- As of March 2014, National Grid had not updated the earlier estimates of costs or identified any additional costs, other than to indicate that it now believes the stranded costs for IT assets will be less than earlier projected due to additional usage by PSEG-LI of IT system resources.⁹²
 - National Grid stated that following transition (the period of time when PSEG-LI is still heavily reliant on and paying fees for National Grid assets), “cost management would be addressed through the normal business planning and budgeting process and not through a separate stranded cost analysis.”⁹³

22. The loss of the LIPA contract should not negatively affect service levels in the long-term, and, in some cases, is likely to improve service levels for KEDLI customers.

- Any changes to a process that are visible to the customer can cause questions and potential frustration in the short-term as the customer adjusts to the new process or methodology (e.g., a change in bill format). National Grid developed appropriate plans to address potential customer-related effects of the loss of the LIPA contract.
- National Grid developed formal plans (including change management, communications and training plans) for the transition of accounts processing, call center and customer office operations, medical and life support processes, major account representative functions, meter reading and certain credit and collections activities that were previously performed on a consolidated basis.⁹⁴
- A Customer Experience Team was established to address customer impacts and develop associated communications, including:⁹⁵
 - The introduction of new account numbers.
 - The elimination of consolidated gas and electric billing.
 - Changes to the bill format and remittance addresses.
 - Meter reading and billing date changes.
 - Changes to the call center, phone system and customer offices.

⁹¹ DR 140.

⁹² DR 574

⁹³ DR 574

⁹⁴ DR 141, 164, 172 and 173

⁹⁵ DR 172 and 330 and IR 30



- Implementation of Automated Meter Reading (AMR) and the change to monthly meter reading.⁹⁶
- Changes to the website for online account access.
- In December 2013, National Grid successfully moved the KEDLI customers from the existing CAS customer information system, which was turned over to LIPA, to the CSS system used by upstate New York. See **Chapter X – Customer Information System** for additional discussion.
- KEDLI customer calls are now answered by National Grid’s call center located in Melville, New York. New customer service representatives were hired and trained prior to the conversion.⁹⁷
- Ultimately, the call center will transition to Metrotech, and will be managed to the same service level as KEDNY (59 percent of calls handled within 30 seconds).⁹⁸ Prior to the transition, KEDLI’s service level averaged 41.2 percent of calls handled within 30 seconds (as of November 2013).⁹⁹
- National Grid considered four options for handling KEDLI customer service calls, and determined this approach to provide the best balance of costs and quality, while minimizing the loss of downstate NY jobs. The options evaluated were:
 - Establishing a new, stand-alone call center on Long Island dedicated to KEDLI.
 - Fully outsourcing KEDLI’s call center.
 - Relocating the KEDLI call center operations to an existing National Grid Gas call center.
 - Relocating the call center to an existing National Grid Gas call center and using a third-party for certain services.¹⁰⁰
- National Grid projected (as of July 2013) an increase in the call center operations estimated cost per call from \$5.02 for combined KEDLI and LIPA operations, to \$5.78 per call if all KEDLI calls are handled internally by National Grid as planned (no outsourcing). This represents an estimated increase of \$688,000 in 2014.¹⁰¹
- As part of the LIPA transition, National Grid and PSEG-LI entered into an agreement allowing National Grid to continue to use the eleven existing customer offices on Long Island, thus creating no service disruption for KEDLI customers who use these

⁹⁶ During the LIPA contract National Grid read the KEDLI gas meters and LIPA electric meters concurrently as part of the same route. The fee paid to National Grid was based on manual reads. Had National Grid implemented AMR at that time it would still have been required to read the LIPA electric meters manually with resulting inefficiencies.

⁹⁷ The staffing plan calls for an additional 62 FTE to handle the anticipated KEDLI call volume. LI Gas Transition Plan (DR 173)

⁹⁸ DR 140, 173, 597 and IR 44. The current New York Service Level Agreement contains a KEDLI service level target of 40 percent of calls answered within 30 seconds.

⁹⁹ DR 598

¹⁰⁰ DR 140, Attachment 2. National Grid Gas planned to outsource a portion of the calls.

¹⁰¹ DR 140, Attachment 3, Cost data as of July 2013.



offices.¹⁰² According to the plan, PSEG-LI will accept KEDLI payments at all offices, and provide space for two to three KEDLI tellers at the three offices with the greatest KEDLI activity.

- National Grid projected a one percent increase in the costs for the customer offices from FY 13 to FY 14 as a result of adding nine tellers (total) at these offices.¹⁰³ This increase in costs did not include the additional capital and operating investment required to add separate KEDLI payment kiosks or any fees payable to PSEG-LI associated with its acceptance of KEDLI payments. Both these elements would further increase costs.¹⁰⁴
- As of July 2013, KEDLI anticipated no change in the use of authorized payment locations following the transition.¹⁰⁵

23. National Grid plans to implement AMR in the KEDLI service territory which should improve the accuracy of the meter reads and reduce the number of estimated reads.

- Previously, National Grid enjoyed the synergies of reading gas and electric meters for Long Island customers at the same time. Meters were read on a bi-monthly basis, while billing occurred monthly. Customers received an estimated bill in the months the meters were not read and an actual bill when the meters were read.
- Bi-monthly reading reduces billing accuracy and contributes to customer confusion, which, in turn, affects the call center and collections.
 - Customers that receive consecutive estimated bills may not understand why their bill is so different when they ultimately receive a bill based on an actual read.
 - Additionally, if the estimates have understated usage, the customer may not be able to pay the bill when it receives a high actual bill.
- AMR allows the utility to drive or walk by a customer's premise and read the meter remotely, thus increasing the number of meters that can be read in a day and eliminating the need to enter the customer's premise.
- Additional benefits associated with AMR implementation include a reduction in resources needed to perform special reads and physical disconnections, fewer billing errors, improved customer satisfaction, and the ability to capture hourly consumption data.¹⁰⁶
- With the loss of the LIPA contract, National Grid estimated an annual increase in meter reading operating costs of \$3.5 million (40 meter reading FTEs) due to the loss

¹⁰² DR 140, Attachment 2, http://www2.nationalgridus.com/contact/contactus_li_visit.jsp.

<https://www.psegliny.com/page.cfm/Account/Payment/CustomerServiceCenters>

¹⁰³ DR 140, Attachment 2

¹⁰⁴ DR 140, Attachment 4

¹⁰⁵ DR 140, Attachment 2

¹⁰⁶ US Sanctioning Paper – KEDLI LI Gas AMR Mobile (DR 145)



of synergies and the switch to monthly reading.¹⁰⁷ To mitigate the potential cost impact on customers, National Grid conducted an evaluation of the potential costs and benefits of the implementation of AMR on Long Island.

- On September 26, 2012, the US Sanctioning Committee approved a \$47.42 million investment (+/- 10 percent) to implement AMR on Long Island. This was expected to eliminate the need for the \$3.5 million increase in operating expenses and is projected to reduce operating expenses by an additional \$6.3 million associated with a reduction in the current meter reading work force.¹⁰⁸ The project had a positive 20 year net present value (NPV) of \$9.2 million and an internal rate of return of 14.7 percent based on a discount rate of 10.75 percent), a cash flow break even in nine years and an NPV break even at year 14.¹⁰⁹
- The first dedicated AMR routes (30,000 meters) were expected to go live in late April or early May 2014.¹¹⁰ The program is scheduled to be completed by September 2015.¹¹¹
- National Grid estimates an improvement in the actual read rate from the current overall rate of 78 percent to above 95 percent. For the 43 percent of Long Island gas customers with meters located inside the customer's premise the meter read rate will improve from 54 percent to above 95 percent.¹¹²

24. Further consolidation of KEDNY and KEDLI is unlikely to provide additional benefits to ratepayers in excess of the costs of consolidation.

- KEDNY and KEDLI have adjacent service territories, with KEDNY serving the boroughs of Brooklyn, Queens and Staten Island, all parts of the City of New York, and KEDLI serving Nassau and Suffolk counties on Long Island and the Rockaway Peninsula in Queens. Due to their separate history, the two entities remain separate legal entities, with separate tariffs, financial books and rate plans.
- According to National Grid, the primary barrier to formally combining the two legal entities and consolidating assets and rate tariffs is the "two county" rule in the Internal Revenue Code.¹¹³ Under the two county rule, a gas utility that serves no more than two contiguous counties (or one city and one contiguous county) is able to issue federal tax-free debt to finance facilities investment. In the past, KEDNY issued \$800M of tax free debt under this rule, of which \$650M is still outstanding. To maintain this tax-free status, National Grid believes the two gas systems must be operated as separate systems.

¹⁰⁷ Queens/Nassau gas meters have a 68 percent saturation density when compared to the number of electric customers. Suffolk County has a saturation density of 37 percent. US Sanctioning Paper – KEDLI LI Gas AMR Mobile (DR 145)

¹⁰⁸ US Sanctioning Paper – KEDLI LI Gas AMR Mobile (DR 145)

¹⁰⁹ DR 140, Attachment 5 and DR 145

¹¹⁰ DR 598

¹¹¹ DR 596

¹¹² US Sanctioning Paper – KEDLI LI Gas AMR Mobile (DR 145)

¹¹³ DR 136, DR 576 and IR 219



- In large part, National Grid operates KEDLI and KEDNY on a centralized basis.¹¹⁴
 - All administrative, engineering, project management, environmental and safety functions are provided by National Grid USA Service Company.
 - Daily operations are provided under a single VP New York Gas Operations, although for reasons of geography, field operations have separate groups to service Long Island and Brooklyn.¹¹⁵
 - Following the separation of LIPA and KEDLI, National Grid consolidated warehouses so that both KEDLI and KEDNY are served by a single warehouse.¹¹⁶
- At the same time, certain key elements of the two entities remain separate, including:
 - The two entities have different officers and separate Boards of Directors.
 - Each entity has its own tariff and rates.
 - Although they are co-located in one dispatch room, the two gas distribution networks are dispatched separately, with distinct monitoring and dispatch systems and separate gas control staff up to the Manager level.¹¹⁷
 - KEDLI and KEDNY hold separate contracts with interstate pipelines for delivery of gas, and specific gas purchases are made for each utility, although gas supply planning and procurement for both utilities are performed by the same personnel within the Gas Supply group.¹¹⁸
- Currently, the two entities have different rates and future growth patterns such that a combination of rates could disadvantage KEDNY ratepayers relative to KEDLI ratepayers.
 - Base residential heating distribution (decoupled) revenue targets are approximately \$790 per year for a KEDLI customer, and \$670 per year for a KEDNY customer.¹¹⁹ Assuming all else the same, consolidating rates would result in a transfer of costs from KEDLI customers to KEDNY customers.
 - The KEDLI service territory is experiencing growth rates greater than KEDNY. National Grid indicated that meeting the increased growth in KEDLI is requiring capital infrastructure investment that will not be fully offset by the additional revenues from the new customers and increased sales. It would not be appropriate to spread the cost of the additional KEDLI capital investment to KEDNY ratepayers.¹²⁰
- In addition to a potentially significant regulatory proceeding to consolidate assets, establish consistent rate structures and tariffs, the process of combining the two

¹¹⁴ DR 143, numerous interviews

¹¹⁵ IR 219, DR 143, numerous other interviews

¹¹⁶ IR 219

¹¹⁷ DR 576, direct observation, IR 98

¹¹⁸ IR 117, IR 118, IR 120, IR 132, DR 227, DR 48

¹¹⁹ IR 219

¹²⁰ Numerous interviews. National Grid has stated its intention to file a rate case for KEDLI within the next two years.



entities would require a large amount of legal filings, court fees, negotiations with unions and vendors, and development of new contracts and agreements.

- Possible benefits from consolidating the two entities would likely be limited:¹²¹
 - Single rate and other regulatory filings, rather than two separate filings, are unlikely to result in reduced staffing in the Regulatory and Pricing functional area. That function already has achieved efficiencies of scale, since it supports all NGUSA operating companies. Although some efficiencies might be gained at the PSC as they would only have one set of filings to review, rather than two, the reduction by one in the number of companies overseen is unlikely to significantly impact staffing resources.
 - Field operations might be able to consolidate supervision of some field crews. However, given the significant centralization currently in place, it is unlikely this would result in more than one or two supervisors.
 - Consolidation of the two gas dispatch activities might result in savings of one or two personnel, but the need for sufficient staff in the control center in the event of an emergency would limit the amount of consolidation possible.
 - No savings would likely result from consolidation of KEDLI and KEDNY pipeline contracts, as all purchases and nominations are already conducted by a single procurement group for all National Grid gas utilities.
- While it is theoretically possible to combine the two entities, the significant amount of legal and regulatory work required to merge the two entities, coupled with the possible risk to the tax exempt status of the KEDNY debt would be costly, with minimal additional benefits for ratepayers.

D. RECOMMENDATIONS

1. Reconstitute the NGUSA BOD by: 1) limiting the number of members who are also part of the US Executive Team, NGUSA Officers and Senior Managers to no more than two; 2) appointing at least one qualified truly independent Director who is not employed by any National Grid company; 3) filling the remainder of Director seats with either NG UK or NG-plc executives, or other independent, qualified individuals. Define the roles and responsibilities of the NGUSA BOD to include those typical of a corporate BOD, including review of financial performance and external auditor reports, review of risks, approval of both capital and operating budgets, and the ability and expectation to challenge and reject recommended projects and actions.
2. Reconstitute the BODs for KEDLI, KEDNY, and NMPC by: 1) limiting the number of members who are part of the New York Jurisdictional team, regardless of reporting relationship, to no more than one Director; and 2) filling the remaining two Director positions with executives from the other US jurisdictions or NGUSA who do not have responsibilities for New York operations. Define the roles and responsibilities of the subsidiary boards to include review of operating and financial performance, review of

¹²¹ DR 136, DR 576, IR 219, other interviews.



relevant external auditor statements, approval of service levels and budgets (e.g., SLAs), and approval of specific plans impacting their service territory, such as rate filings, major capital projects, and significant customer programs.

3. Continue to evolve the Jurisdictional organization model to establish a clear command and control structure for the NY Jurisdictional President, as described by NGUSA executives during the audit.
 - Improvements should include direct organizational reporting relationships between the NY Jurisdictional President and the full-time dedicated, senior managers who are responsible for the core utility operations and performance of the NY utilities such as those depicted in **Exhibit III-3**.
 - The NY Jurisdictional President should have direct reporting and control over NY-dedicated support personnel that plan, execute, monitor and control activities in support of the NY jurisdiction and operating companies.
 - As indicated by NGUSA Executives, this evolution is not a major reorganization nor should it result in increased headcount, but rather a re-alignment of reporting responsibilities and clarification of roles and responsibilities.
4. Establish a Chief Risk Officer within the NGUSA organization, reporting to the President NGUSA, with responsibility and appropriate authority, for coordinating, reviewing and challenging the results of all the various risk assessment groups, including the CRT, the CET/SOX compliance, Ethics and Compliance, and IAD to identify risk trends, track and manage financial and operating risks with materiality below NG-plc levels, and monitor that the plans prepared by the risk owners are appropriate and represent the best cost solution. This individual needs sufficient authority to direct changes in response to risks, and needs to remain sufficiently independent of the operations that they are able to identify patterns, and challenge assumptions patterns with impartiality. This individual should also work to implement necessary changes in the NGUSA internal controls processes so that, as part of the controls processes, sufficient attention is paid to findings that are material at lower reporting levels, and gaps/issues are brought to the attention of the relevant Jurisdictional President and the President, NGUSA.
5. Prepare a true strategic plan for NGUSA's New York operations to serve as a road map for investments, programs and operations in the state. The strategic plan should build on the state energy policy and Connect21 whitepapers and incorporate other PSC, state and federal energy and regulatory initiatives. The initial strategic plan should be presented to the NGUSA BOD and the PSC within six months, and should be updated and presented annually thereafter.
6. Conduct, or contract with qualified outside auditor for, an investigation into the cost impacts of the LIPA separation on remaining NY operating company ratepayers, and provide a report to the PSC staff within six months. The investigation should include:
 - True stranded costs broken out by labor and non-labor sources, and by capital investments and operating charges



- Expected revenues by basis (e.g., real estate, IT) and the time period for the revenue agreement.
- Incremental costs, both labor and non-labor, and capital and on-going operating costs or benefits
- Allocated costs (labor and non-labor combined if necessary), and an estimate of the aggregate impact of the reallocation of these costs on the remaining NY utilities.

The investigation should include a broad review of activities and functions that were performed with, or for the benefit of LIPA, rather than relying solely on prior listings of impacted areas. Where applicable and reasonable, existing studies can be used as sources for the cost estimates, with adjustments clearly specified. The investigation seeks to define and document the costs associated with the separation for future use.



IV. CAPITAL AND O&M BUDGETING (ELEMENT 5)

This Chapter addresses the NorthStar's review of National Grid's Capital and Operating & Maintenance (O&M) budgeting and budget management processes that are used for the New York gas operating companies.

A. BACKGROUND

During the performance of this audit National Grid, and its Finance function in particular, were dealing with two finance-related challenges of significance to NGUSA and the New York jurisdiction: (1) ongoing challenges arising from the implementation of the SAP enterprise resource planning (ERP) system in November 2012, and (2) repeated significant deficiencies and material weaknesses in financial reporting.

These two challenges are related and integral to National Grid's budgeting and budget management processes, because both these processes rely on the availability of data from the financial reporting system and on the use of finance team resources to support related financial analyses. The effort to stabilize the SAP system pulled resources from the efforts to remedy the controls issues. Simultaneously the SAP situation made many areas of financial deficiencies more difficult to resolve. Because these two situations affected nearly every area of the audit, the background and current plans for both situations are summarized in this chapter, rather than scattered throughout this report. The conclusions relating to the broad SAP and material weakness matters are also in this chapter; some conclusions in other chapters of the report relate to specific issues that are SAP-related.

Capital and O&M Budgeting Overview

Capital and O&M budgeting processes and reporting are typically separate, but closely related. Capital budgets are often driven from the top down by broad organizational needs such as customer and load growth and restrictions related to the capability of the utility to fund needed capital projects. O&M budgets are more often developed from the bottom up with recognition of the immediate physical needs of the system as well as long-term maintenance priorities. O&M budgets are also closely associated with the budget for capital expenditures both because new facilitates may affect the demand for O&M services and because the workforce may be used for both capital and O&M work resulting in a situation where additions to work in one area may require reductions in the other area. O&M budgets are often affected from the top by the same sort of funding restrictions that affect capital budgets.

Budgets are also important links to other areas of the company. Budgets must reflect the broader and longer term strategic plans that establish direction for the company. Budgets can be an effective tool in helping the company achieve its desired return on equity by identifying expenditures that contribute to or detract from the desired return. If budgets are timely and sufficiently detailed, they provide a roadmap for management to establish work



priorities. They also provide dynamic feedback that informs managers when their activities have deviated from the plan and may result in not achieving the desired results.

In previous reviews of the capital and O&M budgeting processes at other utilities, NorthStar has identified weaknesses such as the following:

- Managers at inappropriate levels make decisions in the budget preparation process.
- Managers apply inconsistent rationale in decision making.
- Cost effective, efficiency improvements, and long-term maintenance priorities consistent with safety and reliability standards are deferred due to lack of capital.
- Decision-making criteria are not well-articulated or documented and are not consistently applied across all business units.
- The budgeting process does not have sufficient input from the bottom.
- The interface between workforce planning and the budgeting process is not clearly described and effectively implemented.
- Budgets and the related variance/management reporting processes are not consistent with operational plans or the implementation of those plans.
- Reports provided to managers are not useful in assisting managers to exercise their business responsibilities. Too often financial reports do not provide the appropriate detail and structure needed by operations managers.

Organization

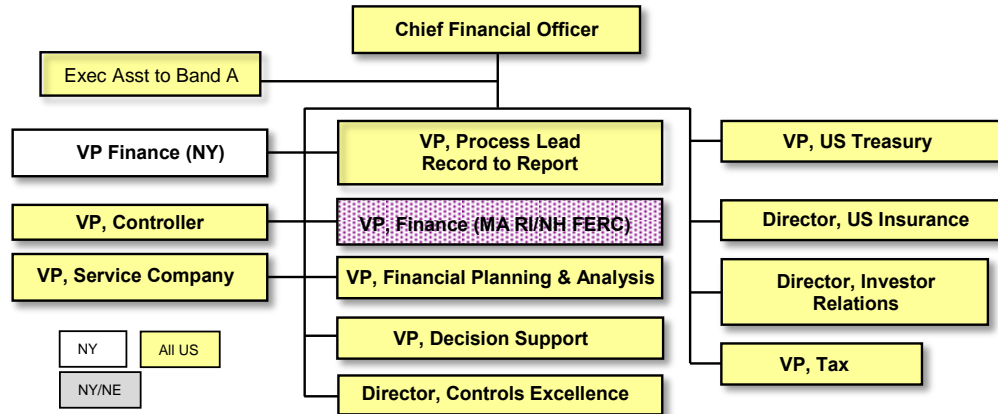
The National Grid Finance function shown in **Exhibit IV-1** provides financial and accounting resources for all 14 NGUSA operating companies on a consolidated basis. There are no finance or accounting activities within any other functional groups. A designated VP Finance for the New York jurisdiction and his staff provide financial support to the NY Jurisdictional President, but all of these resources are a part of the National Grid Finance function and report to the NGUSA CFO. Capital and O&M budgeting is conducted within the Finance function by the Financial Planning and Analysis (FP&A) group and the Decision Support group.

The VP Finance for NY has two direct reports and 16 dedicated resources to support the NY Jurisdictional President and the four New York regulated utilities (electric and natural gas).¹ One sub-unit (a Director and three Analysts) does monthly profit and loss reporting for the NY jurisdiction and operating companies, including investigation of budget versus actual variances. The other sub-unit concentrates on revenue analysis. The NY Finance unit supports rate filings and participates in the Capital and O&M budgeting processes. It does not interface with either the Operations or Network Strategy functional areas, which are supported by the Decision Support group for financial oversight and analyses. The Decision Support group also supports the state jurisdictional teams for budgeting, actual to variance analyses, and other internal consulting efforts. The group is described more as producing ad hoc reports than having responsibility for standard production reports and analyses.

¹ Prior to January 1, 2014 National Grid's finance function included financial services in support of the LIPA MSA. LIPA was not included in the NY jurisdictional structure.



Exhibit IV -1 National Grid Finance Organization



Source: DR 1

FP&A is characterized as providing “corporate” support and financial analyses to NGUSA executive levels and “upstream”. This group is the owner of an Excel™ based “Super Model,” which is used along with data from SAP Business Intelligence (data warehouse) to design and develop finance reports.

The Foundation Program (2010-2012)

Following the Key Span merger in 2007, National Grid operated with several inconsistent business processes across numerous technology platforms. This complex support structure introduced significant technical risk associated with several business-critical systems running on aged infrastructure, often with limited or decreasing vendor support. National Grid identified SAP as the architectural solution to replace the fragmented systems and processes and to help reduce technical risk. This effort was identified as the US Foundation Program (USFP).

The USFP effort was mobilized during the first half of 2010.² National Grid initially used the consulting firm of Deloitte to assist the company develop the high level design for USFP. The company later determined that a multi-partner approach would better meet its needs and replaced Deloitte with Ernst & Young and Wipro. Implementation activities including: Design, Build, Testing, Training and Engaging the Business units were begun in parallel with the high level design.

The primary objective of the USFP was the integration of National Grid’s Human Resources (HR), Supply Chain, and Finance (Back Office/Enterprise Resource Planning) information technology platforms and business processes.³ The USFP consolidated systems onto a single SAP ERP platform to replace and improve the functionality previously

² DR 216

³ DR 152



delivered by the Oracle and PeopleSoft ERP suites and associated applications. The USFP design objective was to enable National Grid to redesign business processes, provide additional functionality, and address recommendations from the Commission-directed Management Audit of Niagara Mohawk's electric business and Liberty Consulting Group's independent affiliate relationship and transaction review relating to:

- Financial/regulatory reporting, business planning capability and improved controls;
- Simplification of business processes and the associated systems landscape (e.g. single ERP, fleet, sales tax, fixed asset, and time entry systems);
- A single set of allocation methods and separate coding specifically for each overhead/burden type;
- Treatment of direct assigned service company costs that are directly reported on affiliate company financial ledgers;
- Automated Delegation of Authority to streamline the process and enable proper control of expenditures;
- An integrated investment portfolio and improved project management capabilities to enable work order ownership to become a "cradle to grave" process, with work breakdown structures as well as more accurate reporting of assets and the timely close out of work orders;
- Enhanced vendor and product stability; and
- More consistent organization hierarchy structure that provides more accurate workforce reporting.⁴

The USFP Conceptual Application Diagram (CAD) design was comprehensive and the program scope included:

- Finance (all elements)
- Supply Chain (including travel and fleet management)
- Human Resources (including time entry)
- Customer Master Data
- Non-Utility Billing
- Supplier Self Service
- Business Information Warehouse (internal and external data repository)
- Business Objects Planning and Consolidation (BPC)(planning, budgeting, forecasting and consolidation)

USFP also included the design of 89 new processes, 51 legacy systems interfaces, 17 third-party interfaces, and 7 upgraded or new non-SAP system interfaces.⁵

The USFP was approved in stages beginning with a sanction request in June 2009 to mobilize the project team. A number of subsequent sanctioning requests were presented during the mobilization, high level design, detailed design, preliminary build and build

⁴ DR 152

⁵ DR 152 Attachment 1 and DR 216



phases of the project as estimates became more refined. A summary of the sanctioning history of USFP as of mid-2012 is shown in **Exhibit IV-2**.⁶

Exhibit IV-2
USFP Sanctioning History – All US Companies (\$m)

Time Period	Amount	Activity
June 2009 – June 2012	\$291.0	Mobilization through Implementation
2012 Updated Request	\$382.8	Build and Implement
2012 Final Request	\$383.8	Final Project Sanctioning

Source: DR 152

The final sanctioned estimate for the USFP was approximately \$384 million, which assumed the project would be launched on October 1, 2012 and included six weeks of post go-live support. National Grid estimated approximately \$9 million of additional software license fees to be incurred for a total estimate of \$393 million for development and implementation.⁷

An initial go-live date of December 11, 2011 was set by the team and then modified. The overall timeframe for USFP development and implementation is shown in **Exhibit IV-3**. The company formed a Risk Assessment Board (RAB) to make the final go-live decision. On September 4, 2012 the RAB determined that the then-scheduled October 12, 2012 date was not viable. By September 24, the RAB tentatively set November 5, 2012 as the go-live date. On October 1 the cutover process was initiated. Superstorm Sandy struck landfall the evening of October 29, 2012 in New Jersey. The storm had been predicted and tracked as early as October 21, 2012. The final decision to go-live on Monday November 5 was made on Sunday November, 4 despite the damages caused by Superstorm Sandy.

National Grid reported that many factors were considered in deciding to go ahead with the November 5 go-live date including:

- Portions of the system necessary for storm restoration could be postponed without significant ramifications.
- A delay during the cutover process would have required extension of business continuity plans which would have created significant risk.
- No plan had been developed to convert mid-month.
- The company had decided it could not go-live December 2012 and not between January 1, 2013 and March 31, 2013 due to financial reporting requirements
- Delaying to April 2013 or later would require significant additional expense and delay in achieving anticipated benefits from implementation.⁸

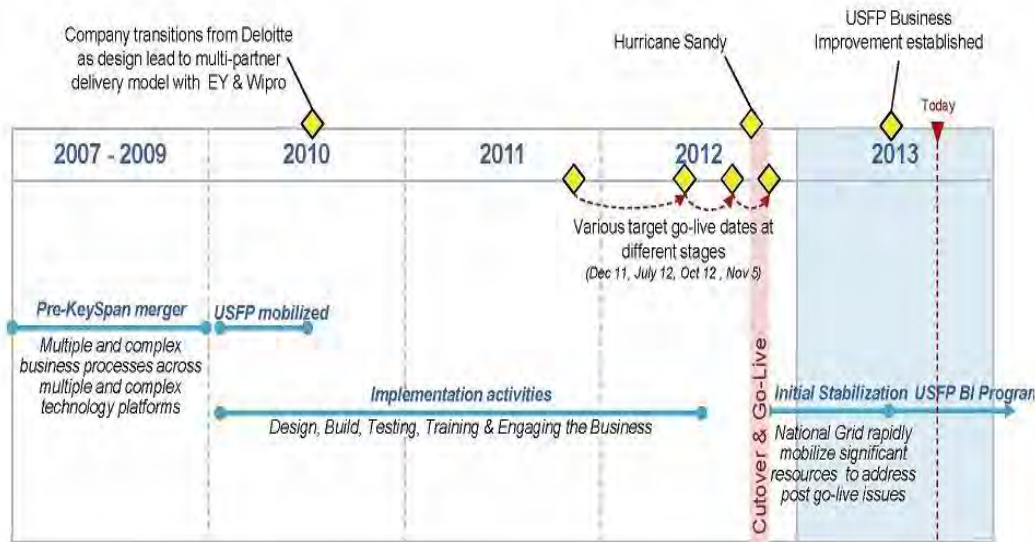
⁶ DR 152 Attachments 2 and 3

⁷ DR 152 Response Page

⁸ DR 216



Exhibit IV-3 USFP Overall Timeline



Source: DR 216

Modifications were made to the deployment strategy and National Grid moved ahead with the November 5, 2012 go-live date.

USFP Stabilization Program (2012-2014)

The first evidence that the implementation of SAP had issues was with the first payroll processed. When errors were first discovered, the company was slow to react because a level of errors higher than historically experienced was expected. However, it soon became apparent that the level of errors in payroll was far greater than expected. Additional resources both from within and without National Grid were applied to resolve the payroll problems. Errors continued to occur for almost a year after the go-live date.⁹ Because of the payroll errors, the company also requested a 30 day extension from the IRS for filing of W-2s. Even with this extension, some W-2s were still late. In September 2013, NGUSA reached an agreement with the unions representing its employees and the Attorneys General of New York and Massachusetts to pay fines, back pay and a lump sum amount to each employee totaling almost \$12 million.¹⁰

Issues were also discovered with supply chain applications by the end of November. Additional issues emerged as time continued.

⁹ IR 58

¹⁰ [http://web.law.columbia.edu/sites/default/files/microsites/attorneys-general/National%20Grid%20To%20Pay%20\\$7M%20To%20Settle%20NY,%20Mass.%20Sandy%20Probes.pdf](http://web.law.columbia.edu/sites/default/files/microsites/attorneys-general/National%20Grid%20To%20Pay%20$7M%20To%20Settle%20NY,%20Mass.%20Sandy%20Probes.pdf)
and Fact Verification July 15, 2014



It took 43 work days to close the first month's financial books compared to less than a week with the previous systems.¹¹ While the time to close improved steadily, it remains at about eight days which is longer than the previous systems and longer than anticipated with the SAP system. Significant errors in financial and data reports were also discovered.¹²

In addition to these problems, the system only produced limited reports for management. Most managers have received only highly summarized reports of the costs they are responsible for since the go-live date. November 2013, eight months into the fiscal year, was the first time managers received a detailed cost report that also contained their corresponding budget figures.¹³ Some of the lack of reporting was as a result of the system design and many reports that had been provided by the predecessor systems were not provided in the design of SAP. Another reason for the lack of information to managers is that the philosophy of information access is that managers are expected to request tailored information and reports from the system with the support of analysts from Decision Support.¹⁴ The lack of staff with the high level of skills to query the data and produce reports for managers has greatly limited the success of this strategy.

To deal with the many accounting, payroll and supply chain issues the Company was grappling with, National Grid launched the USFP Stabilization Program. To support the program, 300 contractors were initially brought in to assist with payroll issues. A total of 450 contractors were eventually brought in to address payroll problems. Another 200 contractors were brought in to assist with supply chain issues. And, another 200 contractors were brought in to support the financial close issues.

The first priority of the stabilization effort was to ensure that National Grid could comply with its obligations including:

- Pay employees accurately and on time
- Pay vendors accurately and timely
- Provide legal, regulatory and other reports to external stakeholders that are accurate and timely

The team's second stabilization priority was to enable the Company to be efficient and self-sufficient in operating the SAP system and realize the benefits the system can provide without significant reliance on external support.¹⁵ The continuing effort to stabilize SAP was anticipated to be about \$30 million per month in September 2013.¹⁶

The presentation on USFP and the Stabilization Program to NorthStar on September 26, 2013 stated that there were 321 External FTE staff contracted as of August 2013. A graph indicated that these external staff would be reduced gradually to about zero by August 2014.

¹¹ DR 216

¹² DR 216

¹³ DR 510

¹⁴ IR 82

¹⁵ DR 216

¹⁶ IR 58. In DR 592 and Fact Verification 7-15-2014, National Grid stated that recent actual amounts over the last eight months have averaged \$20 million.



However, the graph notes that approximately 100 of these external staff will be recruited and on-boarded with the company by December 31, 2013.¹⁷ This raises the question of how many additional company staff will be necessary to support the USFP and the financial systems on an ongoing basis.¹⁸

National Grid established the USFP Business Improvement Program to oversee the activities necessary to efficiently and reliably deliver the full benefits from the USFP. The initial hope was that stabilization could be accomplished in CY2013. However, the plan currently calls for work to continue through much of CY2014. An upcoming upgrade package called Release 3 is intended to correct many issues in the current version of SAP. It is scheduled to be implemented July 18, 2014.¹⁹ SAP stabilization is anticipated to be achieved in September. It is expected that Release 4 will update various modules of SAP to the current versions provided by the vendor and will occur before the end of 2014.²⁰

Payroll is currently being produced with few errors compared to the months immediately following the go-live date. However, gaps in the existing system functionality continue to require workarounds resulting in decreased payroll efficiency and greater run times. The lack of efficiency requires excess staff.²¹

More reports for management are now available. However, many reports which managers received from the predecessor systems are still not available.²² Current estimates are that detailed budget data will not be available to managers until the July to October timeframe. Therefore, managers may not have reports with budget data until half way through the fiscal year.

The Company has discovered that capital expenditures (CapEx) have been below budget since the go-live date and operating expenses (OpEx) have been above budget. The Company believes the reason for this is that time reports by operations personnel are not correctly tracking capital costs and O&M expenses. Several analyses have been conducted to determine both the cause and the effect of this problem. For the period ending March 31, 2013, the Company booked several company-level journal entries in SAP (general ledger) to correct for the discrepancies. The Company devised “push-down” allocation methodologies to spread the adjustments across a population of work orders. Additional journal entries were also planned for the quarter ending December 2013 to further account for these discrepancies.²³

The goal for time to close the monthly financial books is within four work days of each month’s end by the March 2015.²⁴ There are several factors that may contribute to this improvement including:

¹⁷ DR 216

¹⁸ DR 514, 516-519, 529 and 594

¹⁹ DR 589

²⁰ DR 590

²¹ DR 216 p 36

²² DR 216 p 36

²³ DR 304, J

²⁴ DR 306



- Increased experience using the new system
- Correction of problems with the SAP system
- Enhancements to the SAP system that reduce the extent of manual workarounds

The Finance Remediation Program (2014)

In the post implementation period, extensive data validation and time consuming manual workarounds are required to complete certain external financial reports. These efforts place a great burden on an already strained organization. As a result, the independent auditor confirmed a material weakness in 2013; however, all of the individual entity financial statements received clean audit opinions. A comprehensive stabilization plan is in place to address the system and associated process issues that have arisen from implementation of SAP and the Company recognizes that it must renew its focus on properly resourcing and structuring US Finance to address controls deficiencies and focus on external financial reporting.

Some of the current significant deficiencies and material weaknesses are related to previous matters addressed by the company's independent auditors. Others are new and the result of difficulties related to the implementation of SAP. The Company's independent auditor previously confirmed material weaknesses in controls over financial reporting for the US business in 2009 and 2010. The Company launched a US Finance improvement program (Finance Enablement Program Oversight or FEPO) in 2011, which was designed, in part, to remediate identified controls deficiencies over financial reporting. Prior to completion of the work under FEPO, however, the Company went live with its new back office system (SAP) in November 2012, which aggravated existing issues and created new issues to be resolved. As a result, the FEPO program was abandoned before all areas could be addressed.

On February 24, 2014 the company presented a memo titled Finance Remediation Plan to the staff of the DPS. The memo explains that in 2013 the company identified certain deficiencies in its internal controls over financial reporting, which were confirmed in a letter from the Company's independent auditor acknowledging a material weakness and significant deficiencies in its control framework. In response, the Company developed a comprehensive Finance Remediation Plan. This plan will enable National Grid to improve the data quality and financial reporting and controls of the New York operating companies.²⁵

The Company's plan for addressing the financial deficiencies involves hiring approximately fifty additional resources and converting fifty current contractors to full time employees. In addition, staff from FP&A and from Decision Support will have their assignments reprioritized during the period from March through May 2014 to provide assistance in correcting the deficiencies.²⁶ A key effect of this reprioritization of work is that the earliest date that the Company can expect to have a detailed budget for FY15 is July 2014. Having a budget in July 2014 would be better than the previous year when the budget

²⁵ DR 559

²⁶ DR 513, 514, 516, 517, 518, 519, 520



was not input in the system until October 2013. The July date may be pushed back if the work to correct the deficiencies takes longer than currently expected.²⁷

Financial Impact Through April 2014

The total amount sanctioned for USFP (estimated mid CY2012), previously shown in **Exhibit IV-2** was \$383.8 million.²⁸ Because of the extensive manual workarounds currently required by the SAP system, National Grid continues to employ a large number of contractors to augment its staff. Updated costs including FY14 post the go-live amount, results in a total cost of \$426.5 million. Additional costs through FY15 are expected to be \$159 million.²⁹ This brings the estimated cost of the entire USFP program effort through FY15 to approximately \$945.1 million shown in **Exhibit IV-4**.³⁰ National Grid expects to add a total of 120 full-time equivalent (FTE) staff across five functional areas (Operations, USFP Business Improvement, Shared Services, Procurement, Information Services and Finance) to its permanent employment as a result of the need to support SAP.³¹ Some of these resources replace contractors.

National Grid has offered several observations on the root causes of the difficulties it has experienced implementing the USFP:

- Overly ambitious design
- Significantly underestimated the scale of transformation needed
- Ambitious business agenda during the project lifecycle limited availability of internal resources
- The multi-partner delivery model did not provide the intended benefits
- Lack ownership and accountability across some processes
- Testing was less effective than expected due to the limited range of scenarios considered and limited data availability
- Inadequate quality of data from legacy systems
- Too much focus on timeline and not enough on quality
- Training methods proved ineffective

²⁷ DR 591

²⁸ DR 152

²⁹ DR 593

³⁰ DR 216. Cost data reported September 2013.

³¹ DR 594, 9 FTEs in USFP termed “non-enduring” until 9/31/2014.



Exhibit IV-4
USFP Costs Incurred and Estimated
(\$ million)

US Foundation Program Total Costs Incurred (\$M)					
	Design, Build, Test, Launch	11/15/12 to 03/31/13	FY14 ³²	Estimated FY15	Total
Capital	\$231.6M	\$42.4M	\$32.7M		\$306.7M
O&M	\$128.0M	\$90.4M	\$261.0M	\$159M	\$638.4M
Total	\$359.6M	\$132.8M	\$293.7M	\$159M	\$945.1M

Source: DR 216. Data as of September 2013.

B. EVALUATIVE CRITERIA

- Does National Grid Gas use appropriate modeling software in the capital and O&M budgeting processes?
- Is the capital budgeting process documented, adhered to, appropriate and effective?
 - Project authorization
 - Project appropriation
 - Increases/decreases to authorization and appropriation amounts
 - Capital budget status reporting
 - Validation in advance of appropriation
 - Funding controls and other elements of the process
- Does National Grid Gas use budgeting guidelines, practices and procedures, including “zero-based” and other alternative methods, effectively?
- Are bottom-up and top-down processes for developing budgets for capital/construction classifications and categories appropriate?
- Does National Grid corporate affect budgeting priorities and allocations within National Grid Gas in a positive manner?
- Do allowed revenues/rates and financing opportunities or constraints adversely affect budget levels, and priorities?
- Are relationships among planned/budgeted expenditures, rate case proposed expenditures, and actual expenditures appropriate?
- Are actual decision-makers at appropriate levels in the organization?
- Are the roles and responsibilities of the BODs of the operating companies, NG-USA, and NG-plc in the capital and O&M budgeting processes appropriate? Are they provided with sufficient information to execute their responsibilities?
- Does senior management see and have access to a sufficient level of budget detail relative to their budgetary responsibilities?
- Are the roles of and relationships between regional and centralized planning and budgeting functions appropriate?
- Are the rationale and criteria used to make budget decisions consistent across NYS companies and departments?

³² Forecasting operating costs for FY14 in the range of \$250 to \$300 million (range includes the approximately \$139 million incurred April 1, 2013 through July 31, 2013).



- Does National Grid USA have a capital spending bias toward one state versus another, or between regulated affiliates?
- Are capital budgets managed and controlled?
- Is management held accountable for performance improvements, e.g., cost savings and productivity gains anticipated from specific capital and O&M programs and projects?
- Do near and long-term capital and O&M planned expenditures maximize new business and new customer opportunities, including potential new gas service customer requests?

C. FINDINGS AND CONCLUSIONS

1. National Grid was unprepared for the USFP in terms of technological complexity and the magnitude of business transformation requirements associated with an SAP implementation.

- NGUSA had very limited discussions with other U.S. utilities about their experience implementing and using SAP.³³ It relied on the experience of National Grid UK that had previously implemented SAP and on the previous experience of its primary consultants. While Wipro had extensive experience in Europe, it had virtually no experience at the time implementing an SAP platform for utilities regulated in the US.³⁴
- Building an SAP system requires the development of a series of components commonly referred to as RICEFWs (Reports, Interfaces, Conversions, Enhancements, Forms, Workflows). National Grid's design had a total of 636 RICEFWs. As **Exhibit IV-5** illustrates, this was a large number for even a large power utility. The USFP design was twice as complex as National Grid UK's R1 implementation of SAP and three times as complex as National Grid UK's R2 implementation.
- Testing was conducted during each phase of development of the USFP. One of the lessons learned is that the testing was designed to determine where the system did work rather than identifying the areas where it did not work. Another lesson is that errors were found in the final test stages. Fixes were installed but there was no time for retesting.
- The need for training was identified early on. In particular, it was recognized that many operations personnel would have to use significantly different methods to input their time worked. The company assigned a team to develop the necessary training. The team was in the process of delivering that training to operations personnel when Superstorm Sandy struck. A decision was made that the staff should stop training and assist in other areas of the company.³⁵

³³ DR 586

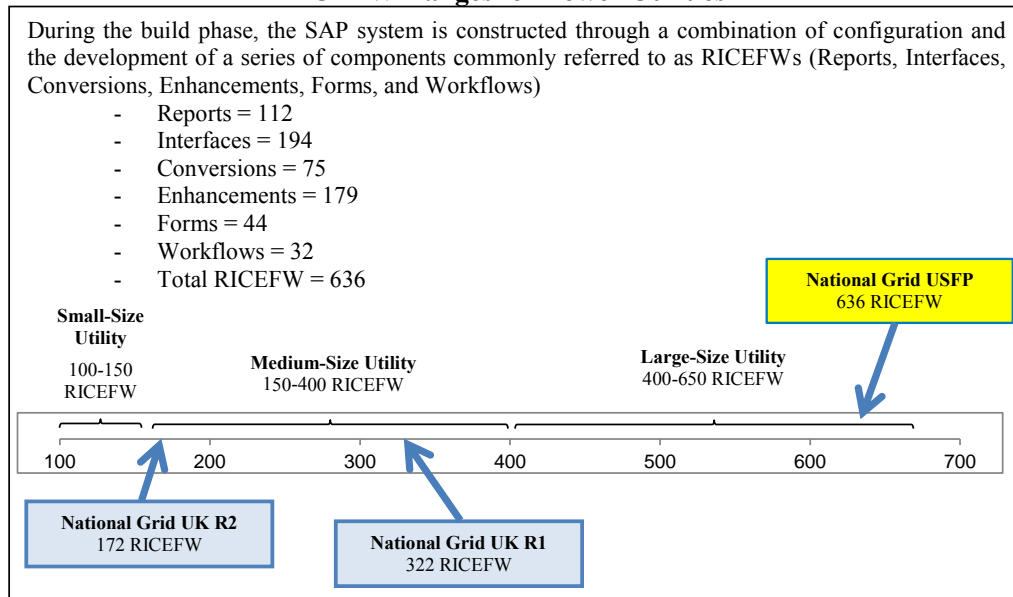
³⁴ DR 587, 588 and 642

³⁵ IR 55 – DR 613



- The USFP team considered both a staged go-live process and a single release strategy and determined that the single release strategy was preferred. During the implementation process a number of go-live dates were scheduled from December 11, 2011 to November 5, 2012.

Exhibit IV-5 RICEFW Ranges for Power Utilities



Source: DR 216

- The act of going live with a system as complex as the USFP requires many steps and some of them, such as conversion of data files, must occur prior to the go-live date. Even with a single release strategy, the go-live process occurs over several weeks with different functionality going-live on different dates.
2. **Many National Grid financial reporting and management problems are the result of program decisions and have evolved beyond SAP implementation to where they jeopardize the foundations of National Grid's financial management.**
- NGUSA has faced inadequate internal financial controls since its acquisition of KeySpan in 2007, as evidenced by the findings of prior management audit, the Liberty Audit, the Overland audit and its own Independent Auditors.
 - National Grid initiated the USFP and SAP go-live before solving existing significant deficiencies and material weaknesses, and did not address these in the USFP design plans.
 - USFP/SAP has created additional significant deficiencies and material weaknesses in financial controls.
 - Labor distribution is being processed manually to overcome USFP issues.



- National Grid has operated without detailed budgets for the better part of two years thereby limiting management's ability to make informed financial and operational decisions.
- National Grid was unable to definitively quantify the incremental benefits that will be enabled by the USFP. These were envisioned to be improved operational and shared services efficiencies, simplification and consolidation of IS infrastructure, and an overall reduction in the cost of IS services.³⁶ National Grid acknowledges that these benefits may never be realized, based on experience to date.

3. National Grid anticipates that the recently launched Finance Remediation Plan will address many areas that have contributed to the material weaknesses and significant deficiencies; however given that the work was still ongoing NorthStar was not able to determine the results of the effort.

- At least as far back as 2009, National Grid's Independent Auditor noted significant deficiencies and even some material weaknesses in numerous financial systems and controls across multiple operating companies. The Company's independent auditor confirmed significant deficiencies and material weaknesses in controls over financial reporting for the New York and several other US operating companies in 2009, 2010 and 2011.³⁷
- Neither National Grid nor its independent auditor identified material weaknesses in 2011 and 2012. However, in 2011 the independent auditor reported 52 significant deficiencies among all the NGUSA companies. All financial statements prepared by the company had clean audit opinions.³⁸
- The SAS 114 reports from the independent auditor to the NGUSA Board of Directors for FY2009, FY2010 and FY2011 identified 67 significant deficiencies relating to financial reporting and controls at the NGUSA and operating company levels. Twenty-six of these operating deficiencies were in NGUSA and the New York operating companies.³⁹ There were 16 material weaknesses reported in FY2009 and FY2010 for all the US entities. Among these were four material weaknesses in FY2010, one for NGUSA and one for each New York operating company.
- These failures of internal controls led to the formation of a project team to address the gaps. It was believed that the problems arose from the fragile "patchwork" of disparate applications since the acquisition of KeySpan in August 2007.⁴⁰ These included Oracle and PeopleSoft, Hyperion Planning and associated legacy planning, budgeting and allocation systems and the legacy fixed asset system PowerPlan (two instances). The USFP to implement SAP as a single financial system for all of National Grid was expected to resolve many of the internal control problems.

³⁶ DR 525

³⁷ DR 521

³⁸ DR 559

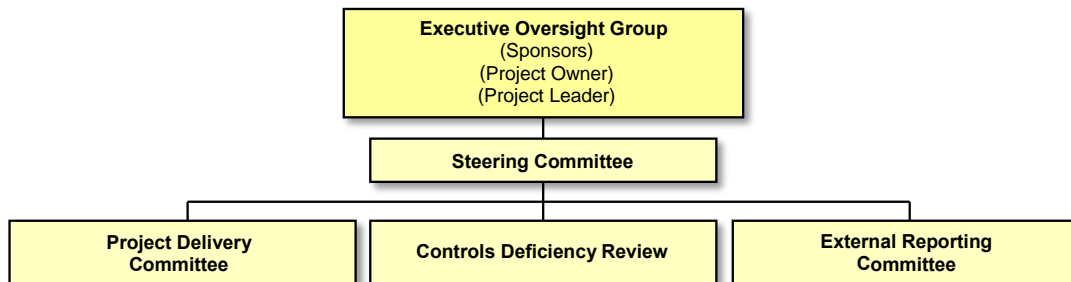
³⁹ DR 521

⁴⁰ DR 152



- National Grid also addressed these control weaknesses by establishing FEPO in 2011. While this effort made some progress, it was ended prematurely in 2012, due to the implementation of and then the effort required to stabilize SAP.⁴¹ The conversion to SAP has not resolved the significant deficiencies and material weaknesses. The conversion to SAP has increased the internal control problems. There are several reasons for this including: assignment of staff and contractors to several areas in an effort to stabilize SAP and produce timely reports, rather than decreasing the number of accounts that must be reconciled when National Grid was operating two different systems. SAP has in fact increased the number of accounts that require reconciliation.
- In December 2013, the independent auditor again identified material weaknesses in NGUSA's financial systems and controls.⁴² NGUSA responded to this finding by establishing the Finance Remediation Plan which it described to the PSC on February 24, 2014. The Finance Remediation Plan has the support and commitment of the Company's senior leadership and the successful execution of the plan is a top priority of the Company.⁴³ The structure and leadership of the Remediation Plan team are shown in **Exhibit IV-6**. It is important to note that many of the senior leadership of this effort were also the senior leaders of the FEPO which failed to achieve its objectives and which was allowed to simply cease operations when difficulties with SAP became apparent.

Exhibit IV-6
Finance Remediation Plan Oversight Team



Source: DR 559, pg. 3

- The Finance Remediation Plan will address many areas that have contributed to the material weaknesses and significant deficiencies that have occurred including:
 - National Grid anticipates that this plan will result in the issuance of financial statements with clean audit opinions for FY14 and the correction of many long-standing process weaknesses and lack of qualified staff. However, the work to complete the plan will likely extend beyond the deadlines for issuing this year's financial statements.

⁴¹ DR 559

⁴² DR 559

⁴³ DR 559



- National Grid has begun the process of adding 100 additional FTEs to the organizations responsible for these financial operations and has reprioritized the work of three quarters of the FP&A and Decision Support staff to assist in the remediation plan.
 - This reprioritization will delay other areas these departments are responsible, including preparation of the budget for FY15 which will not be completed until July 30 at the earliest and could be as late as October.⁴⁴
- Because the completion dates for the Finance Remediation Plan lie beyond the schedule and scope for this audit it is not possible for the auditor to comment now on the success of this effort.
4. **The USFP, Stabilization and Remediation programs have significantly increased costs charged to NY gas utilities. It is unclear whether and by how much these costs will decline as the initiatives are completed.**
- NGUSA has experienced significant increases in the finance area operating expenses, largely the result of USFP/SAP as shown in **Exhibit IV-7**.⁴⁵

Exhibit IV-7
NGUSA – Actual Operating Expenses
(\$millions)

Functional Area	FY11	FY12	FY13	FY14
Information Services	144,431	148,206	182,186	177,700
Finance	119,273	155,417	(101,629)	155,342
Corporate Cost Center	15,441	33,332	296,867	23,570
Total	279,145	336,955	377,424	356,612

Source: DR 238 and DR 238 Attachment 1, Supplement #2 for FY14.

- Actual operating expenses for the NY gas companies have experienced similar increases in USFP/SAP affected areas over the same time period as shown in **Exhibit IV-8**.⁴⁶

⁴⁴ DR 591

⁴⁵ DR 238 and DR 238 Attachment 1, Supplement #2

⁴⁶ DR 238



Exhibit IV-8
National Grid NY Gas Companies – Actual Operating Expenses
(\$millions)

Functional Area	FY11	FY12	FY13	FY14
NMPC-Gas				
Information Services	7,465	6,309	8,166	7,600
Finance	3,947	4,200	5,837	6,843
Corporate Cost Center	(64)	1,032	(2,738)	2,995
KEDLI				
Information Services	9,278	9,830	13,131	13,692
Finance	6,818	9,671	12,556	16,717
Corporate Cost Center	1,679	1,665	10,539	1,306
KEDNY				
Information Services	16,973	18,380	19,425	15,328
Finance	11,660	15,913	25,870	18,157
Corporate Cost Center	2,794	6,626	15,008	(3,979)
Total	60,550	73,626	107,794	78,659

Source: DR 238, FY13 figures updated in DR 238 supplement and Fact Verification.

- Employee resources are augmented with contractors and consultants. In some cases, contracted resources that have provided day-to-day accounting assistance (e.g., account reconciliations, journal entries, and external reporting activities) are being replaced with full time employee resources. There have been significant increases in staffing and the Finance function has incurred significant costs for contracted staff over the last five years in budgeting-related areas, as shown in **Exhibit IV-9**.⁴⁷

Exhibit IV-9
National Grid Finance Contracted Staff – Actual Expenses
(\$millions)

Finance Organization Contractors/Consultants	FY10	FY11	FY12	FY13	FY14 Forecast
Controller's Group (Accounting)	1.21	0.59	10.73	10.12	15.55
FP&A	0.06	0.03	1.83	0.27	0.59
Decision Support	0.34	0.45	1.32	0.83	1.30
Total	1.61	1.08	13.89	11.21	17.44

Source: DR 516

- National Grid reported that as of August 2013:
 - Approximately 108 National Grid employees were assigned to the USFP.
 - Additionally, 350 plus employees from various parts of the business participated in USFP.
 - National Grid retained approximately 450 external resources to assist with payroll difficulties.
 - Approximately 200 external resources were retained to support supply chain issues.⁴⁸

⁴⁷ DR 516

⁴⁸ DR 216



- While there was some indication that the number of external staff would be reduced gradually to about zero by August 2014, it was also noted that approximately 100 of these external staff would be “on-boarded” with the company as full-time employees by December 31, 2013.
 - National Grid is adding 120 FTEs across five functional areas (Operations, USFP Business Improvement, Shared Services, Procurement, Information Services and Finance) to its permanent employment in support of SAP.⁴⁹ Some of these resources are replacing contracted labor. Some permanent employees within FP&A and Decision Support are replacing contractors who have historically performed analysis of financial data.
 - The Finance Remediation Plan includes an effort to create a sustainable Finance organization that can meet its requirements. Approximately 100 FTEs are being added to Finance to meet this objective.⁵⁰
 - National Grid is therefore adding approximately 220 FTEs to support the USFP and Finance Remediation efforts.⁵¹
 - This increase in in-house staffing is in contrast to typical expectation for implementing an ERP, where after an initial increase in contractor resources during development and immediate post go-live, Finance group staffing declines to or below prior levels due to increased efficiencies.
 - The costs provided by NGUSA understate the actual costs incurred by an unknown amount due to the method(s) used by the Company to account for time of some employees doing work on the SAP stabilization program. If an employee is assigned to work full time on these activities then the employee’s time and expenses are charged to the assigned task. However, if an employee remains assigned part time to their traditional work and part time to the stabilization effort then none of their time is charged to the stabilization program. Furthermore, incremental expenses required for this work are charged to the stabilization program.
- 5. While National Grid has accepted responsibility for USFP/SAP issues that exceed program plans provided to and accepted by the PSC, the lack of clear definitions and cost tracking makes it difficult to determine allowed costs. Operating and depreciation expenses are projected to increase dramatically from recent levels.**
- The NG-plc BOD announced in September 2013 that all costs associated with SAP stabilization would be held at the corporate level and covered by stockholders.
 - National Grid presented its SAP business case justification to the PSC in the recent NMPC rate case (12-E-0201 and 12-G-0202). The information was provided in the direct testimony of the Information Services Panel.⁵²

⁴⁹ DR 594

⁵⁰ DR 513

⁵¹ DR 594



- Based on rate case testimony, the portion of the annual rent expense attributable to the USFP investment was described as follows:⁵³

Q. What is the cost of the US Foundation Program?

A. The costs for the US Foundation Program are currently estimated at \$365.8 million. Of this amount, approximately \$282.5 million comprise capital costs, and \$83.3 million comprise operating expense. Through March of 2012, National Grid has invested \$172.3 of the total estimated capital cost of \$282.5 million. In addition, although, as of the same date, in total, National Grid has incurred \$33 million of operation expenses of the total estimated operating costs of \$83.3 million through the in-service date of the USFP, the Company is not requesting recovery of what would have been its share of these expenses in this case.

Because the US Foundation Program is a shared investment, only a portion of the total investment would be allocated to Niagara Mohawk in the form of an annual rent expense as part of the overall IS service rent expense allocated to Niagara Mohawk. The portion of the annual rent expense attributable to the US Foundation Program investment is \$11,876,982 for the electric business and \$2,572,446 for the gas business in the Rate Year, as shown in Exhibit __ (RRP-3), Schedule 8. Exhibit __ (RRP-3), Schedule 8 also shows the forecast rent expense for the USFP to Niagara Mohawk for the Data Years.

- The testimony is inconsistent with National Grid's most recent USFP cost projections shown in **Exhibit IV-10**. The Exhibit also shows the forecasted rent expense for the USFP to NMPC, KEDNY and KEDLI.
- USFP costs are allocated to the NGUSA operating companies using the three-point formula.⁵⁴ While USFP charges were established in the recent NMPC rate cases (12-E-0201 and 12-G-0202), the KEDNY and KEDLI USFP costs are similarly established even if they are not currently in rates.
- NGUSA was unable to provide detailed support for "Excluding USFP" capital investments and related depreciation costs for inclusion in this report.⁵⁵ Nevertheless, the amount of "non-USFP" capital investment, exceeding USFP/SAP, in the same timeframe is unknown to NorthStar and makes the commitment to absorb all cost overruns questionable.
- NGUSA was unable to provide a detailed explanation for the USFP/SAP expense allocation methodology for inclusion in this report.⁵⁶

⁵² DR 525 page 32 at line 12

⁵³ DR 525 and testimony Exhibit (RRP-3), Schedule 8. Exhibit (RRP-3), Schedule 8

⁵⁴ DR 704: Three-point formula: net margin, net plant, net O&M

⁵⁵ DR 702

⁵⁶ DR 703, 704 and 705



Exhibit IV-10
IS and USFP Depreciation Expenses for NY Gas Utilities
(\$millions)

Depreciation "Rent Expense"	Actual CY2011	Actual CY2012	Actual CY2013	Actual CY2014	Budget CY2015	Budget CY2016	Budget CY2017
Depreciation Expenses Excluding USFP:							
KEDNY	1.04	2.08	2.14	2.75	4.12	4.03	3.74
KEDLI	0.26	1.06	1.57	2.16	3.34	3.27	3.04
NMPC-Gas	0.25	0.76	0.96	1.25	1.85	1.81	1.68
Total	1.55	3.90	4.66	6.16	9.30	9.10	8.46
USFP Depreciation Expenses:							
KEDNY		0.27	2.45	2.65	2.77	2.77	2.77
KEDLI		0.20	1.80	2.08	2.25	2.25	2.25
NMPC-Gas		0.12	1.10	1.20	1.25	1.25	1.25
Total		0.59	5.35	5.93	6.27	6.27	6.27
Total IS Depreciation Expense:							
KEDNY	1.04	2.35	4.59	5.40	6.89	6.80	6.52
KEDLI	0.26	1.26	3.36	4.24	5.59	5.52	5.29
NMPC-Gas	0.25	0.88	2.06	2.45	3.10	3.06	2.93
Total	1.55	4.49	10.01	12.09	15.58	15.37	14.73

Source: DR 525

- Even if National Grid stockholders accept the USFP/SAP overrun costs, the growth in National Grid IS depreciation expenses combined with the recent and projected Finance/IS/Corporate Cost Center operating expenditures is extraordinary.
- 6. Even after SAP implementation, National Grid's approach to management reporting relies heavily on complex Excel spreadsheets, an approach that is both labor-intensive and more subject to errors.**
- Internally used management reports are produced by one of several Excel spreadsheet models that are maintained and operated by the staff of FP&A. Different worksheets must be prepared for different levels of management. Currently, these worksheets are prepared for only for higher management levels:
 - Level 4 (L4): National Grid Regulated Operations
 - Level 5 (L5): National Grid Maintenance and Construction
 - Level 6 (L6): Total NY Gas by Department/Jurisdiction
 - As of March 2014, there were no reports prepared for levels below L6. And, if a manager wants more detail than this spreadsheet provides, the manager must request assistance from Decision Support to possibly write then run a custom query of data from SAP.⁵⁷
 - The Company's decision to rely so heavily on worksheets is particularly puzzling given that National Grid's independent auditor found evidence of significant deficiencies in the use of spreadsheets by NGUSA and some of its operating

⁵⁷ IR 92



companies as recently as FY 2011. In its report to management the independent auditor stated:

- Several input and logic errors in spreadsheets resulting in adjustments to the general ledger were identified.
 - These spreadsheets were not deemed key during the year ending March 31, 2011 and were not subject to key spreadsheet controls.
 - Both a design and operating effectiveness deficiency exists.⁵⁸
- Currently SAP Stabilization and the Financial Remediation Plan are placing a heavy burden on the financial staff who maintain and use these spreadsheets. These additional demands raise concerns over the quality of spreadsheet controls.

7. The capital budgeting process is formally documented in policies and procedures along with the Project Management Playbook.

- The National Grid US Sanctioning Committee Procedure provides overall policy covering capital project identification, approval and budgeting.⁵⁹ The procedure provides guidance for sanctioning and re-sanctioning investments greater than \$1 million. Its purpose is to establish a formal review and approval process for all National Grid services, US strategies and other investment proposals.
- National Grid's GEN03002 procedure establishes responsibility and accountability for the work order process – basic elements of the capital budget. Organizational areas of responsibility include Gas Systems Engineering, Customer Fulfillment, Public Works, Maintenance and Construction, and Resource Planning.
- Each fiscal year blanket funding projects (individual capital projects less than \$1 million, similar/repetitive work, and normally included as elements of a program) are presented to the US Sanctioning Committee for approval. They are assigned a default complexity/risk score as a group with an overview presentation. Blanket funding programs are reviewed at the end of each year.⁶⁰

8. National Grid's capital and O&M budget development process is performed during the second half of National Grid's prior fiscal year. However, as a result of SAP/USFP and related BPC issues, the budget process has only produced limited reports for management.

- The O&M budgeting process calendar of activities consists of the following steps:⁶¹
 - **Early October:** Begin annual O&M planning cycle. Provide preliminary guidance to Decision Support and functional areas on O&M growth from prior year, based on high level output from the Strategic Planning model. Resource

⁵⁸ DR 211

⁵⁹ DR 95 Attachment 1, effective May 2013

⁶⁰ DR 95 Attachment 1

⁶¹ DR 23



allocations across functions subject to adjustments resulting from the initiative prioritization process.

- **Late-October:** Solicit information from Decision Support and functional areas on proposed initiatives in the upcoming fiscal year.
 - **Early November:** Aggregate and share the proposed initiatives with JPs, stakeholders, and other responsible parties and schedule informational / challenge sessions.
 - **Mid-November:** Conduct O&M informational/challenge sessions to review and discuss proposed O&M initiatives and review preliminary draft of budget.
 - **Mid-November:** Distribute templates to JPs to rank/ prioritize the initiatives.
 - **Late November:** Calculate the final rankings and share list of prioritized initiatives to be incorporated into the final version of the budget.
 - **December:** Decision Support and jurisdictional finance teams enter final budget data in system; Financial Planning & Analyses (FP&A) consolidates and reviews budget submission.
 - **Early January:** Conduct final budget review session with all JPs, functional leaders and senior management.
- Capital budget planning and process steps include:⁶²
 - **April/May:** Begin annual capital planning cycle. Solicit preliminary capital requirements from the responsible parties.
 - **June:** Develop draft of the Business Plan, prioritize mandated work and regulatory obligations.
 - **July:** Distribute draft of the Business Plan to the responsible parties/stakeholders and schedule informational/challenge sessions (2 rounds).
 - **July:** Review and question the scope, justification, schedule, cash flows, and risk scoring for each project/program (2 rounds).
 - **July/August:** Incorporate results of the capital informational/challenge sessions, revise the draft Business Plan, and redistribute to responsible parties (2 rounds).
 - **August/September:** Conduct Business Plan review. Present the Business Plan to the JPs, jurisdictional delegates, vice delegates, VP of Engineering, and the Director of Resource Planning. Focus on financial requirements, remuneration, regulatory obligations, major projects and other key themes.
 - **August/September:** Revise the draft Business Plan as informed by the business plan review with the JPs.
 - **September:** Submit summary of Business Plan to Finance.
 - **October/November:** Finance consolidates “direct” capital spending plan from Investment Planning Group with “indirect” capital spending plan (*i.e.*, Property Services, Information Services, Fleet, etc.) for a total view of the capital spending plan by jurisdiction and entity.
 - **December:** Finance enters the capital business plan into the business planning application (SAP-BPC) for submission to the UK for consolidation into total corporate capital spending.

⁶² DR 23



- The SAP BPC application was expected to unify and streamline the planning, budgeting, forecasting and consolidation process.⁶³ However, that has not yet occurred.
- Most managers have received only highly summarized reports of the costs they are responsible for since the go-live date November 5, 2012. November 2013 was the first time managers received a detailed cost report that also contained their corresponding budget figures.⁶⁴ Many reports that had been provided by the legacy systems were not provided in the design of SAP.
- The FY2015 budget at the L4 level (fiscal year from April 2014 through March 2015) is expected to be available in June 2014 for information reported in May. The detailed budget at the L4 to L7 levels is expected to be available after July 2014. National Grid's worst case scenario for the budget at the L4 to L7 levels is September 2014.⁶⁵
- Another reason for the lack of timely financial information was a change in philosophy regarding information access. Managers are expected to request tailored information and reports from the system with the support of analysts from Decision Support.
- The lack of staff with the high level of skills to query the data and produce reports for managers has greatly limited the success of this strategy.
- Capital and O&M budget detail was not available to National Grid managers until the fall of 2013.
- As of October 2013, "draft budget information" became available but did not include anticipated adjustments to FY13 (fiscal year ending March 31, 2013) capital expenditures that were not available at the project level.⁶⁶
- Again in FY15, capital budget information will not be available until mid-year 2014 and detailed, department-level information may not become available until October 2014.⁶⁷
- The final step in the budgeting process is when the NG-plc Board approves the consolidated budget in March.⁶⁸ However, the Board review and approval package provided by the Executive Committee and issued by Group Financial Control is at a very high level and focused primarily on variances from prior projections including categories of:

⁶³ DR 152 Attachment 1 page 26

⁶⁴ DR 510

⁶⁵ DR 512

⁶⁶ DR 243

⁶⁷ IR 227

⁶⁸ DR 528



- US Controllable Operations - OpEx
- US Regulated Capital Investment - CapEx
- US Other Activities

9. National Grid uses escalation guidelines, trend data and new initiatives, together with allowed revenues/rates, mandated programs and financing constraints to develop O&M budgets. Zero-based budgeting is not used.

- Budget development begins with preliminary guidance from NG-plc to FP&A, passed on to Decision Support and then to functional areas based on prior year and high level strategic planning information. Initiatives (changes from previous year) are identified for review and discussion.⁶⁹
- The National Grid budget development process is a highly conceptual, goals oriented process as illustrated in **Exhibit IV-11**.⁷⁰

**Exhibit IV-11
National Grid Budget Process**



Source: DR 201

- NY jurisdictional budgeting priorities for FY14 are generally common across all NGUSA operating companies, and include the following:
 - Cost competitiveness – management of work plans and focus on costs per work unit
 - Customer responsiveness – gas conversion timeline
 - Safety – focus on reduction of RTC incidents
 - Stewardship
 - Regulatory electric reliability – upstate NY operations focus on CAIDI

⁶⁹ DR 23

⁷⁰ DR 201



- Emergency response – coordinated response program with NYCFD for large gas emergencies
 - Leak backlog – workload balancing to support timely leakage survey cycle
 - Overall Network Strategy priorities included infrastructure, new personnel training and adherence to FY14 budget.
- The budget guidance process along with categories of consideration and prioritization is illustrated in **Exhibit IV-12**.

10. While the budgeting process is followed at the functional level, information feedback is untimely and allocations to the various jurisdictional utilities with limited focus on local issues make it ineffective for operational management decision-making purposes.

- The budgets are developed by National Grid Service Company at a functional level for all of NGUSA in aggregate. As discussed in Chapter III, Executive Management and Governance, within NGUSA’s Jurisdictional organizational structure there are no NMPC/KEDNY/KEDLI managers. Nearly all NGUSA managers are employees of ServCo. A manager’s budget development product is essentially a functional budget that is then allocated to one or more operating companies.
- Budget guidance is for all of NGUSA – 14 regulated utilities in different states. There is limited ownership for activities and issues directly related to NY gas services.
- Initiatives identified by budget preparers compete for recognition across a larger financial landscape than just NY gas operations.
- Budget information is largely dependent on past practice. Unfortunately, NGUSA managers have received minimal and untimely budget and performance feedback information over the most recent three-year period.

11. National Grid budgeting is largely a “top-down” decision-making process with a bias toward financial targets. Allowed revenues/rates, mandated programs and financing constraints largely determine budget levels and priorities.

- As **Exhibit IV-12** illustrated, the emphasis of National Grid’s budgeting processes is on financial considerations such as profitability, earnings, investment and competitiveness.
- The O&M budget development begins with managers receiving a proposed budget target from National Grid’s finance team (FP&A and Decision Support).⁷¹ The proposed budget includes a one percent increase based on the prior year. This one percent increase is the combination of a two percent labor cost increase and an assumed one percent productivity improvement.

⁷¹ IR 179



Exhibit IV-12 Budget Guidance Process

FY14 Budget Guidance

Financial				Non Financial			
Returns	Cash Flow Management	Growth	Regulatory	Costs	Internal	Safety	Alva
● ROE: 8.8% to 9.2%		● Rate base growth: 5.5% to 7%	● Actual to allowed ROE >= 90%	● Controllable cost budget increase / (decrease): -1% to +1%	● ?? ● JD Power?	● ? Reliability ● ?	● Rank ● Performance JD Power ● Rank ● Performance
		Investments ● Cash flow from operations / Capex >= 0.9					

FY13 Projection

● Profitability	● Funding and Cash Flow Management	● Growth & Investment	● Regulatory & People Engagement	● Cost Compet'ness	● Customer Resp'ness	● Safety ● Reliability	● Stewardship
These themes align with the APP and Elevate 2015 CSR metrics							
P&L ● IFRS Bus Perf Operating profit \$(48)m adv to bgt Earnings Growth ● IFRS earnings \$169m fav to bgt and growth rate Returns ● ROE 9.1% CY12 ● ROCE 7.7% FY13	Cash flow management ● Cash Generation (operating) \$(40)m adv to bgt	Growth ● Rate base growth 6.8% Investments ● Cash flow from operations / Capex = 0.92	Regulatory ● Actual to allowed ROE = 92%	Costs ● Controllable costs versus budget Labor & productivity	Internal ● Customer service ● Website overall satisfaction ● Gas conversion process satisfaction ● Electric order fulfillment satisfaction ● Distributed Generation on-time interconnectors JD Power ● Electric and Gas overall scores	Safety ● RTCS ● OSHA Recordable Incidents ● LTIs Reliability ● SAIFI / SAIDI ● CAIDI / Storm CAIDI ● MCO ● Gas Leak Backlog ● Gas Emergency Response Time	Alva ● Rank ● Performance JD Power ● Electric and Gas Corporate Citizenship scores

Source: DR 201



- National Grid management has described on numerous occasions how senior management allocates available funds among various functions/companies to ensure the total outcome.⁷²
- The National Grid’s budgeting process focuses on financial capability (revenue) but does not otherwise have an inherent bias toward one utility versus another, or one state versus another.
- Operating budgets are largely inertia driven with stable resource levels, reliance on prior budgets, isolation of initiatives/exceptions and the requirement to fit within financial parameters (as illustrated in **Exhibit IV-12**).
- **Exhibit IV-12** also shows that the budget guidance process and information is predominately focused on utility financial performance including:
 - Returns ➡ - Profitability
 - Cash Flow ➡ - Funding and Cash Flow
 - Growth ➡ - Growth and Investment
 - Costs ➡ - Regulatory Engagement
 - Internal ➡ - Cost Competitiveness

12. Senior management’s emphasis on financial performance results in a “variance” management focus, rather than attention to root causes.

- Information is retrospective, not active or projected cost management.
- Budget information reported is predominately variances (budget minus actual). Information is based on functional areas, not tied to detailed items.
- Spending overruns are netted against underruns and projected year-end amounts. This is not meaningful from an operational management perspective, but concentrates on high level financial control and outcome orientation.
- Managing to total budget, variances should be indicators of operational issues. NGUSA management focuses on variances as the issue. NorthStar’s review of budgets, actual expenditures and variances over the last four years showed the following patterns:⁷³
 - Over the last three years, budget expenditures in NY were generally underrun and cover other functional area overruns
 - Major overruns such as USFP (shown in Finance and Corporate Cost Center) are covered by underruns in other areas
 - The result minimizes total variance

⁷² IR 227 on 2/26/2014

⁷³ DR 238



- The VP Finance for New York uses variance analyses to report on the New York gas companies' financial performance (as compared to budget and to the prior year) to the New York leadership team on a monthly basis.
 - The variance report shows and explains the “overs/unders,” and the written explanations of the variances in net margin from budget and the prior year.
 - These reports are provided to the Financial Planning and Analysis organization for use in preparing the Monthly Performance Review reports.⁷⁴
 - Areas highlighted include operating profit, controllable OpEx and capital investment.
- As an example of management's focus on variances rather than their operational causes, monthly finance report highlights are brief and high level. Typical variance explanations include:
 - Operating profit is \$16M unfavorable to budget
 - Net margin is \$1M favorable to budget primarily driven by favorable commodity timing of \$15M and other margin decreases of \$14M due to lower non-decoupled / unbilled margins and storm cost deferrals
 - Direct / indirect controllable OpEx is \$15M higher than budget mainly due to CDP adjustments processed in the month
 - Pensions and other employee benefits are \$1M favorable
 - Bad debt expense is \$1M higher than budget for the month due to higher net write-offs
 - Non-controllable costs are \$1M unfavorable primarily driven by residual storm costs of \$4M, capital related OpEx of \$1M and higher allocated depreciation of \$1M partially offset by favorable regulatory assessments of \$5M due to budget phasing differences
 - Other costs are \$1M unfavorable
- Utility operational issues, their related expenditures, capital expenditures and their impact are not highlighted in variance reports.⁷⁵
- The review of financial data also shows that while individual operating companies may have dramatic individual variances across functional areas (in excess of +/- 10 percent), the National Grid combined variance is minimal – only a few percent, and only one-tenth of one percent for FY13.⁷⁶

⁷⁴ DR 197 (Confidential) and 213

⁷⁵ DR 197 (confidential)

⁷⁶ DR 238



13. The roles and responsibilities of the NY operating companies' BOD and the NGUSA BOD regarding capital and O&M budgeting are entirely subordinate to the NG-plc Board; however the NG-plc Board approves only corporate performance expectations, not actionable budgets.

- There are a number of budgeting and planning areas where the NG-plc Board aptly takes the lead, for example around corporate governance, strategic direction, financial policy – including budget and business plans at a corporate level – and the reputation of National Grid and its operating businesses.⁷⁷
- FY14 and FY15 budgets were approved by the NG-plc Board without appreciable levels of detail.⁷⁸ The budgets presented to the NG-plc BOD addressed earnings per share expectations and total financing levels at US, UK and corporate levels. The materials provided to the BOD did not include information on US operating company performance expectations, capital budgeting levels or operating expenses either by operating company or by US jurisdiction.
- The NGUSA BOD does not generally discuss, review or approve budgets for any of the operating companies, functional units, or US operations in total. Over the past five years, minutes from the NGUSA BOD only mentioned budgets or business plans three times and only since 2012.
- The NMPC, Brooklyn Union Gas (KEDNY) and KeySpan Gas East (KEDLI) BODs do not generally discuss, review or approve budgets.⁷⁹ BOD minutes for the past five years included the word “budget” only three times.

14. Because the NY Jurisdictional President has limited management and financial control over shared services provided by ServCo the existence of strong, arm's length Service Level Agreements (SLAs) is essential for control and protection of NY ratepayers. The current agreements are primarily cost allocation mechanisms.

- SLAs are formal agreements between the suppliers and consumers of services. Similar to a contract between an outside vendor and the company, SLAs provide a mechanism for governing the business relationship between a regulated utility and a shared services organization. Typically, SLAs address:
 - Unbundled products and services provided.
 - Specific timing, volume, frequency and cost associated with each product and service.
 - Measures of performance or at least minimum acceptable quality for each product and service as delivered.
- Successful SLAs contain the following key elements:
 - Top management commitment

⁷⁷ http://www.nationalgrid.com/annualreports/2012/business_review/management_structure/

⁷⁸ DR 520

⁷⁹ DR 68



- A participative approach
 - Top to bottom involvement of staff
 - Customer input
 - A sound management framework
 - Defined metrics for measurement of performance and costs
 - Incentives and penalties for vendor performance
 - Regular review of service levels
 - Sufficient detail but not a step-by-step manual
 - Benchmarked services
 - Alignment with the operational utility needs
 - Simplified standard systems and processes
 - Leverage end-to-end process ownership
 - Strong performance management with greater transparency
- NGUSA uses ServCo, to perform the utility functions and allocates the costs associated with services provided to one or more operating entities.
 - The importance of SLAs needed to formalize the relationship between NGUSA's regulated utility operations and ServCo was noted in the 2009 management audit of the NMPC electric operations.⁸⁰
 - At the initiation of the Audit, there was a Service Agreement between ServCo (the Service Provider) and the Service Recipients (which includes KEDLI and KEDNY) that broadly defined the categories of services which may be provided by ServCo to the Service Recipients. Services were to be billed at cost. The November 2012 Service Agreement does not include performance measures, budgets or detailed descriptions of activities to be performed.⁸¹
 - In addition to the Service Agreement, services for NMPC were provided under 16 SLAs between ServCo and NMPC for the period August 1, 2011 through March 31, 2012 (the NMPC SLAs). The NMPC SLAs are not legally binding agreements.⁸² No such specific SLAs existed for KEDLI or KEDNY at that time.
 - Each of the NMPC SLAs provided a description of the services to be provided, an estimated aggregate budget (total gas and total electric), a description of the cost allocation methodology, and some Key Performance Indicators (KPIs), primarily those required by regulation. Limited targets were provided for the KPIs.
 - The NMPC SLAs also included a statement that the Service Provider was to provide appropriate reporting to the designated point of contact for the Service Recipient as described in the US SLA Governance Handbook.
 - The NMPC SLAs were subsequently extended beyond March 31, 2012 for an indefinite period; however, no new budgets were provided.

⁸⁰ Case No. 08-E-0827, Comprehensive Management Audit of Niagara Mohawk Power Corporation d/b/a National Grid's Electric Business.

⁸¹ DR 6

⁸² DR 7, Attachment 17



- Most of the services included in the both the Service Agreement and the NMPC SLAs are core competencies of a gas or electric utility, including:
 - Construction – labor, supervision and equipment for construction and maintenance.
 - Customer Services – policy development and functional direction of field business service departments.
 - Emergencies – assistance in maintenance and restoration of utility service and mobilization of personnel and equipment.
 - Engineering – civil, mechanical, electrical, technical advice, design, installation, supervision, planning, research, testing, technical operation and maintenance services.
 - Supply Procurement– planning for natural gas, electric power supply and contract negotiation.
 - Purchasing and Stores – purchase and storing of materials, supplies and equipment.
 - Rates – review, design, interpretation, analysis and special contracts.
 - Legal and Regulatory – analysis of laws, rules, regulations and actions with regulatory and governmental authorities.
 - Operation
 - Finance
 - Human Resources
 - Corporate Affairs
 - Audit
 - Information Technology
 - Safety, Health, and Environmental (SHE)
 - Strategy and Business Development
- The Service Agreement includes a section on Cost of Service but the information provided is minimal and not particularly useful for cost management or financial accountability.⁸³
 - The cost of service will include all costs of doing business incurred by Service Company, including a reasonable return on capital.
 - The Service Company will maintain an accounting system for accumulating all costs on a project, activity or other appropriate basis.
 - The methods of assignment or allocation of costs shall be reviewed annually or more frequently if appropriate. Subject to the terms of the Agreement, if the use of a basis of allocation would result in an inequity because of a change in operations or organization, then Service Company may adjust the basis to effect an equitable distribution.
- Neither the Service Agreement or the NMPC SLAs provide authority or controls to the Jurisdictional organization or the PSC.⁸⁴ ServCo is not regulated by the PSC and therefore avoids direct regulatory oversight of products and services.

⁸³ DR 6



- Neither the Service Agreement or the NMPC SLAs contain unit prices for products and services, minimally acceptable levels of quality, volumes to be provided, or performance timeframe. Lacking these fundamental elements, the current Service Agreement and NMPC SLAs cannot be considered viable SLAs.

15. National Grid has made only limited progress in developing SLAs since the 2009 management audit and the SLAs presented to the PSC in September 2013 do not provide sufficient controls to meet the needs of the NY Jurisdictional President, the PSC or NY ratepayers.

- During the course of the audit, an effort was underway to enhance the existing SLAs by providing more detailed service descriptions and, where possible, targets to demonstrate and ensure that the services provided by the service companies achieve reasonable levels of quality and performance. Under the terms of the Joint Proposal in Cases 12-E-0201 and 12-G-0202, enhanced SLAs for NMPC were to be submitted to Staff on September 30, 2013. The Company also committed to submit enhanced SLAs for KEDLI and KEDNY to Staff by December 31, 2013.⁸⁵ According to the Joint Proposal:

National Grid will develop Service Level Agreements (“SLA”) that contain service descriptions that align with the stated budgeted cost for each service and, where possible, targets to demonstrate and ensure that the services provided by the service companies achieve reasonable levels of quality and performance. National Grid will also develop external cost comparisons to demonstrate and ensure that SLA costs are reasonable relative to appropriate market alternatives. National Grid will develop the enhanced SLA service descriptions and corresponding budgets, as described above, and submit amended SLAs to Staff no later than September 30, 2013. Further, National Grid will submit to Staff by March 31, 2014 the external cost comparisons developed for no less than one-third of the Service Company functions. By March 31, 2015, National Grid will submit to Staff the external cost comparisons for another one-third of the Service Company functions; and by March 31, 2016, National Grid will submit to Staff the external cost comparisons of the final one-third of Service Company functions.⁸⁶

- On September 30, 2013, National Grid presented 14 SLAs between ServCo (the Service Provider) and NMPC, KEDNY, and KEDLI (the Service Recipients) to the PSC (the 2013 SLAs). The 2013 SLAs are signed by the NY Jurisdictional President, as the representative of the Service Recipients, and by the respective functional executives.⁸⁷

⁸⁴ DR 6

⁸⁵ DR 7

⁸⁶ DR 176

⁸⁷ DR 440



- SLAs were developed only for NMPC, KEDNY, and KEDLI, indicating that they were prepared in response to NYS regulatory requirements, and are a limited approach to managing the relationship between regulated entities and ServCo.⁸⁸
- In terms of “What services are being provided to the Service Recipients?” the 2013 SLAs contain only broad service descriptions that align with the functional organization structure, and present a functional list of their activities. They fail to unbundle products and services being provided by ServCo.
- For “What is the anticipated (budgeted) cost of each service?” the 2013 SLAs show the allocated budget for NY gas companies, to the degree known by the Service Company, for their respective organizational units. Identification of “each service” is limited to the activities performed within the existing Service Company functional organization. It is merely the budget without a breakdown of unit prices for products and services. The cost is the organization’s budget allocation methodology, having little to do with the actual cost of services or their cost drivers.
- In terms of “How is performance of the services measured and what are the appropriate service levels?” the 2013 SLAs include some KPIs, shown in **Exhibit IV-13**, attempting to show that the services provided by the Service Providers must achieve reasonable levels of quality and performance.
 - The KPIs provided are in some cases inappropriate (e.g., for “operate the gas control room” the KPIs are CAIDI and SAIFI, which are electric reliability measures⁸⁹), in some cases they are aspirational goals, a percentage of activities to be performed (apparently for the same cost as all activities performed), in many cases they are not “key” to performance, do not address minimum levels of quality, and for some functions are simply not provided.⁹⁰
 - According to the terms of the 2013 SLAs, the KPIs will be monitored and reported in FY13. Beginning in FY14, KPIs will be measured and reported on an annual basis. Certain KPIs will be measured on a calendar year basis while others will be measured on a fiscal year basis.⁹¹

⁸⁸ DR 146, 423, and 440

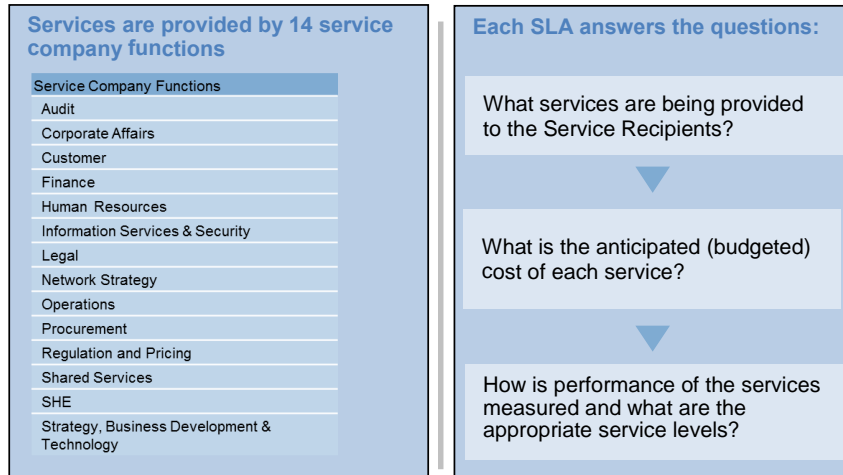
⁸⁹ Customer Average Interruption Duration Index (CAIDI) and the System Average Interruption Frequency Index (SAIFI) – are common electric utility reliability measures.

⁹⁰ DR 146, 423, and 440

⁹¹ DR 146



**Exhibit IV-13
National Grid Presentation of SLA Contents**

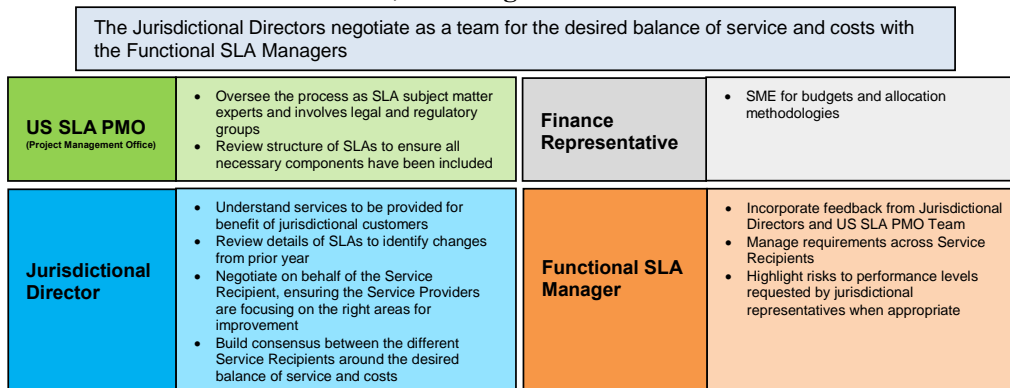


Source: DR 440

16. As a result of the jurisdictional organization model, the current SLAs cannot be considered an “arms-length” agreement between supplier and consumer organizations.

- National Grid’s 2013 SLAs do not differentiate Service Providers (e.g., ServCo) from service recipients, e.g., the operating utilities as consumers, as illustrated in **Exhibit IV-14**.
- The SLA creation, challenge and renewal process duplicates the O&M budgeting process and does not represent any “negotiation” of performance or cost.

**Exhibit IV-14
SLA Creation, Challenge and Renewal Process**



Source: DR 423



- The “virtual utility” created by NGUSA’s jurisdictional organization model results in all managers being members of the same ServCo organization. They are not employees of the NY gas companies and do not even have direct reporting responsibility to the NY Jurisdictional President. Therefore, the budgeting and financial management exercise is merely theoretical as service providers and clients are in fact the same.
- The individual departments that provide services are budgeted each year in aggregate and provide the NY gas companies with a set budget figure, allocated from the whole functional budget amount. Any challenge of costs or level of service may occur at the senior management level but amounts to little more than cost-leveling and reallocations among the 14 regulated utilities.

17. Presently, SLAs fail to address accountability for results and the consequences of not providing products/services, unacceptable quality or over-providing.

- As described above, budgets are developed from approved rates, financial guidelines and cost allocations. Thus, NY gas company customers pay for ServCo products and services at approved budget levels. There are no revenue adjustments made for ServCo providing fewer products and services than planned, deviations in product/service quality, or provision of amounts greater than planned.
- The impact of paying for “budget” amounts can be illustrated by the following:⁹²
 - NY gas utilities were a significant contributor of positive operating budget variances for FY11–FY13 (actual expenditures less than budget). For the three-year period, this positive variance was \$85.9 million.
 - NY gas utilities effectively paid NGUSA the budgeted amount for less actual work accomplished.
 - In FY12, NGUSA had a combined positive operating variance of \$138.3 million, largely underspending controllable cost functional areas.
 - In FY13 the pattern of underspending budgets changed dramatically. NGUSA combined operating expenditures showed a negative variance (actuals greater than budget) in the amount of \$3.7 million. NGUSA FY13 negative variances (overspending) were predominantly in the functional areas of Finance and Corporate Cost Center.
- Conceptually, National Grid believes that employees can be held accountable for achievement of SLA metrics and has stated the following.⁹³
 - The Company utilizes a Performance for Growth tool that consists of an integrated performance, talent and reward process. As part of this performance management process, employees are evaluated on their success in achieving

⁹² DR 238: NY Gas Companies and NGUSA Operating Expenses – Actual vs. Budget and Variance FY11 – FY13

⁹³ DR 266



annual performance targets, and that assessment is a key factor in determining the level of variable compensation an employee receives.

- The Company's guidance documents direct leadership to incorporate, where appropriate, applicable quantitative or qualitative measures of success reflected in relevant SLAs in employees' annual objectives. The guidance documents further direct that the performance objectives of NY jurisdictional employees should include satisfactory performance rendered to the NY operating companies. As indicated in the amended SLAs, satisfactory performance will be measured according to SLA metrics, where applicable. Accordingly, the service company functions' success in meeting SLA metrics will be considered when assessing personal performance and determining incentive compensation for relevant service company employees.
- Budget versus actual variances experienced by National Grid for NY gas companies have been extraordinary over the past five years and particularly volatile on an individual functional/organizational basis.⁹⁴ These variances far exceed the potential coverage of management's variable performance based compensation, suggesting the above statements by National Grid are without merit when compared to expenditure variances.
- Strong SLAs would explicitly resolve these problems if they addressed ServCo's accountability for results and specified consequences of not providing products or services, unacceptable quality or over-providing of underspending in some cost categories to cover overspending in others, as well as providing baselines for budget review and variance analyses on the part of the NY jurisdiction and its management team.

D. RECOMMENDATIONS

1. Prepare a report for submittal to the PSC staff within six months that fully documents the capital and O&M costs associated with USFP, USFP Stabilization, Finance Remediation and other financial and IS system related initiatives so that ratepayers are protected from SAP-related costs in excess of levels agreed upon in the previous NMPC and KEDNY rate cases (and for KEDLI by default). At a minimum, NGUSA should:
 - Document and re-establish the original capital and O&M costs underlying the rate case level.
 - Clearly and specifically define the distinctions (e.g., timing, scope and cost) between the original USFP project, the USFP Stabilization Project, other SAP/USFP-related projects, the Finance Remediation Project and other financial and IS system activities.
 - Specify how the costs associated with each of these activities are being tracked, monitored and verified, including: the specific project or cost codes used for dedicated internal labor, part-time or as-needed internal labor, contractors, other

⁹⁴ DR 238



direct, indirect and capital costs, and the procedures for review, verification, challenge and correction of costs.

- Explain and document the impact of back-filling positions assigned to these initiatives.
- Explain and document the sources of the increase in “other IS” capital and O&M expenditures (see **Exhibit IV-11**) to confirm the costs are not related to the USFP Stabilization initiatives.

The purpose of the report is to provide the PSC staff with contemporaneous documentation so the costs for fixing USFP/SAP will not be borne by ratepayers, and the costs of Finance Remediation and other IS issues can be appropriately assessed in future rate cases. National Grid would continue to have the right to justify costs for SAP enhancements and other initiatives for inclusion in rates as a part of the normal rate case process.

2. Develop improved SLAs to govern the relationship between the jurisdictional operating companies and ServCo. For products and services provided to NYS utilities from the ServCo, SLAs must emulate commercial agreements and should include:
 - Improved dialogue among the various National Grid management teams.
 - Detailed metrics addressing product and service units, volumes provided, timeframe, quality and unit prices.
 - Tracking mechanisms including quantifiable and meaningful KPIs.
 - Standardized reports across all NGUSA entities.
 - Enforcement via payment only for product and service units actually provided.
 - Jurisdictional management authority to terminate and change service providers.



V. SYSTEM PLANNING (ELEMENT 5)

This chapter provides NorthStar's assessment of the effectiveness of National Grid's New York (NY) natural gas system planning function, including an examination of its plans to address pipeline safety concerns and system hardening in storm areas.

A. BACKGROUND

National Grid USA (NGUSA) owns and operates three natural gas distribution systems in NY which include: Niagara Mohawk Power Corporation's gas operations (NMPC), Brooklyn Union Gas Company (KEDNY) and KeySpan Gas East Corporation (KEDLI). In aggregate, the three NY gas companies provide service over 21,000 miles of pipelines to more than 2.3 million customers. NGUSA also owns and operates two liquefied natural gas (LNG) storage plants in Holtsville (Long Island) and Greenpoint (Brooklyn). The two LNG plants have an aggregate estimated maximum storage capacity of approximately 2.2 bcf, and are used for peaking natural gas supply and emergencies.

Exhibit V-1 depicts the natural gas transmission lines in KEDLI, KEDNY and NMPC's service territories.

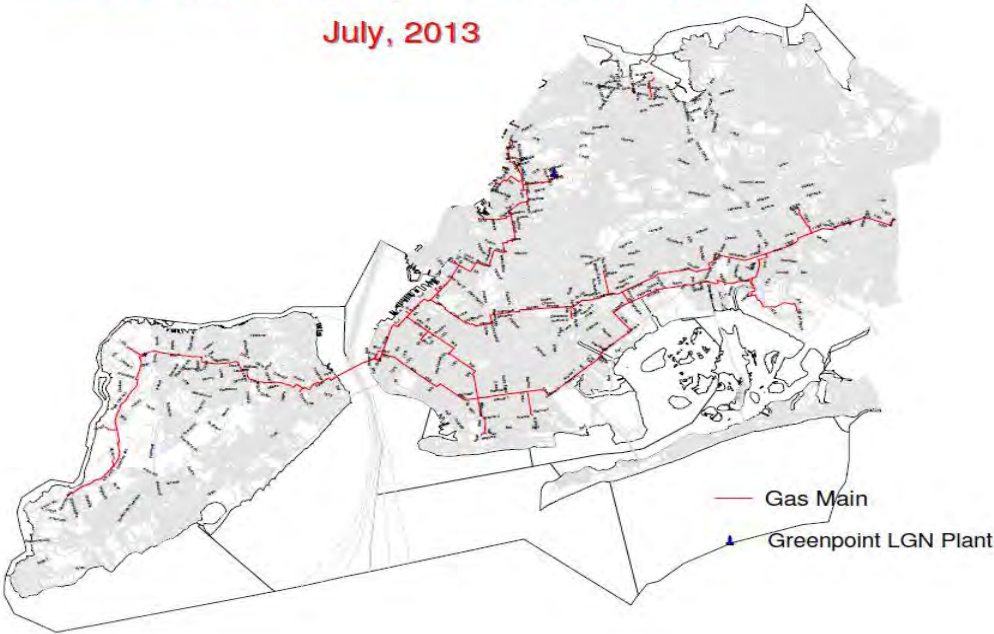
Exhibit V-1
NGUSA New York Transmission Lines



Source: DR 114

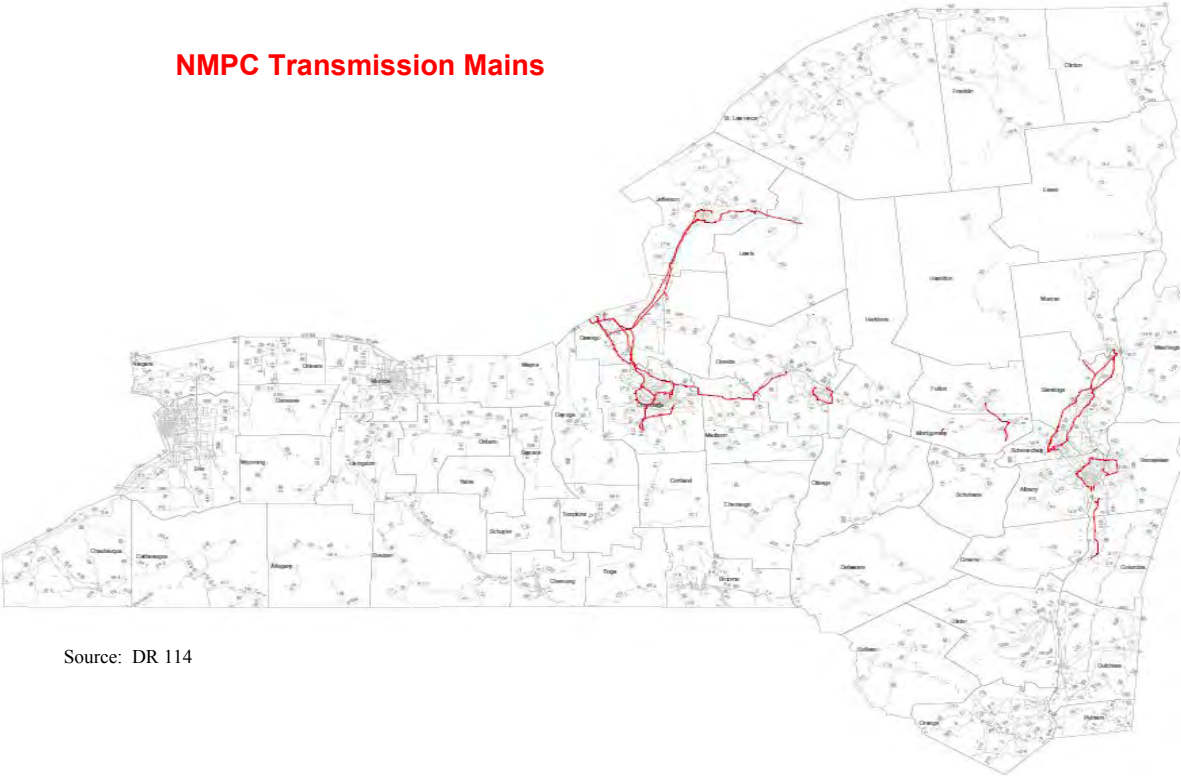


2013 New York City Transmission Mains
July, 2013



Source: DR 114

NMPC Transmission Mains



Source: DR 114



NGUSA NY Natural Gas Infrastructure

NGUSA's natural gas infrastructure is comprised of five categories of assets:

- **Transmission Pipeline** – Transmission pipelines operate at pressure greater than 125 psi. Transmission pipeline is typically 6 inches to 30 inches in diameter and constructed of high strength stainless steel.
- **Distribution Main** – Distribution main lines serve districts or areas within the service territory. NGUSA's distribution main is constructed of cast iron, unprotected steel, cathodic protected steel and plastic pipe.
- **Distribution Service** – Distribution service lines run from the main line to the customer meter. They can range in size from one-half inch to several inches in diameter, depending on the customer's demand requirements. Distribution service pipelines are constructed of cast iron, unprotected steel, cathodically protected steel, and plastic pipe.
- **Pressure Regulator Stations** – Pressure regulator stations boost pressure back to operating levels when pressure is lost in the pipeline system due to the friction of the natural gas moving inside the pipes. NGUSA has three types of pressure regulator stations: City Gates, High Pressure District Regulator Stations and Low Pressure District Regulator Stations. Gate Stations are the interconnection points between the transmission and distribution systems. The high and low pressure district regulator states are located as necessary.
- **Services** – Services refer to customer meter, customer regulator and shut-off valve.

Exhibit V-2 provides a summary of the assets comprising NGUSA's NY gas system infrastructure.

Exhibit V-2
NGUSA New York Gas Infrastructure

Assets	KEDNY	KEDLI	NMPC
Transmission Pipeline (miles)	71	132	280
Distribution Main Pipeline (miles)	4,128	7,843	8,552
Distribution Service Pipeline (miles)	4,845	6,423	7,386
Services (meters)	1,222,484	558,418	595,294
Gate Stations	10		24
High Pressure Regulating Stations	150		205
Low Pressure Regulating Stations	389		204

Sources: DRs 177, 261, 368 and

<http://primis.phmsa.dot.gov/comm/reports/operator/Operatorlist.html?nocache=5354#>

Pipeline Safety Regulatory Requirements

Gas distribution companies such as KEDLI, KEDNY and NMPC are subject to numerous federal and state regulations.



Federal Pipeline Safety Regulations

The U.S. Department of Transportation's Pipeline and Hazardous Materials Administration (PHMSA) outlines the minimum federal safety standards for the transportation of gas by pipelines in Title 49 Part 192 of the Code of Federal Regulations (CFR). Important elements of the code include the following:

- Section L prescribes minimum requirements for the operation of pipeline facilities.
 - Procedural manuals are the focus of §192.605 which requires that each operator prepare and follow a manual of written procedures for conducting operations and maintenance activities and for emergency response for each pipeline. For transmission lines, the manual must also include procedures for handling abnormal operations. This manual must be reviewed and updated by the operator at intervals not exceeding 15 months, but at least once each calendar year.
 - Damage prevention program guidelines are outlined in §192.614 which requires that a written program be developed to prevent damage to pipelines from excavation activities.
 - Emergency procedure requirements are detailed in §192.614 which requires the preparation of written procedures to minimize the hazard resulting from a gas pipeline emergency.
 - Public awareness requirements are defined in §192.614, which orders the development and implementation of a written, continuing public education program that follows the guidance provided in the American Petroleum Institute's (API) Recommended Practice (RP) 1162.
- Section N details the required qualifications of pipeline personnel.
 - Qualification program requirements are listed in §192.805 which states that each operator shall have and follow a written qualification program.
 - Recordkeeping mandates are described in §192.807. Qualification records must be retained for five years and include identification of qualified individual(s) and the covered tasks the individual is qualified to perform, as well as dates and methods of current qualification(s).
- Section O prescribes minimum requirements for an integrity management program on any gas transmission pipeline (IMP).
- Section P prescribes minimum requirements for an integrity management program on any gas distribution pipeline (DIMP).

Two sections of the code that are of particular importance to NGUSA's gas system planning pertain to the IMP and the DIMP.

Transmission Integrity Management Program (IMP)

The pipeline integrity management regulations require transmission operators to develop and implement a formal, documented IMP. The IMP Framework lays the foundation for how



the operator intends to develop and implement its program. The elements of an IMP include management, analytical, and operational processes specified in 49 CFR 192:

- An identification of all high consequence areas (HCAs).
- A baseline assessment plan.
- An identification of threats to each covered pipeline segment, which must include data integration and a risk assessment. An operator must use the threat identification and risk assessment to prioritize covered segments for assessment and to evaluate the merits of additional preventive and mitigation measures for each covered segment.
- A direct assessment plan, if applicable.
- Provisions for remediating conditions found during an integrity assessment.
- A process for continual evaluation and assessment.
- If applicable, a plan for confirmatory direct assessment.
- Provisions for adding preventive and mitigation measures to protect the HCA.
- A performance plan that includes performance measures.
- Record keeping provisions.
- A management of change process.
- A quality assurance process.
- A communication plan that includes procedures for addressing safety concerns raised by the Office of Pipeline Safety (OPS) and a State or local pipeline safety authority when a covered segment is located in a State where OPS has an interstate agent agreement.
- Procedures for providing (when requested), by electronic or other means, a copy of the operator's risk analysis or integrity management program to OPS and a State or local pipeline safety authority when a covered segment is located in a State where OPS has an interstate agent agreement.
- Procedures for ensuring that each integrity assessment is being conducted in a manner that minimizes environmental and safety risks.
- A process for identification and assessment of newly-identified HCAs.

NGUSA maintains two IMPs in New York – one KEDLI and KEDNY, and one for NMPC. NGUSA developed these IMP plans in 2004 in accordance with NYCRR, Title 16, Part 255 and 49 CFR 192, Subpart O.

Distribution Integrity Management Program (DIMP)

The PHMSA published final regulations establishing integrity management requirements for gas distribution pipeline systems on December 4, 2009. These regulations specify how distribution utilities must identify, assess, prioritize, evaluate, repair and validate the integrity of distribution mains. DIMP regulations require gas distribution utilities to be able to 1) know the risks in their system, 2) identify various threats in the system, and 3) be able to mitigate the threats. Gas distribution companies are required to develop, write, and implement a DIMP with the following elements:

- Knowledge
- Identify threats
- Evaluate and rank risks



- Identify and implement measures to address risks
- Measure performance, monitor results, and evaluate effectiveness
- Periodically evaluate and improve program
- Report results.

NGUSA has a single DIMP for its entire US gas operations. The DIMP consists of a general section covering all states in which NGUSA operates, along with state-specific appendices. The appendices specific to NY cover the KEDLI, KEDNY and NMPC operating companies.¹

New York Pipeline Safety Requirements

The State of New York Codes, Rules and Regulations (NYCRR) prescribes minimum safety requirements for the design, fabrication, installation, inspection, testing and operation and maintenance of gas transmission and distribution systems, including gas gathering lines, gas pipelines, gas compressor stations, gas metering and regulating stations, gas mains, service lines, gas storage equipment of the closed pipe type fabricated or forged from pipe or fabricated from pipe and fittings, and gas storage lines not covered by 49 CFR 192.

NYCRR Part 255 is applicable to the National Grid NY gas companies and includes many of the requirements set forth in title 49, Code of Federal Regulations, part 192 of the Department of Transportation Regulations for Transportation of Natural and Other Gas By Pipeline: Minimum Federal Safety Standards. They state that the rules and regulations expressed or implied by this Part meet or exceed the Minimum Federal Safety Standards.

Important elements of NYCRR Part 255 include the following:

- Part § 255.100-559 cover pipeline design, installation, components, welding and connections, service lines, protection, maximum pressures and conversions.
- Part § 255.600-629 provides minimum requirements for the pipeline facilities operation in sections that include:
 - Operator qualifications
 - O&M plan essentials
 - Continuing surveillance
 - Emergency plans
 - Operating pressure
 - Gas odorization
 - Tapping and purging
- Part § 255.700-757 provide minimum requirements for pipeline facilities maintenance.
- Part § 255.800-827 cover accident reporting, leaks, service interruptions, and facility failure investigations.

¹ DR 132

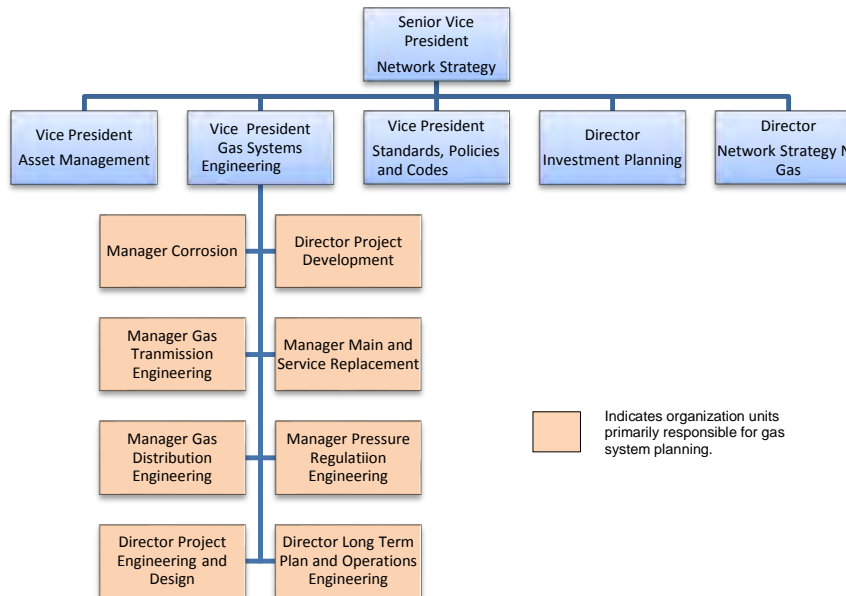


- Part § 255.900-951 cover minimum requirements for an integrity management program including continuous evaluation, assessment and measuring program effectiveness semi-annually.

NGUSA's System Planning and Infrastructure Replacement

NGUSA's Network Strategy organization provides engineering and planning functions for all US electric and natural gas operating companies. The Gas Systems Engineering organization, shown in **Exhibit V-3**, is responsible for NMPC, KEDLI and KEDNY system planning, reliability and mandated work.²

Exhibit V-3
Gas Systems Engineering Organization



Source: DR 1

Individual groups within Gas Systems Engineering responsible for natural gas transmission, distribution and pressure regulation monitor the performance of the assets and develop the strategies and policies to ensure the safety and reliability of the assets.

- Transmission Assets – NGUSA's Transmission Engineering group is responsible for the Company's transmission asset strategy. The group oversees assets that include pipelines operating at 125 psi and greater. Transmission Engineering is divided into two areas, the IMP area and the Strategy area.
 - The IMP area focuses on execution of the IMP as mandated by PHMSA regulations. The IMP includes periodic testing and surveys such as External Direct Corrosion Assessment (ECDA), Close Interval Survey, Inline Inspection

² DR 1. Organization as of July 2013.



and other testing methods as appropriate. Test results are evaluated and the results are prioritized for further investigation. The testing and follow-up investigations are used to categorize the condition of each line segment. The IMP section also develops and coordinates any necessary mitigation measures.

- The Strategy area focuses on the long term planning, budgeting, code compliance, risk reduction and the development of new assessment technologies. The group sets the schedule for the IMP program, designs modifications to the system to accept new inspection technologies, and evaluates the condition of each segment to enable repair or replace decisions.
- Distribution Assets – NGUSA’s Distribution Engineering group is responsible for the distribution asset strategy. The group focuses on assessing the condition and performance of the distribution system and setting the appropriate asset management policies to address known system integrity issues that impact safety and reliability. The Distribution Engineering group develops and maintains the DIMP.
- Pressure Regulation Assets – The Pressure Regulation Engineering group oversees the asset management strategy for pressure regulating stations. The Pressure Regulation Engineering group reviews and integrates the pressure regulation work plan with the system reliability work plan annually and ensure that the asset management plans for pressure regulation facilities include sizing modifications as well as retirements of stations no longer needed.³

The Long Term Planning organization reviews and evaluates the operating condition of the gas network on an annual basis. Each year, NGUSA analyzes the gas distribution system to determine reinforcement and reliability projects for the next five years and issues the enterprise-wide “Five-Year Distribution System Reinforcement and Reliability Plan.”⁴ The Long Term Planning organization also conducts a winter performance analysis and produces a winter operations plan.⁵

Five-Year Capital Investment Plan

On an annual basis, NGUSA develops a five-year capital plan for each of the NY gas companies. Several organizations are involved in the development of the capital plan as follows:

- **Investment Planning**– The Investment Planning Director is the owner of the capital plan budget process. The two New York planners (one Upstate, one Downstate) work with process owners to develop the business plan. Investment Planning is in the part of the Network Strategy Organization, as shown in **Exhibit V-4**.

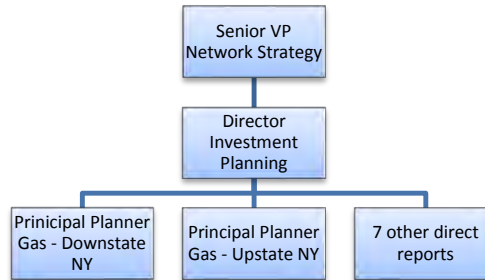
³ DR 108

⁴ DR 105

⁵ Fact Verification July 15, 2014.



Exhibit V-4 Investment Planning Organization



Source: DR 143

- **Process Owners** – Process owners are the asset owners that sponsor an investment proposal, and they are generally responsible for specific line items in the plan. Process owners in various organizations (see **Exhibit V-5**) identify preliminary capital requirements (programs and projects) and work with Investment Planners throughout the capital planning process.

Exhibit V-5 Capital Plan Process Owner Organizations and Capital Programs/Projects

Capital Plan Category	Process Owner Organizations	Capital Plan Programs and Projects
Growth	Sales Operations Gas System Planning Asset Reliability	Base Growth - Customer Contributions Base Growth - Fitting Base Growth - Install Meter/Regulator Base Growth - Main/Services Base Growth - Meter Purchase/Operations Base Growth - Tariff Main System Improvements Base Growth- Meter Purchases Gas System Reinforcement Install Main Install Services
Mandated	Main & Service Replacement Maintenance & Construction Corrosion Control Gas Transmission Engineering Gas Distribution Engineering Customer Meter Services Asset Reliability	Atmospheric Corrosion Inside Inspections Corrosion City State Construction /Public Works Local Law 30 Main Replacements - (Proactive Programs) Main Replacements - (Reactive Programs) Meter Changes Pipeline Integrity Purchase Meters (Replacements) Service Replacement – Proactive Service Replacement - Reactive Leak Programs Service Replacements- Non Leak Other

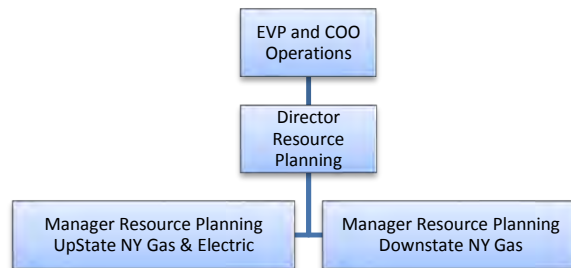


Reliability	Pressure Regulation Engineering Instrument & Regulation Services Gas System Planning Gas Control Customer Meter Services Gas Operations Engineering Corrosion Control Gas Distribution Engineering	Control Line Integrity Program Gas Facility Reliability - Instrumentation and Regulation (Includes CNG) Gas Facility Reliability - Production/LNG Gas Planning Gas System Control Gas System Reliability - Gas Control Gas System Reliability - Service Heater Installation Program Regulator Station/Pressure Regulation Facilities Remote Control Valve(RCV) program System Automation Valve Installation/Replacement Water Intrusion Specific projects, such as the Brooklyn Queens Interconnect, Bayridge Gate Station, regulator retirements, uprating projects.
Discretionary	Asset Reliability Standards, Policies & Codes	Tools Equipment Other

Source: DR 316 and 470

- **Resource Planning** – Determines resources for the portfolio of work, staffing plans and any necessary schedule adjustments. Resource Planning is part of NGUSA Operations.

Exhibit V-6 Resource Planning Organization



Source: DR 143

The capital plan includes the following work categories:

- **Growth Related** – New mains and services, and planned gas system reinforcement identified in the 5 Year Distribution System Reinforcement and Reliability Plan to support growth.
- **Mandated (regulatory)** – City State Construction (CSC)/public works (relocating or replacing facilities as required to accommodate city and state road projects), replacement of leak prone mains and services (both proactive and reactive), and meter replacements. In New York City, this also includes Local Law 30 which requires that



every gas service line in NYC have a gas service valve or other outside emergency shut-off device installed.⁶

- Reliability – Upgrades and other improvements. The category includes program work for various system infrastructure components (pressure regulating stations, heaters, SCADA upgrades etc.), work identified in the 5 Year Distribution System Reinforcement and Reliability Plan and Special Projects.
- Discretionary – Capital equipment and tools.

A summary of the companies' FY 2014 – FY 2018 planned capital investment is shown in **Exhibit V-7**.

Exhibit V-7
Summary of FY 2014 – FY 2018 Capital Investment Plans
(Dollars in Thousands)

	Fiscal Year					Total	Percent
	2014	2015	2016	2017	2018		
KEDNY							
Growth	\$85,006	\$83,515	\$67,387	\$72,246	\$73,915	\$382,069	23%
Mandated	158,459	177,800	192,905	189,704	193,209	912,077	55%
Reliability	69,388	23,976	85,896	85,737	85,964	350,961	21%
Discretionary	3,497	5,159	6,501	6,575	6,649	28,381	2%
Total	\$316,350	\$290,450	\$352,689	\$354,262	\$359,737	\$1,673,488	100%
KEDLI							
Growth	\$83,619	\$74,949	\$66,404	\$70,374	\$53,583	\$348,929	34%
Mandated	97,259	95,430	128,457	129,004	131,015	581,165	57%
Reliability	17,149	6,556	7,991	7,264	7,679	46,639	5%
Discretionary	15,124	15,146	1,779	1,802	1,206	35,057	3%
Total	\$213,151	\$192,081	\$204,631	\$208,444	\$193,483	\$1,011,790	100%
NMPC							
Growth	\$19,494	\$19,710	\$20,629	\$20,763	21,380	\$101,975	21%
Mandated	55,865	61,947	71,727	73,074	74,191	336,804	68%
Reliability	12,849	12,250	9,354	9,908	6,488	50,848	10%
Discretionary	642	654	665	677	691	3,329	1%
Total	\$88,850	\$94,560	\$102,376	\$104,421	\$102,749	\$492,957	100%

Source: DRs 90 and 243

Mandated capital investment work includes projects and programs that are designed to ensure the safety and integrity of the gas distribution system. There are various regulations that require this work to be done, in addition to the spending amounts that are included in the rate case proceedings. As shown in **Exhibit V-7**, well over half of NGUSA's projected capital work is mandated. Mandated work includes:

⁶ DR 253



- Main replacements, both proactive and reactive
- Service Replacements
- City and State Construction
- Local Law 30 Program (New York city requirement that every gas service line have a gas service valve or other outside emergency shut-off device installed)
- Pipeline Integrity
- Integrity, including work associated with the IMP and DIMP⁷

A major component of the mandated work is the replacement of leak prone pipe. Over 30 percent of NGUSA NY's mains and services are made up of leak prone materials. NGUSA's IMP states that several replacement plans are in place to reduce the inventory and thus the risk associated with leaks and cast iron breaks.⁸

B. EVALUATIVE CRITERIA

- Do the infrastructure planning and engineering functions operate effectively?
- Do the NGUSA NY gas companies have appropriate priorities, guidance and other instructions for evaluations, tradeoffs and decision-making including:
 - Asset condition and management process
 - Using input from the asset health review process
 - Linking asset management decisions (e.g., predictive failure analyses) to improve reliability and performance?
- Are the processes and criteria for making decisions regarding replace vs. repair, including how the overall construction program planning process is affected, documented, adhered to and appropriate?
- Are benefit/cost analyses and risk analysis considered in the decision-making process?
- Are the specific types of benefit/cost and risk analysis methodologies used appropriately?
- Are the needs for major projects (e.g., gas lines, expansions) identified, developed and justified adequately?
- Do the NGUSA NY gas companies develop accurate system forecasts which are used in identifying infrastructure requirements?
- Are other load and infrastructure factors such as advanced technology, new business, customer growth, natural gas vehicles, impact of oil to gas conversions and energy efficiency initiatives given appropriate consideration in the planning process?
- Do the NGUSA NY gas companies' system planning and gas service expansion criteria appropriately address the economic benefits, the capability to serve, and the potential impediments to system expansion?
- Are trade-offs optimized with respect to the replacement of older technology with newer technology and the resulting effect on the useful lives and depreciation assumptions of the existing infrastructure, cash flow and system reliability?

⁷ DR 109

⁸ DR 132 and NY – 2013 DOT Report, Fact Verification July 15, 2014.



- Are distribution systems designed to optimize delivery, safety and future upgrades? Has system hardening been emphasized particularly in coastal areas and is there a risk analysis performed?

C. FINDINGS AND CONCLUSIONS

1. NGUSA recently consolidated its gas system planning activities into a single organizational unit.

- The Five-Year Capital Investment Plan includes the planning products of all of the organizations and categories shown in **Exhibit V-5**.
- The Enterprise-Wide 5-Year Distribution Reinforcement and Reliability Plan is a component to the Five-Year Capital Investment Plan and is developed in the Long Term Planning and Operations Engineering group.⁹ The Long Term Plan group focuses on capital system improvements related to growth.
- Growth work includes items such as meter purchases, regulator purchases, customer meter installation and service line installation.
- Additional reliability work is planned and submitted by a variety of process owners (contributors) to the Five-Year Capital Investment Plan process including:
 - Pressure Regulation Engineering
 - Instrument & Regulation Services
 - Gas System Planning, Gas Control
 - Customer Meter Services
 - Gas Operations Engineering
 - Corrosion Control
 - Gas Distribution Engineering¹⁰
- Mandated work is largely planned in three separate groups within Transmission Engineering, Distribution Engineering, and Pressure Regulation Engineering.¹¹ Mandated work represents over 50 percent of the Five-Year Capital Investment Plan.
- Discretionary work includes projects undertaken at the discretion of the Company, not driven by external obligations or policies.
- All organizations are now under the VP of Gas Engineering and are involved in the gas system planning process (analysis and development). The planning process includes cost estimates developed by the VP's direct reports, reviewed by the VP, and

⁹ IR 195

¹⁰ DR 316

¹¹ DR 108



sent to Investment Planning unit to be consolidated with proposed investments by the electric asset strategy group for review by the SVP of Network Strategy.¹²

2. NGUSA appropriately evaluates risks on its gas system (transmission, distribution and pressure regulation) and uses this information to identify work to be performed to improve system reliability.

- The Transmission Engineering, Distribution Engineering and Pressure Regulation Engineering groups monitor the system performance develop the strategies and policies to ensure the safety and reliability of the assets.¹³
- NGUSA maintains three detailed databases to evaluate the risks on its system – transmission, distribution and pressure regulation. Each of these data bases are evaluated using different algorithms intended to assign the relative risk of the components of each data base.
- Transmission System - The transmission database contains all § 192 transmission assets other than pressure regulation facilities. For pipeline integrity management, lines that operate in excess of 125 psig but do not meet the Federal definition of transmission are included in the distribution system. The evaluation of these assets is based on § 192 Subpart O, Gas Transmission Pipeline Integrity Management.
 - NGUSA uses definition (1) of § 192.903 to establish high consequence areas (HCAs) – those areas where the transmission integrity management requirements specifically apply. Of the approximately 500 miles of § 192 transmission line, approximately 300 miles are within HCAs and subject to detailed transmission integrity management analysis, evaluation and remediation. The other 200 miles of § 192 transmission line are evaluated by the distribution integrity management program.
 - NGUSA has included additional analysis including Progressive Hazard Analysis and Layered Hazard Analysis. Most of the system operates at relatively low stress levels and is therefore not likely to rupture.
 - The NGUSA transmission system is divided into segments. The result of this analysis is a risk ranked list of segments of its transmission system. It provides a path forward for replacement and other forms of remediation to be taken to minimize the risks to the system, customers and the citizenry. NGUSA’s transmission replacement program and program for mitigation of its risks generally starts at the top of the list and progresses downward.
 - NGUSA evaluates its transmission line by “smart pigging” and direct assessment. Smart pigging, is the preferred approach, but it can only be performed in certain pipelines.
 - Smart Pigging entails performing an internal inspection of the pipeline by an electronic probe travelling through the pipeline. It evaluates various conditions of the pipeline including dents, wall thinning due to corrosion,

¹² Re-organization reviewed during Fact Verification July 15, 2014.

¹³ DR 108



missing or damaged outer corrosion control coating and some manufacturing defects.

- Direct Assessment primarily addresses corrosion issues.¹⁴
 - Distribution System -- The distribution database covers all distribution facilities other than pressure regulating facilities as well as certain transmission facilities as discussed above. The evaluation of these assets is based on the requirements of the Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards, § 192 Subpart P, Gas Distribution Pipeline Integrity Management.
 - The NGUSA distribution system is divided into approximately 800,000 segments. The initial analysis of the system determines the likelihood of a failure for the different facilities classes (classes are based upon material type).
 - After completing the first step, NGUSA then evaluates each of its 800,000 segments on a segment basis taking in to account deterioration, consequence and other factors. This is a risk evaluation that addresses the requirements of § 192. The result of this analysis is a risk ranked list of segments of its distribution system. It provides a path forward for replacement and other forms of remediation to be taken to minimize the risks to the system.¹⁵
 - Pressure Regulation Facilities -- There is a separate database for pressure regulation. These facilities are classified as either §192 transmission or distribution. The evaluation of these assets must meet or exceed the requirements of §192 Subpart O and P, respectively.
 - There are 22 factors used to evaluate these facilities. Most of these factors relate to the safety and reliability. Each factor is given a score from 1 to 5 with 5 being the worst condition and 1 the best condition.
 - The result of this analysis is a risk ranked list of segments of its pressure regulation system. NGUSA's pressure regulation replacement program and program for mitigation of its risks generally starts at the top of the list and progresses downward. It should be noted that rebuilds and new stations geared to new business are based upon growth conditions and are separate from and in addition to the replacement program.
- 3. NGUSA uses a formal risk scoring process to objectively rank capital projects for inclusion in its Five-Year Capital Investment Plan.**
- Projects identified for inclusion in the Five-Year Capital Investment Plan are ranked utilizing NGUSA's Risk Scoring Process.¹⁶ A portfolio of projects that are operationally similar or required to be combined in order to achieve benefits is combined into a program, for risk scoring and sanctioning (approval).¹⁷

¹⁴ DR 131

¹⁵ DR 132

¹⁶ DR 262

¹⁷ DR 262



- Projects/programs are stratified into three types:
 - Mandated Projects – receive the highest risk score of 49.
 - Policy Driven Projects – subject to the risk scoring methodology.
 - Net Present Value (NPV) – Projects are not risk-scored and are pursued solely at the discretion of NGUSA management.
- The risk methodology provides an objective methodology for ranking projects based on their relative merit. It results in a stratification of the most important work for inclusion in the Five-Year Capital Investment Plan and the deferral or exclusion of lower priority work.
- Risk scoring for policy driven type projects/programs is conducted utilizing a matrix of impact versus likelihood.
 - Likelihood, scored from 0 to 7, is defined as probability of failure. **Exhibit V-8** provides the matrix used to assess likelihood. There are two components to assessing likelihood: Years to Certain Failure and Likelihood of Coincident Event. Coincident Event is defined as event that must occur at the same time as the failure. If there is no coincident event, likelihood is 100 percent.

Exhibit V-8
Determination of Likelihood of Failure

		Years to Coincident Event											
		1	2	3	4	5	10	20	33	100	1000		
Years to Certain Failure	1	7	7	6	6	6	5	4	4	4	2	100%	Probability of Certain Impact Occurring in Following Year
	2	7	6	6	6	6	5	4	4	4	2	50%	
	3	6	6	6	6	6	5	4	4	4	2	33%	
	4	6	6	6	6	5	5	4	4	4	2	25%	
	5	6	6	5	5	5	5	4	4	3	2	20%	
	6	5	5	5	5	5	4	4	4	3	1	17%	
	7	5	5	5	5	5	4	4	4	3	1	14%	
	8	5	5	5	5	5	4	4	4	3	1	13%	
	9	5	5	5	5	5	4	4	4	3	1	11%	
	10	5	5	5	5	5	4	4	4	3	1	10%	
	20	4	4	4	4	4	4	4	3	2	1	5%	
	50	4	4	4	4	4	3	3	2	2	1	2%	
	100	4	4	4	4	3	3	2	2	1	1	1%	
	200	3	3	3	3	3	2	2	1	1	1	0.5%	
	500	2	2	2	2	2	2	1	1	1	1	0.2%	
	1,000	2	2	2	2	2	1	1	1	1	1	0.1%	
	2,000	1	1	1	1	1	1	1	1	1	1	0.05%	
		100%	50%	33%	25%	20%	10%	5%	3%	1%	0.1%		
Likelihood of Coincident Event													

Source: DR 262

- Impact is scored from 0 to 7 and is defined as impacts to safety and health, environment, and reliability. The calculation of risk uses the highest impact from safety and health, environment, and reliability.
- The product of impact and likelihood is the risk score.
- NGUSA uses the same risk scoring methodology in its sanctioning process. The sanction paper includes a single risk score which is used to compare the safety,



environmental and reliability risks for each project. Those existing projects which are already under construction are not required to be risk scored.¹⁸

4. System leaks are an important system reliability indicator. NGUSA is successfully executing its leak prone pipe replacement and leak repair programs.

- The largest safety-related program is the replacement of leak prone pipe mains and services. This includes the NGUSA's mandated leak prone pipe replacement program for cast iron and bare steel mains, which is designed to reduce risk associated with aging gas pipeline infrastructure. This category also includes the reactive pipe replacement program, which provides capital funding for gas mains that may not be included in the current main replacement program, but require replacement due to conditions identified during that year.
 - Over a third of NGUSA's mains and services are made of leak prone pipe materials. These are primarily cast iron mains and unprotected steel mains and services. Cast iron and unprotected steel pipe buried in the ground, where there is moisture in the soil, will corrode over time. Corrosion may occur over the entire surface of the pipe and it may take many years before the first associated leak is detected. However, once the first leak on a pipeline segment occurs, there are other points on the pipe where similar corrosion is taking place. As the corrosion continues, these pipes will experience additional leaks.
 - NGUSA recognizes that these leak prone mains and services represent a serious risk.
 - NGUSA has developed replacement plans, both proactive and reactive, that are intended to reduce the inventory of leak prone mains and services as well as the serious safety risk associated with leaks and catastrophic pipe breaks.
 - NGUSA has sought and obtained regulatory approval to upgrade, replace and maintain the distribution systems in order to reduce the risk and to its system and the customers it serves.¹⁹
- NGUSA has also undertaken an initiative to deal with issues related to older plastic pipe in its distribution systems.
 - When Distribution Engineering determines that a systemic issue exists in a specific main segment due to construction defects or material deterioration, the entire affected section of main is scheduled for replacement within two or three years.
 - NGUSA participates in a nation-wide effort to track plastic material failures and use that information to assess risk on plastic systems.²⁰
- **Exhibit V-9** and **Exhibit V-10** provide the leak backlog, and the number of leaks repaired each year since 2003 for KEDLI, KEDNY and NMPC.²¹

¹⁸ DR 262

¹⁹ DR 132

²⁰ DR 132



- As shown in **Exhibit V-9**, KEDLI, KEDNY and NMPC have improved their Types 1, 2A and 2 leak backlog rates consistently from 2003 through 2013.
- As shown in **Exhibit V-10**, each company has maintained a consistent level of annual repair since 2008. (NMPC repaired 778 leaks in 2012, but had a backlog of only 4).²² The number of leaks repaired each has decreased over 50 percent from over the past ten years, while leak backlog in 2013 for KEDLI, KEDNY, and NMPC are at the lowest level in the past ten years. In 2013, NMPC reported no backlog leaks

Exhibit V-9
Leak Backlog Since 2003 (Types 1, 2A, and 2)

Year	KEDLI	KEDNY	NMPC	Total
2003	419	139	151	709
2004	177	197	56	430
2005	151	166	43	360
2006	143	158	48	349
2007	111	99	16	226
2008	72	70	7	149
2009	67	51	17	135
2010	29	17	1	47
2011	21	6	3	30
2012	25	25	4	54
2013	10	7	0	17

Sources: DR 685, State of New York, Department of Public Service, 2011 and 2012 Gas Safety Performance Measures Reports

Exhibit V-10
Annual Leak Repairs (Types 1, 2A, and 2)

Year	KEDLI	KEDNY	NMPC	Total
2003	6,327	5,359	1,407	13,093
2004	4,127	4,174	1,446	9,747
2005	3,730	3,553	1,212	8,495
2006	3,359	3,120	1,067	7,546
2007	2,651	3,307	1,264	7,222
2008	2,282	2,460	1,033	5,775
2009	2,325	2,351	1,316	5,992
2010	2,170	2,378	1,354	5,902
2011	2,509	3,114	1,164	6,787
2012	2,331	2,287	778	5,396
2013	2,269	2,935	1,156	6,360

Sources: DR 685, State of New York, Department of Public Service, 2011 and 2012 Gas Safety Performance Measures Reports

²¹ Data includes only Type 1, Type 2A and Type 2 leaks. Type 1 - requires immediate effort to protect life and property, continuous action to eliminate the hazard, and repairs on a day-after-day basis or the condition kept under daily surveillance until corrected; Type 2A - monitored every two weeks and repaired within six months; and Type 2 - monitored at least every two months and repaired within one year. Type 3 (not included in data) – leaks not immediately hazardous at the time of detection and can be reasonably expected to remain that way.

²² Fact Verification July 15, 2014 (778)



5. NGUSA's excavation damage performance has improved consistently since 2008. Excavation damage is one measure of system reliability.

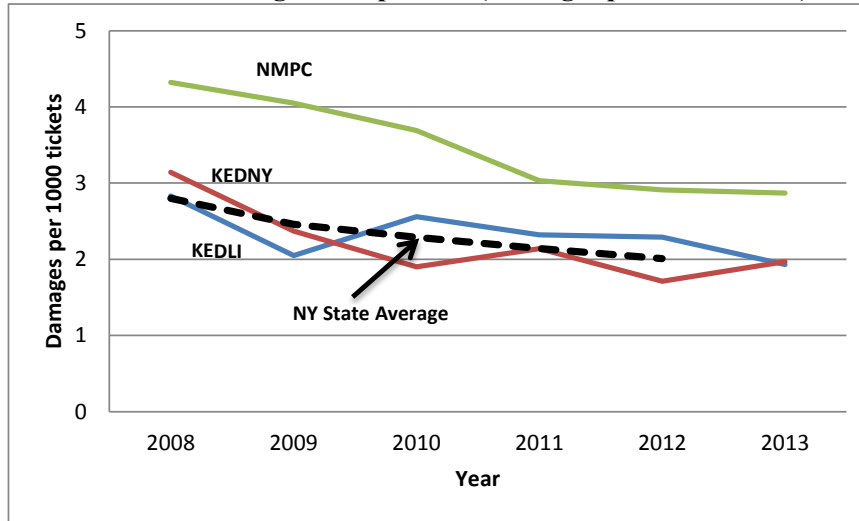
- Damages to buried facilities caused by excavation activities are the leading cause of pipeline failure and accidents nationwide.
- NGUSA's DIMP identifies excavation damage as a primary threat and specifies mitigation measures including damage prevention monitoring, excess flow valves, training, and emergency response.²³
- NGUSA is actively involved in mark outs and damage prevention.
 - NGUSA follows the nine elements contained within the published Pipeline and Hazardous Materials Safety Association Damage Prevention Assistance Program.
 - NGUSA also participates in the Common Ground Alliance program referred to as DIRT. DIRT stands for Damage Information Reporting Tool, a secure, National Grid web application for the collection, analysis and reporting of underground facility damage information for all stakeholders.
- Damages to buried facilities caused by excavation activities are the leading cause of pipeline failure and accidents nationwide. NGUSA's DIMP identifies excavation damage as a primary threat and specifies mitigation measures including damage prevention monitoring, excess flow valves, training, and emergency response ²⁴
- **Exhibit V-11** shows excavation damages per 1000 tickets since 2008.
 - KEDNY consistently performed at or below the New York State average since 2008.
 - KEDLI's damage rate is generally in line with the state average.
 - NMPC's rate is higher than the state average, but has shown consistent improvement since 2008.

²³ DRs 132

²⁴ DRs 132



Exhibit V-11
Excavation Damages Comparison (Damages per 1000 tickets)²⁵



Source: DR 568 and State of New York, Department of Public Service, 2011 and 2012 Gas Safety Performance Measures Reports

6. NGUSA's capital plan includes projects to harden the gas transmission and distribution system in areas of potential flooding in order to avoid damage from storms in the future.

- NGUSA has begun identifying its vulnerable facilities in flood-prone regions on both 100-year and 500-year flood surge maps, and will consider any appropriate safety and reliability improvements to those facilities.
- Following Superstorm Sandy, NGUSA identified projects to harden the gas transmission and distribution system in areas of potential flooding in order to avoid damage from similar storms in the future. These projects and programs have been incorporated into future construction plans.²⁶
- In areas of potential flooding, NGUSA plans to convert existing low pressure networks to high pressure in order to avoid water intrusion in the event of another such disastrous storm. Current on-going activities are being implemented for the "up-rate" to Breezy Point, Roxbury, Neponset, Island Park, and Belle Harbor areas.
- NGUSA is also taking steps to protect its pressure regulating facilities in areas prone to flooding, including the following:
 - Replacing those low pressure regulator stations with higher pressure regulator stations.

²⁵ Statewide data not available for 2013. DR 685 and State of New York, Department of Public Service, 2011 and 2012 Gas Safety Performance Measures Reports

²⁶ DR 080



- Evaluating the need to increase the height of the relief stacks. During the recent storms, none of the regulator stations experienced failure due to water entering the regulator vent stacks.
 - Investigating the feasibility of relocating district regulators stations to higher ground, a more expensive alternative.
 - Investigating remote monitoring, installation of seals, and other measures.
- Superstorm Sandy also pointed out the advantage of having automated isolation points, in order to cut off gas during an emergency. This will reduce the size of the pipeline segment remises structures (homes and businesses) to sustain the forces of storm surge and that can be shut in during an emergency.

7. NGUSA has a logical process for making decisions regarding replacement of system assets.

- Distribution gas mains (and associated services and appurtenances) assets are typically replaced in accordance with three procedures:
 - ENG-04030, “Identification, Evaluation and Prioritization of Distribution Main Segments for Replacement” (KEDNY and KEDLI) – describes and details the identification, evaluation, and prioritization of distribution main segments for replacement, and prescribes methods to be used for corrective action. Potential areas of active corrosion are identified using leakage surveys in conjunction with an analysis of the corrosion and leak history records.
 - Gas Operating Practice Bulletin (GOPB) 420 (NMPC) – specifies that the System Integrity Asset Replacement organization, with the help of Gas Operations and local and state municipalities, identifies cast iron pipe segments to be evaluated for replacement. A GIS scoring model is used to identify the highest priority NMPC cast iron pipeline segments and services for replacement. Based on this information, region specific annual and five-year cast iron replacement programs are developed submitted as part of the Five-Year Capital Investment Plan.
 - GOPB 422 (NMPC) – describes NMPC’s bare steel replacement program. Similar to GOPB 420, this document explains the process for identifying bare or unprotected steel mains to be evaluated for replacement.²⁷
- Once assets qualify for replacement in accordance with the above-listed procedures, NGUSA’s DIMP Risk Ranking Model is used to identify the highest asset integrity-related risks. The asset is given a “DIMP Factor” to accelerate the attrition of the riskiest assets.²⁸
- NGUSA typically addresses service leaks by replacing the affected segment of pipe unless the leak can be isolated to a specific fitting or appurtenance and the actual pipe is tested and deemed sound.²⁹

²⁷ DR 82

²⁸ DR 82

²⁹ DR 82



- NGUSA ranks its pressure regulation assets for replacement on a three-year cycle in accordance with its DIMP. Risk scores include weighting factors for the design, as well as a physical condition assessment of the asset. Multi-year work plans are prepared and reviewed annually using these scores to determine which stations carry the highest risk. Although replacement selection is normally based on risk, other factors include the necessity of increasing station flow, as determined by Long Term Planning, or the need to relocate a station, as might be required by a public works project. NGUSA typically replaces stations when it is no longer effective to refurbish them, unless replacement is not possible.³⁰
- The condition of a transmission asset will generally determine whether it is repaired or replaced.
 - NGUSA's Transmission Engineering department uses Integrity Management Program (IMP) data, as well as mandated program data (e.g., corrosion protection and leak surveys), to determine the condition of its transmission assets.
 - For localized areas of concern such as corrosion or third party damage, the Company uses a procedure, "The Repair of Transmission Mains," to determine if the pipeline will be repaired or replaced.³¹

8. NGUSA gas service expansion criteria appropriately address the economic benefits, the capability to serve, and the potential impediments to system expansion.

- In late 2012, NGUSA established a working team to assess the gas distribution expansion opportunities. The team addressed the following question: "How can National Grid cost-effectively connect the most customers with the goal of achieving allowed regulated returns?"
- The team examined opportunities for gas service expansion: Franchise expansion and Unserved Customers. Unserved customers are customers that are currently non-heating customers or customers in close proximity to natural gas mains. The review found:
 - NMPC has limited opportunities to expand the service territory. There are extensive distances to reach pockets of population density making franchise expansion uneconomical. Unserved customers offer moderate opportunities for growth however NMPC experiences saturation rates of over 70 percent in some counties.
 - KEDLI and KEDNY have very limited opportunities for franchise expansion. Neighboring areas are already part of an LDC. However, unserved customers offer high potential for growth. In the downstate franchises, there are over 220,000 facilities within 200 feet of a gas main.³²

³⁰ DR 82

³¹ DR 82

³² Kick off meeting presentation pages 180-191



- The team evaluated four strategic options: 1) Controlled Growth (focus on single customers), 2) Focused growth (combine groups of customers), 3) Strategic Build Out (coordinate growth construction with main replacement and other work under a load density constraint and other constraints, and 4) Access to Gas for all (similar to Strategic Build Out, but no density constraints). Consideration in all options included:
 - CIAC (contribution in aid of construction)/ROI (return on investment) models – If the cost of gas main and service lateral required to connect a new customer is greater than the customer's facilities entitlement under the tariff, the customer may be required to pay a portion of the cost of the additional main and service line.³³
 - Deployment of capital in accordance with approved regulatory framework.
 - Maximize third party funding (such as state incentives for upfront heating conversion costs).

NGUSA chose to pursue the Strategic Build Out option. This entails updating the CIAC/ROI models to promote growth.

- System Planning considers the impacts of system growth. The load forecast includes annual growth in residential heating customers consistent with the initiatives. The System Plan includes reinforcement projects to support growth initiatives.³⁴

9. NGUSA utilizes a structured review and sanctioning (approval) process for capital investments over \$1 million.

- The Director of Investment Planning is the owner of the sanctioning process.
- The project manager works in conjunction with the project sponsor to organize, gain commitment from and manage cross-functional support and resource needs, and to clarify business priorities and strategy. The project sponsor must be a vice president or higher position and is ultimately accountable for assuring that a project delivers its proposed scope, cost, schedule and benefits.
- Sanction Papers are submitted to the US Sanctioning Committee (USSC) for project approval at key times during the project life cycle including project identification, completion of preliminary design, completion of final design, and project close-out. Each stage of the project life cycle requires a cost estimate that has tolerances beginning at +/- 50 percent at the project identification stage to +/- 10 percent at the completion of final design stage. Final approval for project funding is obtained at the completion of the final design stage.
- Sanction papers request delegations of authority (DOAs) for expenditures. The DOA authorized level of expenditure is recorded in the PowerPlan work order management system.

³³ Kick off meeting presentation page 185 and Fact Verification July 15, 2014.

³⁴ DRs 177 and 105



- DOA requests for Gas and Electric investments between \$1M and \$8M whether high, medium or low complexity are approved by the responsible level sponsor and placed on the USSC consent agenda.
 - DOA requests for Gas and Electric high or medium complexity funding projects with total costs greater than \$8M are presented to the USSC for approval.
 - DOA requests for Gas and Electric low complexity funding projects with total costs greater than \$8M are be presented to the USSC for approval.³⁵
- A project may request funds for preliminary engineering through a partial sanction.
 - A funding project must be re-sanctioned within 60 days of notification that the cost is forecasted to vary outside of the tolerance approved in the project grade sanction paper (generally 10 percent).
 - There is a standard Sanction Paper Template for all Partial Sanctions, Sanctions, and Re-sanctions. Information contained in the sanction paper includes:
 - Project Detail
 - Project Description and Benefits
 - Investment Recovery
 - Related Projects
 - Summary of Projects
 - Associated Projects
 - Prior Sanctioning History
 - Category
 - Asset Management Risk Score
 - Complexity Level
 - Financial
 - Business Plan CIAC / Reimbursement
 - Cost Summary Table
 - Project Budget Summary
 - Key Milestones
 - Supporters
 - Reviewers

10. Cost/benefit analyses are required for sanctioning capital projects that are not mandated or policy-driven and are pursued at the discretion of NGUSA management.

- Cost/benefit analysis is a systematic process for calculating and comparing benefits and costs of a project. Cost/benefit analysis has two purposes:
 - To determine if the project is economically justifiable and feasible.
 - To provide a basis for comparing projects. It involves comparing the total expected cost of each option against the total expected benefits, to see whether the benefits outweigh the costs, and by how much.

³⁵ DR 95



- NGUSA performs NPV analyses on discretionary projects – those that are not mandated or policy-driven.
- NorthStar reviewed the business case for the Mobile Based Automatic Meter Reading System for KEDLI gas meters and found appropriate use of cost/benefit analyses. The business case included a presentation of alternatives, a cost analysis of each alternative, and the expected payback time.³⁶

11. The enterprise-wide Five-Year Distribution System Reinforcement & Reliability Plan identifies reinforcement and reliability projects for the next five years.

- Each year NGUSA performs an analysis on the US gas distribution system to determine the reinforcement projects and associated costs that need to be constructed over the following five years to support forecasted customer growth.
 - The process begins with establishing a forecast of peak day send out. Peak day send out includes firm customers that purchase their gas from either NGUSA or from aggregators or marketers. The peak day send out is then distributed across the system based both on historical demand and in areas where customer growth is expected to occur.
 - The distribution system is then modeled utilizing SynerGEE to simulate system pressure under peak conditions. SynerGEE Gas is a network modeling software, built to analyze closed conduit networks of pipes, regulators, valves, compressors, storage fields, and production wells.³⁷
 - Areas that do not meet system requirements are considered for reinforcement projects.
 - A similar analysis is done for reliability projects.³⁸
- The Five-Year Distribution System Reinforcement & Reliability Gas System identifies three types of projects:
 - Reinforcement projects are designed to maintain minimum design pressures throughout the distribution system under peak-hour conditions. System reinforcement spending is directly tied to forecasted customer growth.
 - Reliability projects improve the overall reliability of the distribution system, often by providing additional system capacity or through improvements to system integration, and, in many cases, will become reinforcement projects in future years.
 - Special Projects - Certain larger-scale system reliability projects and supply-related projects are budgeted separately and are identified as special projects.³⁹
- Mandated projects related to public works and regulatory requirements are included in the reinforcement, reliability and special projects listed in the system plan.⁴⁰

³⁶ DR 145

³⁷ www.dnvgl.com

³⁸ DR 105

³⁹ DR 105



- The 5-Year Plan is issued annually and adjusted for changes to the send out forecast, differences between actual load growth and estimated load growth, reinforcement project deferrals, public works activity, main replacement program activity, Sales and Program Operations supported growth reinforcements, and updates/improvements to the SynerGEE computer network analysis models.⁴¹

12. NGUSA uses its design-day load forecast to develop its Five-Year Distribution System Reinforcement and Reliability Plan. The system forecast appropriately includes factors such as advanced technology, new business, customer growth, natural gas vehicles, the impact of oil to gas conversions and energy efficiency initiatives.

- Reinforcement projects are designed to maintain minimum design pressures throughout the distribution system under design-day conditions
- NGUSA uses design-day send out forecasts to develop its Five-Year Distribution System Reinforcement and Reliability Plan.⁴² These forecasts are prepared by the consolidated forecasting function located in the Analytics Modeling and Forecasting Organization. This organization reports to Customer Analytics and Risk Management Organization in the US Customer Organization.⁴³
- NGUSA includes a number of special considerations in the load forecasts including:
 - Energy Efficiency – Incremental energy efficiency is applied to load forecast after the completion of all modeling. The energy efficiency savings are based on the current NY State approved programs.
 - Natural Gas Vehicles – KEDLI, KEDNY and NMPC have separate rate classes for natural gas vehicles. This rate class has its own forecast.
 - Customer Conversions – NGUSA employs a hierarchal regression load forecasting methodology. It begins by forecasting the number of customers with in each business sector. Then each rate class within each sector is forecast. Migration from non-heating to heating customers is captured in this process.
 - New Business – NGUSA forecasts are based on net customer growth. The forecast includes regression based models that forecast the number of customers. NMPC forecasts net growth at approximately 0.2 percent annually. KEDNY and KEDLI forecasts net growth at approximately 0.3 percent annually.⁴⁴
 - Advanced Technology – Customers in the KEDLI and KEDNY service territories may elect to use dual fuel. KEDLI and KEDNY offer a temperature-controlled rate where customers receive a reduced natural gas rate and in return switch to the alternate fuel during peak conditions.⁴⁵

⁴⁰ DR 105

⁴¹ DR 105

⁴² DR 105

⁴³ DR 177

⁴⁴ “Net” growth per Fact Verification July 15, 2014.

⁴⁵ DR 177



- System load forecast accuracy is addressed in **Chapter VIII – Load Forecasting**.

13. NGUSA has a well-defined process to develop the Five-Year Capital Investment Plans for KEDLI, KEDNY and NMPC.

- Work included in the Five-Year Capital Investment Plan includes projects identified through:
 - Annual system inspections of distribution pipelines and services, transmission assets, and pressure regulating assets. Assets identified for replacement are assigned a risk score and included in the Five-Year Capital Investment Plan.⁴⁶
 - Annual System Integrity Reports, based on databases of at risk facilities. High risk assets are included in the IMP, the DIMP.
 - Blanket funding projects for New Business and System Failures.
 - The Five-Year Distribution System Reinforcement and Reliability Plan.
- The Five-Year Capital Investment Plan process is iterative, with extensive interaction among the parties. Key Events are shown in **Exhibit V-12**.
- The starting point for each plan is the previous year's approved plan.⁴⁷
- The Upstate and Downstate Investment Planners work with process owners to identify planned work in each budget category, and then work together to develop five-year plans for each company.
- The Investment Planners work with the Process Owners to develop initial budgets using historical spend and unit data, as well as complex project cost and schedule estimates.⁴⁸ Resource Planning provides the Process Owners unit cost data (cost per unit) for the programs. Due to SAP issues, cost data was not available for FY14; Resource Planning provided the previous year's data instead.
- Resource Planning is responsible for ensuring that the plan is deliverable; i.e., that the work can be accomplished by the existing work force, complemented by contractors.
- As shown in **Exhibit V-12**, from July to September, there are three separate reviews of the draft plan:
 - Two informational sessions at which stakeholders review and question the scope, justification, schedule, cash flows, and risk scoring for each project, program, and blanket. Risk Scoring is discussed in Conclusion 4.
 - A business plan review with the Vice Presidents of Gas Engineering, Customer Meter Service, Operations and Construction and Operations.

⁴⁶ DR 82 and 108

⁴⁷ IR 160

⁴⁸ DR 480



Exhibit V-12

Key Activities in the Development of the Five-Year Capital Investment Plan

Time Frame	Event	Responsible Party	Description
April to May	Identify Preliminary Capital Requirements	Process Owners	Process Owners identify capital investment plans and provide system needs to Investment Planners. Information is provided by other parties as follows: <ul style="list-style-type: none"> Decision Support provides Monthly, Year to Date, and historic spend data Resource Planning provides Monthly, Year-to-Date, and historic completed units of for Blankets and Programs, and updates and insight regarding any other work they are responsible for including projected year-end spend forecasts and future year requirements. Engineering and Project Management update the cost, schedule, and scope of specific projects for which they have responsibility. Long Term Planning provides a project list including schedule and cost estimates for inclusion in the Capital Plan.
June	Prepare first draft of plan	Investment Planning	Input information from Process Owners into the capital planning tool.
July	Informational Session 1	Planner	Informal process to Review and question the scope, justification, schedule, cash flows, and risk scoring for each project, program, and blanket
August to September	Analyze and Optimize Portfolio	Resource Planning	High level Resource leveling, schedule adjustment, staffing plan, risk and impact fiscal year analysis, mitigation planning, bundling opportunities for the upcoming year.
	Revise Plan	Investment Planning	Revised to reflect resource analysis. Typically, load forecasts underlying the Gas cycle requirements. Growth, Reliability, and Reinforcement processes are not available until July. Growth, Reliability, and Reinforcement budget requirements may not be available until August.
	Informational Session 2	Planner	Review and question the scope, justification, Informational Session #2 schedule, cash flows, and risk scoring for each with key stakeholders or project, program, and blanket. Project "Responsible Parties" sponsors need to be prepared to defend their (Challenge Session) proposals.
	Revise Plan	Investment Planning	
	Business Plan Review with Delegates, Directors and VPS	Investment Planning	Planners meet with the Vice Presidents of Gas Engineering, Customer Meter Service, Operations and Construction and Operations.
	Revise Plan	Investment Planning	
October	NY President Review		Present plan to NY Jurisdictional President
November to December	Resource the first year plan vet in field	Resource Planning	Defines labor and resources necessary to accomplish the Business Plan. Presents a high level review of the work to be done next year
	Issue Capital Plan	Investment Planning	

Source: DR 480



- In October, a presentation is made to the Jurisdictional President. Following the Jurisdictional President's review, Resource Planning develops an annual work plan, as discussed in Chapter VII – Work Force Management.
- The capital plan is developed to meet each company's budget target. Increases in one area category must be offset by decreases in another. The objective is to arrive at a total budget number that is acceptable to the Jurisdictional President and still meets the requirements of the rate cases and other mandatory requirements for units to be installed.⁴⁹

14. In spite of NGUSA's well-developed planning processes and analyses, system planning does not effectively deliver on its fundamental mission – to identify future system reinforcement, reliability, and special projects for KEDLI, KEDNY, and NMPC. NGUSA has not yet developed an integrated system plan that explicitly addresses both long-term system needs and infrastructure replacements.

- Planning is conducted in Long Term Planning, Gas Engineering Planning, Transmission Engineering Planning, Pressure Regulation Engineering, and in a variety of process owners' organizations (described in Conclusion 1).
- Coordination of the system needs occurs as the first step of the Investment Planning process (described in Conclusion 13), resulting in no formal identification of the difference between system needs and capital constraints.
- Long-term system needs are contained within "Programs" and are not explicitly identified.⁵⁰
- In its Five-Year Distribution Plan for Reinforcement and Reliability, NGUSA identifies many projects within only one or two years. Few projects are identified in later planning years.
- As shown in **Exhibit V-13**, system planning fails to identify the increasing need for reinforcement projects in future years.
 - In all of the plans, the planning horizon (five years) appears to end two years out. Where over 20 or 30 projects are shown in the first two years of the plan, few projects are identified in years 3 to 5 of the plan.
 - In the KEDLI FY12-16 plan, 5 projects are identified for 2014. The FY13-17 plan (developed one year later) identifies 11 projects for 2014 – twice the work.
 - The KEDLI plan for FY14-18 identifies 39 projects for the same year.
 - In a one year period of time, the amount of work increased over three times –a failure in system planning to identify and prepare for this workload.

⁴⁹ DR 480

⁵⁰ Fact Verification July 15, 2014.



- While it is not expected that all work can be identified, there are significant planning gaps between FY13-17 and the FY14-18 plans. The pattern is seen throughout **Exhibit V-13**.

Exhibit V-13
Number of Reinforcement Projects by Plan Year

Plan/Year Needed	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
KEDLI										
FY10-14 Plan	11	6	6	9	7					39
FY11-15 Plan		6	4	3	2	1				16
FY12-16 Plan			10	10	5	9	3			37
FY13-17 Plan				13	11	6	11	5		46
FY14-18 Plan					39	33	8	16	8	104
KEDNY										
FY10-14 Plan	24	18	5	6	4					57
FY11-15 Plan		21	26	5	7	5				64
FY12-16 Plan			21	13	1	1	4			40
FY13-17 Plan				34	45	3	5	8		95
FY14-18 Plan					45	28	5	4	7	89
NMPC										
FY10-14 Plan	4	5	3	2	1					15
FY11-15 Plan		9	9	2	1	1				22
FY12-16 Plan			14	7	10	2	10			43
FY13-17 Plan				10	5	3	1	1		20
FY14-18 Plan					7	4	5	2	1	19

Source: DR 105

- Reliability planning appears to have been started only recently in 2013 and generally fails to identify future projects that will improve system performance and increase system reliability. **Exhibit V-14** provides a summary of the number of reliability projects developed by the system planning process.
 - There were no KEDLI reliability projects identified until 2013. However, the FY13-17 plan identifies seven projects in its first plan year. This work should have been identified in previous years.
 - The KEDNY reliability project plans also fail to identify projects until 2013 and then show 11 projects needed in 2013 and 10 projects in 2014.
 - The previous KEDNY plan did not identify any work in 2013 and the next plan eliminated 8 of the projects identified, indicating the projects were deferred, unnecessary or unjustified.⁵¹
 - There appears to have been an NMPC planning breakdown in 2011/2012 period when no reliability projects were identified for the FY11-15 plan. Numerous

⁵¹ DR 105



projects were identified in subsequent plans that overlapped the time period of the previous plan.

- There were no NMPC reliability projects identified in the FY11-15 plan. There were numerous projects identified in subsequent plans that overlapped the time period of the previous plan.

Exhibit V-14
Number of Reliability Projects by Plan Year

Plan/Year Needed	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
KEDLI										
FY13-17 Plan				7	2	2	2	2		15
FY14-18 Plan					1	5	4	3	3	16
KEDNY										
FY10-14 Plan		2	1		1					4
FY11-15 Plan		2	1		1					4
FY12-16 Plan						2	4			6
FY13-17 Plan				11	10	6	3	4		34
FY14-18 Plan					2	13	10	4	4	33
NMPC										
FY10-14 Plan	4	1		1	1					7
FY12-16 Plan				1	1	1	1			4
FY13-17 Plan				3	3	4	4	3		17
FY14-18 Plan					9	8	8	6	1	32

Source: DR 105

15. Many capital programs and projects address safety concerns.

- NGUSA's capital plans include substantial spending for gas programs and projects that are based on safety concerns. In each company's plan, a large percentage of the total expenditures are directly related and intended to minimize risk to the company, the customers and the public.
- NGUSA estimates that over 45 percent of its planned capital expenditures were safety related for each company in FY13-14: NMPC – 62 percent, KEDLI – 43 percent, and KEDNY – 48 percent.⁵² NGUSA's estimate of safety-related spending includes the following programs:

Directly Related to Safety

- Main Replacements
- Service Replacements
- Pipeline Integrity Management Program
- Corrosion and Main Exposure
- Local Law 30

⁵² DR 680



- NMPC Projects for Locks Number 10 and 11 to replace the gas distribution facilities catastrophically damaged as a result of Hurricane Irene
- Remote Control Valves to meet PHMSA guidance documents
- Control Line Integrity Program to replace facilities due to condition
- NMPC Special Projects - Higby Gate Station, Davis Road Station and Pipeline 21 retirement
- KEDNY's Brooklyn Backbone - pipeline assessment, evaluation and remediation necessary to reduce the risk profile.
- KEDLI's East Hampton Sphere Retirement - required due to deteriorated condition, and safety related risk.

Partially Related to Safety

- Growth – some work results in retirement of leak prone pipe.
- City and State Construction– some work results in retirement of leak prone pipe
- Proactive and Reactive Pressure Regulator Facilities. .
- Gas Planning Reliability.
- Gas Facility Reliability for Production/ LNG and Holtsville LNG Trucking.
- Valve Installation/Replacement.

16. KEDLI, KEDNY and NMPC are examining new technologies to replace older technologies.

- In the area of transmission pipelines, new technology includes specifying pipe material's toughness characteristics. (Toughness is the ability of a material to absorb energy and plastically deform without fracturing.) The increased toughness of new transmission facilities should result in systems more able to withstand the rigors of service, particularly with respect to 3rd party damage, the leading cause of transmission leaks nationwide. Such resistance to outside forces should improve system reliability. For transmission lines within a distribution company, wear and tear may be a significant cause of retirements. With such improve materials, longer lived facilities with the resultant decreased annual depreciation rates compared to existing infrastructure can be anticipated.
- NGUSA is reviewing a new technology customer service shutoff valve. It would be battery operated, remotely controlled and installed to shut off the gas service to a structure. This would prevent any gas leaks inside the structure, gas leaks caused by structures moving off their foundations, and prevent water from flooded structures entering the distribution system. This would allow selectively shutoff only those customers it felt needed to be shut off for safety reasons and allow gas service to continue to other customers in that distribution system whose location made them less susceptible to flooding.
- A further area of new technology being explored relates to monitoring turn offs/turn ons during shutdowns. Currently, a manual system is used to track the status of the outages. While this can be appropriate for small outages, it may not be the most efficient and secure method in dealing with larger interruptions. NGUSA is



considering a new computerized system for recording turn on/turn off during an emergency. The use of a valid, cost-effectively technology could result in greater efficiency and greater assurance of safety during the operation.

17. NGUSA programs and procedures to comply with the federal safety standards specified in §192 appear to be inadequate in three areas: in two instances the written procedures do not appear to address all required items, and the companies' IMPs have not be updated since 2006 and 2007.

- NorthStar reviewed NGUSA's documentation in support of its compliance with the requirements § Part 192. The results of NorthStar's review are shown in **Exhibit V-15**.
- NGUSA's documentation in support of § Part 192 appears to be inadequate in three areas:
 - Program to prevent damage by excavation activities – NGUSA's damage prevention procedures do not address all of the items specified in § 192.614 part (c). As it relates to program documentation requirements, § 192.614 part (b) states that an operator may comply with any of the requirements of paragraph (c) of this section through participation in a public service program, such as a one-call system, but such participation does not relieve the operator of responsibility for compliance with this section. NGUSA's participation in the one-call system does not appear to satisfy all of the requirements of § 192.614 part (c).
 - Continual Improvements to the integrity management program – The KEDLI/KEDNY IMP has not been updated since 2007 and the NMPC IMP has not been updated since 2006. Semi-annual measurements of program effectiveness required by NYCRR § 255.937-945 were not apparent.



Exhibit V-15
§ 192 Documentation Review

Requirement	Reference	Adequate ?	NorthStar Analysis
Written Construction Standards	§ 192.303	Yes	The Operations and Maintenance procedures (O&M Manual) contains written construction standards and comprehensive engineering specifications for the design, engineering and installation of gas transmission facilities. ⁵³ Specifically: Design Procedures for Transmission Lines & mains, General construct & maintain procedures, Mains, Pipe Joining, Services, Corrosion – general & administrative, Corrosion – inspection & repair, Corrosion – testing, Installation of anodes, insulators, and test stations, and Construction standards/drawings.
Other Written Construction Standards		Yes	The O&M Manual contains construction standards for service lines (including sketching of the service line, approved materials for installation and important safety and compliance notes) and the standards for service line design specification (including the sizing and selection of material, diameter and codes & regulatory requirements).
Written standards for inspection of new construction	§ 192.305	Yes	The O&M Manual contains design procedures for standards for inspection of new construction specific to: Design Procedures for Transmission Lines & mains, General construct & maintain procedures, Mains, Pipe Joining, Services, Corrosion – general & administrative, Corrosion – inspection & repair, Corrosion – testing, Installation of anodes, insulators, and test stations, and Construction standards/drawings.
Written uprating plans for the last 3 years	§ 192.553	Yes	The O&M Manual contains two procedures which provided guidance and direction in relation to system upratings. The procedures are ENG04002 – “Uprating Pipelines to Less than 125 psig” and ENG03002 – “Uprating Pipelines to 125 psig or Greater”. Both procedures became effective 6/15/12.
Written procedures for O&M activities and emergency response	§ 192.605	Yes	The O&M Manual contains 47 emergency response procedures.

⁵³ DR 123, Attachment 1



Requirement	Reference	Adequate ?	NorthStar Analysis
Written program to prevent damage by excavation activities	§ 192.614	No	The O&M Manual contains a Damage Prevention section, as well as procedure 070005-PL Preparation of Gas Facility Records. As part of its damage prevention program, the Company updates records when it encounters field conditions that differ from the maps. The damage prevention program fails to meet the following requirements of § 192.614 part (c): (1) Include the identity, on a current basis, of persons who normally engage in excavation activities in the area in which the pipeline is located. (4) If the operator has buried pipelines in the area of excavation activity, provide for actual notification of persons who give notice of their intent to excavate of the type of temporary marking to be provided and how to identify the markings.
Written continuing public education programs	§ 192.616	Yes	NG has a Gas Pipeline Public Awareness and Communications Program, also known as the Pipeline Public Awareness Program Policy
Evaluations of the effectiveness of the public education program		Yes	NG performed a 2006 Natural Gas Association baseline survey, 2010 NGA survey, and 2011 NGUSA follow-up survey and the 2011 internal audit. ⁵⁴
Procedure to establish and maintain liaison with appropriate fire, police and other public officials.	§ 192.615	No	The O&M Manual contains procedure 0010015-PL- Gas Pipeline Public Awareness and Communications Program for the communications procedures with fire, police and other public officials pursuant to § 192.615. The following deficiencies are noted: <ul style="list-style-type: none"> Lack of information about the responsibility and resources of each government organization that may respond to a gas pipeline emergency. Absence of plan for how the operator and officials can engage in mutual assistance to minimize hazards to life or property.
Evaluation of the effectiveness of the liaison program	§ 192.615	Yes	NGUSA's 2011 internal audit of the Pipeline Public Awareness Program included a comprehensive review of liaison practices with emergency providers and public officials across all operating regions. The review found differences among the regions between delivery of information and liaison practices. As a result, the Company is currently working toward enhancing the liaison program by standardizing natural gas training programs across all operating regions.
Procedures for analyzing accidents and failures	§ 192.617	Yes	NG has three related procedures for analyzing accidents and failures per § 192.617. The first procedure is the Incident Investigation Program Guide (Attachment 1 to 127). The second procedure is the Incident Investigation Program Guide, MATL-3021 (Attachment 2 to 127). The third procedure is the Reporting Non-Conforming Material, 120010-TI (Attachment 3 to 127).

⁵⁴ DR 124



Requirement	Reference	Adequate ?	NorthStar Analysis
Written Control Room Management procedures	§ 192.631	Yes	NG has written Control Room Management Procedures as per § 192.631. ⁵⁵
Criteria used by NG to identify ‘critical valves’	§ 192.747	Yes	NG’s O&M manual contains three procedures addressing the criteria used to identify valves subject to inspection pursuant to § 192.747: 1. 040070-PL Valve Inspection Policy 2. EMER 5155 Gas System Emergency Sectionalizing Program (KEDNY and KEDLI) 3. GOPB-209 Sectionalizing Zone Procedure and Guidelines (NMPC)
Written operator qualification program	§ 192.805	Yes	The O&M Manual contains written Operators Qualification Plan (010100-PL).
Written integrity management program	§ 192.907	Yes	NG has two Integrity Management Programs -- one for KEDNY/KEDLI and one for NMPC.
Continual Improvements to the integrity management program	§ 192.911	No	The KEDLI/KEDNY IMP has not been updated since 2007 and the NMPC IMP has not been updated since 2006.
Written DIMP plan with specific elements	§ 192.1005 and § 192.1007	Yes	NG has a single DIMP for its US operations. The DIMP consists of a general section covering all states in which the NG operates, along with a state-specific appendix for each state in which the Company operates. The appendices are specific to New York State and cover the KEDLI, KEDNY and NMPC operating companies. Appendix C of the DIM Plan contains the risk prioritization listing and scores of the highest ranked assets by operating region; included is a list of the pressure regulating facilities with the highest ten percent (10%) highest risk scores by operating company.
Listing of all violations of § 192		Yes	The New York State Department of Public Service operations and maintenance audit reports identify violations of 16 NYCRR Part 255, Part 261 and Part 753 cited by Department of Public Service Staff.
Written evaluations of NG pipeline safety written procedures by NYPSC or other pipeline safety regulatory authority for the last three years.		Yes	The 2010, 2011 and 2012 NY PSC audits of NMPC, KEDNY or KEDLI contain written evaluations of NGUSA’s pipeline safety written procedures.

Source: DRs 117 through 134

⁵⁵ DR 128 Attachment 1



D. RECOMMENDATIONS

1. Develop an integrated natural gas system-wide plan. The system plan should include all reliability work, mandated replacements, growth projects and system planning work identifiable over a five-year period.
 - The system plan should include all projects identified based on their relative merit and need dates. It should not be limited by budget amounts.
 - The system plan should be updated annually.
 - It should also include associated project cost estimates, risk scores and resource requirements.
 - The integrated system plan should provide input to the Investment Planning process to create the Five-Year Investment Plan.
2. Update the companies' IMPs in § Part 192.911, including:
 - An identification of all high consequence areas, in accordance with § 192.905.
 - A baseline assessment plan meeting the requirements of § 192.919 and § 192.921.
 - An identification of threats to each covered pipeline segment, which must include data integration and a risk assessment. An operator must use the threat identification and risk assessment to prioritize covered segments for assessment (§ 192.917) and to evaluate the merits of additional preventive and mitigation measures (§ 192.935) for each covered segment.
 - A direct assessment plan, if applicable, meeting the requirements of § 192.923, and depending on the threat assessed, of §§ 192.925, 192.927, or 192.929.
 - Provisions meeting the requirements of § 192.933 for remediating conditions found during an integrity assessment.
 - A process for continual evaluation and assessment meeting the requirements of § 192.937.
 - If applicable, a plan for confirmatory direct assessment meeting the requirements of § 192.931.
 - Provisions meeting the requirements of § 192.935 for adding preventive and mitigation measures to protect the high consequence area.
 - A performance plan as outlined in ASME/ANSI B31.8S, section 9 that includes performance measures meeting the requirements of § 192.945.
 - Record keeping provisions meeting the requirements of § 192.947.
 - A management of change process as outlined in ASME/ANSI B31.8S, section 11.
 - A quality assurance process as outlined in ASME/ANSI B31.8S, section 12.
 - A communication plan that includes the elements of ASME/ANSI B31.8S, section 10, and that includes procedures for addressing safety concerns.
 - Procedures for providing (when requested), by electronic or other means, a copy of the operator's risk analysis or integrity management program.
 - Procedures for ensuring that each integrity assessment is being conducted in a manner that minimizes environmental and safety risks.
 - A process for identification and assessment of newly-identified high consequence areas. (See § 192.905 and § 192.921.)



3. Update procedural documentation/manuals per § 192.614 and § 192.615, including:
- Correct any documentation deficiencies in relation to § 192.614.
 - Include the identity, on a current basis, of persons who normally engage in excavation activities in the area in which the pipeline is located.
 - If the operator has buried pipelines in the area of excavation activity, provide for actual notification of persons who give notice of their intent to excavate of the type of temporary marking to be provided and how to identify the markings.
 - Correct any documentation deficiencies in relation to § 192.615.
 - Provide information about the responsibility and resources of each government organization that may respond to a gas pipeline emergency.
 - Develop plan for how the operator and officials can engage in mutual assistance to minimize hazards to life or property.



VI. PROJECT MANAGEMENT (ELEMENT 6)

This chapter addresses NGUSA's management of complex capital projects, as well as construction support services and selection of its contractors. It also examines NGUSA's actions in response to the gas events in San Bruno, CA, and Allentown, PA, and in response to Hurricanes Sandy and Irene.

A. BACKGROUND

Complex projects are managed by NGUSA's Gas Project Management group. These projects may be included within a broader Gas Program. In a typical year, NGUSA has fewer than 25 complex projects which require management by the Gas Project Management group, with a total annual portfolio value ranging from \$50 million to \$150 million.¹ The Gas Project Management group was formed in 2009. Prior to 2009, the Engineering organization performed project management for complex gas projects. The Gas Project Management organization currently consists of a manager and three project managers (the manager position is currently vacant and one of the project managers is serving as acting manager).² Gas Project Management is responsible for the management and oversight of the portfolio of complex projects through all phases of the project life cycle. Project manager responsibilities include:

- Providing overall direction to the project team throughout the life-cycle of the project.
- Planning, coordinating, and controlling the project.
- Bringing the project in on time within the desired cost, schedule, scope, and quality.
- Providing overall leadership to the project.
- Working with Resource Planning to ensure that the required in-house and/or contractor resources are on-hand to perform the desired work.
- Overseeing any changes in project scope, schedule, and cost.
- Retaining documentation associated with each project in a secure location.³

In April 2013, NGUSA introduced a formal project complexity scoring procedure to determine the level of project management required.⁴ Previously, project managers worked with the engineering sponsor to determine whether project management was required for each project.⁵ The Project Sponsor is responsible for determining the complexity score, which is determined using eight weighted factors: cost, project components, outages,

¹ DR 241

² DR 143

³ DR 95

⁴ DR 94

⁵ IR 110



community outreach, asset complexity, land/rights, permits, and procurement. The score determines the level of complexity:

- **Level 1 Complexity** – Major modifications, large, complex projects (or multiple related projects) generally with a high dollar value, typically spanning two or more fiscal years, involving complex permitting and extensive stakeholders and critical to the business.
- **Level 2 Complexity** – Medium projects or minor modifications that are of lower dollar value, shorter duration, and have less complex permitting than Level 1.
- **Level 3 Complexity** – Small projects with minor configuration changes, low risk and low dollar value.

Complexity Level 1 and 2 projects are assigned to gas project managers. Complexity Level 3 projects are assigned to Resource Planning.

In the period October 2009 through September 2013 NGUSA's NY gas companies had 50 project-managed projects. Ten of these projects were on-going at the start of NorthStar's audit in September 2013. As shown in **Exhibit VI-1**, most of these projects are downstate, with costs less than \$5 million.

Exhibit VI-1
Project-Managed Projects October 2009 - September 2013

Company	Number of Projects				Total Number of Projects
	Project Cost (Estimated Cost)				
	Under \$1M	\$1M to \$5 M	\$5 M to \$10 M	\$10M to \$50M	
KEDLI	10	8	2	2	22
KEDNY	4	13	2	3	22
KEDNY and KEDLI				1	1
NMPC		4		1	5
Total	14	25	4	7	50

Source: DRs 241 and 242.

The number of project-managed projects is growing. In December 2013, NGUSA NY gas companies had 28 project-managed projects. As shown in **Exhibit VI-2**, most of the projects are downstate, with over half of the projects in New York City.

Exhibit VI-2
Project-Managed Projects as of December 2013

Company	Total
KEDLI	8
KEDNY	16
KEDNY, KEDLI	2
NMPC	2
Total	28

Source: DR 319.

The number of project managed projects is increasing as a result of an increase in the number and complexity of major gas construction projects in NGUSA's capital plan.



NGUSA's Project Management group conducted a resource and staffing review to determine the level of project management support required to execute the Company's preliminary FY 2014 Five-Year Capital Investment Plan. The resource review examined the number of: major gas transmission projects in the plan; Level 1 and 2 Complexity (highly complex) projects requiring project management; and, active construction projects for New York. The review showed that:

- Major transmission projects were expected to increase from approximately one project per year to three projects per year by FY14/15.
- The workload associated with the Level 1 and 2 Complexity projects was generally consistent year-over-year, except for a one year peak in FY14/15.
- The number of active construction projects was expected to increase from approximately 20 (FY13/14) to approximately 25 projects per year (FY14/15).⁶
- The number of project-managed projects in New York is estimated to increase to a high of 49 projects in FY15/16.⁷

NGUSA also evaluated the size/scale of the projects in the 5-year Capital Investment Plan. Based on the increased size and scale of the major transmission projects, the review recommended that NGUSA deploy additional project management resources, specifically, assign a project manager to each complex project. Based on the size and scale of a particular project, a project manager may be dedicated full-time to a project as it transitions into construction.⁸

Because of the increase in the number of project-managed projects in the Capital Investment Plan, as well as the increased size and scale of these projects, NGUSA determined that the Downstate New York gas project management work load would effectively double over the next several years. To address the increased workload, NGUSA's Project Management group was authorized to hire three additional Downstate New York project managers, increasing the total number of New York gas project managers to six. NGUSA intends to fill these positions as soon as qualified candidates have been identified and hired. NGUSA is using external contractors to obtain Project Management services to manage the peak workload in FY14/15.⁹

B. EVALUATIVE CRITERIA

- Are the program and project planning, design, estimating, engineering, costing, scheduling and execution functions well documented and performed to company and recognized standards for good practice?

⁶ DR 684

⁷ DR 684

⁸ DR 684

⁹ DR 684



- Does NGUSA have effective contractor management and project/program management, including accountability, goals, objectives, and performance measurement?
- Are project estimates accurate and updated on a periodic basis?
- Does NGUSA routinely identify typical variances between original budgeted and actual capital expenditures and work units?
- Does NGUSA use a well-defined work breakdown structure to estimate, track and monitor project performance? Is the project work breakdown structure consistent between in-house, contracted projects and the utility's cost accounting systems?
- Does NGUSA track and minimize variances in order to improve the cost control, efficiency/productivity and work quality?
- Does NGUSA use baseline scope, budget, and schedule for monitoring and controlling projects? How well have projects, programs, and portfolios performed? Are these results visible in a timely way for monitoring and controlling?
- Does NGUSA have an effective methodology for tracking costs, work units and work quality for specific programs and projects?
- Are project change orders managed and controlled effectively?
- Are project scope changes effectively controlled and communicated among participants?
- Are materials and equipment, transportation and other logistical support planned and managed effectively for programs and projects?
- Are contractor and engineering bidding practices appropriate?
- Does NGUSA have appropriate policies, training and verification regarding interactions between employees/contractors and outside inspectors and regulators?
- How have these safety concerns, storm planning, restoration and response changed since the gas events in San Bruno, CA and Allentown, PA?
- Did NGUSA's response to recent storms comply with its established response plans, and has NGUSA instituted appropriate lessons learned reviews and improvement activities?

Criteria Addressed in Other Chapters

- Do capital and O&M plans and budgets convert to specific programs and projects in an effective manner? (Chapter V)
- Does capital and O&M program and project planning emphasize safety concerns, storm planning, restoration and response? (Chapter V)
- How has program and project planning evolved with respect to emergency preparation and response/restoration since Hurricanes Irene and Sandy? (Chapter V)
- Does NGUSA analyze trade-offs and make decisions in order to optimize the use of in-house workforce versus contractor labor? (Chapter VII)
- Are project quality control and technical requirements effectively communicated and transferred to contractors? (Chapter VII)
- Does NGUSA have effective quality assurance and quality control at the program and project level? (Chapter VII)



C. FINDINGS AND CONCLUSIONS

1. NGUSA's Gas Project Management Playbook (Playbook) provides a comprehensive and well-defined approach to project management; however, NGUSA does not maintain the project management files as required by the Playbook and accepted industry practice.

- NGUSA's Playbook, issued in March 2011, provides the project management procedures to be used by the various departments for the planning and execution of gas capital projects.¹⁰
- Playbook procedures address the entire life cycle of a project, from its initial identification through closeout. Individual procedures provide the detailed step-by-step actions and associated roles and responsibilities for completing each project step. **Exhibit VI-3** (page following) provides an overview of the major outputs of each project lifecycle step as outlined in the Playbook.
- Project management files should represent a high-level summary of documentation supporting the entire project life cycle. The Playbook requires each Project Manager to retain project documentation on a shared drive in specific folders. NorthStar reviewed the project files for 32 project-managed projects that were completed between October 2009 and September 2013 and found that much of the documentation was missing, as shown in **Exhibit VI-4**.
- As shown in **Exhibit VI-4**, only the project schedule and project summary reports were routinely included in the project files. The missing documentation was stored in multiple locations, and it would require significant effort to track down these documents if required

¹⁰ DR 95



Exhibit VI-3
Project Life Cycle Steps – Key Outputs

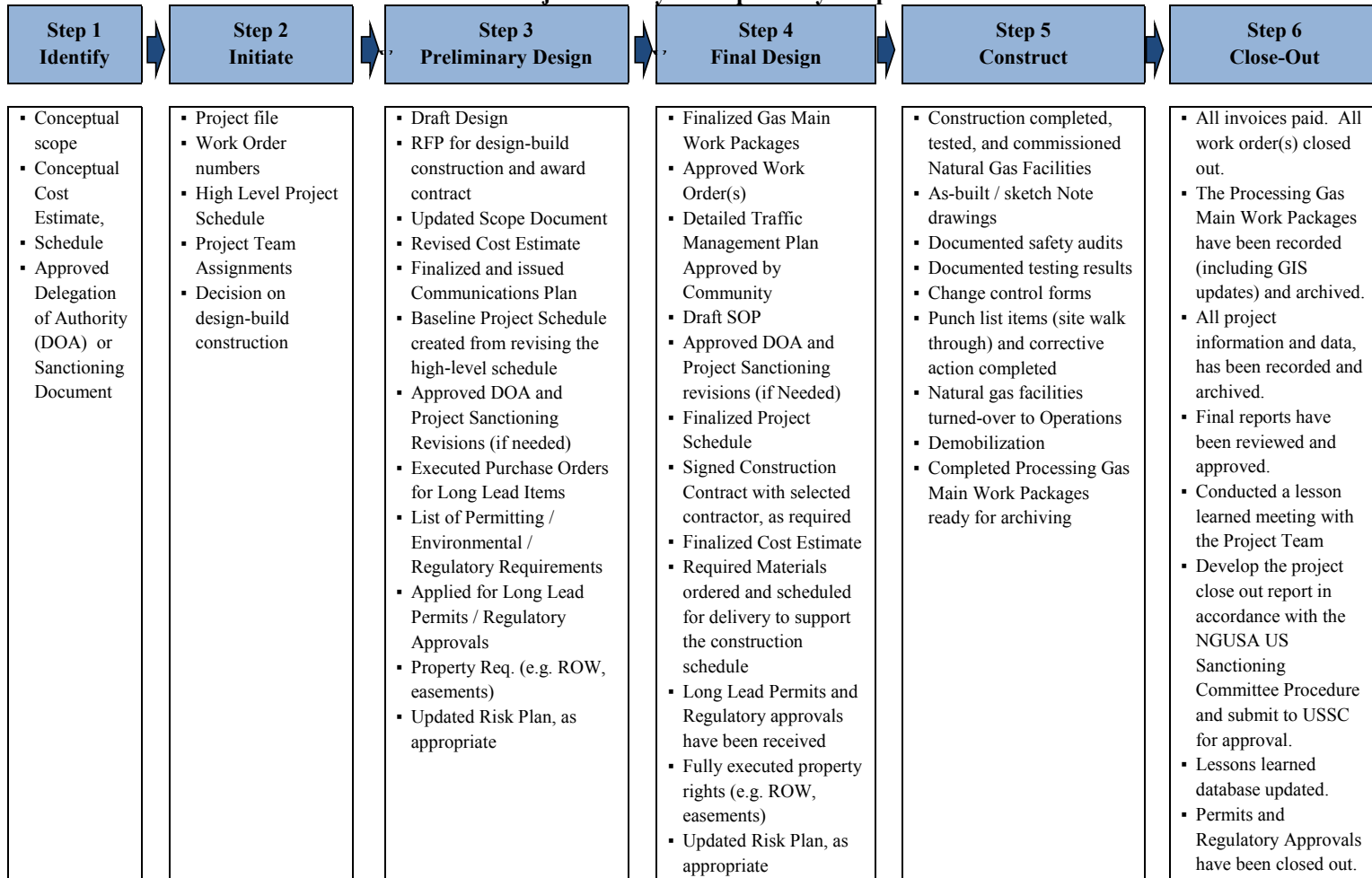


Exhibit VI-4
Results of NorthStar’s Review of Project Documentation [Note 1]

Document Folder	Number of Projects		Percent
	Required Document s	Had Required Document s	
Schedule	32	32	100%
Project Summary Reports	32	30	94%
Sanctioning	25	19	76%
Checklists	22	15	68%
Change Orders	18	11	61%
Permits	13	6	46%
Financials (Estimates)	31	10	32%
Meetings	32	6	19%
Engineering	32	5	16%
Contractor Correspondence	22	3	14%
Bids	8	1	13%
Photos	32	4	13%
Safety	32	1	3%
Lessons Learned	32	0	0%

Note 1: Shading highlights instances in which NorthStar found inadequate documentation in the project folders.

Source: IR 110 – Working session to review project documents for completed projects in DR 242.

2. NGUSA is taking steps to address deficiencies in the Project Management group’s adherence to the Playbook documentation requirements.

- In early 2013, NGUSA’s Internal Audit group identified deficiencies in the Project Management group’s adherence to the Playbook. In response, NGUSA is taking corrective actions. These corrective actions also address the deficiencies identified by NorthStar.
- In October 2013, the Manager of Gas Project Management began monthly reviews of ten percent of the active projects to assess compliance with the requirements in the Playbook, using a Gas Project Management Project Checklist.¹¹
- In 2014, NGUSA replaced the monthly review with “desktop audits” of project files performed by an external engineering consultant.¹² Three audits were conducted on

¹¹ DR 335

¹² DR 499



February 4, 2014. The resulting Audit and Compliance report showed a 95 percent compliance rate with the documentation requirements.¹³

- NGUSA issued draft documents delineating project management documentation responsibilities in fall 2013, and plans to incorporate corrective actions in response to the 2014 desktop audit findings in the final versions of the documents.¹⁴ These documents include:
 - A Project Management Documentation Policy which identifies the requirements and responsibilities for records management on project-managed projects (i.e., medium and high complexity gas projects) from initiation of a project through closeout. According to the policy, the project folder should contain all relevant project information and provide for full view of the project throughout a project's lifecycle. The project folder will act as the primary resource for project.¹⁵
 - A Project File Format which lists all the documents to be included in project folders.¹⁶
- Project Management also implemented a new program designed to maintain project information in an electronic format that is consistent across all regions of NGUSA.¹⁷

3. NGUSA has a formal project cost estimating process for its complex projects, with appropriate accuracy levels based on the project stage; however, the current estimating templates are more suited for mains and services work than for complex projects.

- Since January 2011, NGUSA has used a standard spreadsheet process with built-in rates and unit costs to develop project estimates.¹⁸ Estimating templates are developed and maintained in-house by Project Engineering. There are separate estimating templates for NMPC and for KEDNY/KEDLI.¹⁹
- There are four estimate levels, with Level I representing the first-cut budgetary estimate and Level IV being the final estimate. Each estimate level has increasing accuracy, as shown in **Exhibit VI-5**.²⁰

¹³ DR 499

¹⁴ DR 499

¹⁵ DR 312

¹⁶ DR 312

¹⁷ DR 312

¹⁸ DRs 461 and 313

¹⁹ DR 97

²⁰ DR 313



**Exhibit VI-5
NGUSA Estimate Levels**

Estimate Level	Project Stage	Definition	Accuracy
Level I	0% Design	The project objectives are well defined but key components of the design and construction are not clearly defined since no detailed design has been done.	+/- 50%.
Level II	30% Design	Most permit requirements have been identified and costs associated with materials are being refined. Some but not all constructability issues have been identified. Test holes have been used, where necessary, to determine field conditions.	+/- 25%.
Level III	100% Design	Includes all materials, expected permit costs, and costs associated with field conditions. The job site-specific conditions have been identified using mapping and survey data, and combined with the previously obtained test hole information. Permit applications for sanctioned projects are submitted for long lead permits. Requests for long lead permits for projects that do not require sanctioning have been submitted. Applications for easements/ right of ways are submitted.	+/- 15%.
Level IV	100% Design Construction Bids Received	At this level Engineering is 100% complete. Resources have been identified to construct the project. Estimates/bids from in-house Construction, contractors and other in-house implementing groups based on identified/observed field conditions, permit stipulations, etc. are in hand. The costs of special items such as easements, permits, etc. are known.	+/- 10%.

Source: DR 313.

- The Project Manager assists Gas Engineering with the estimate development for project-managed projects.²¹
- The same template is used for all estimate levels. Contractor labor and equipment rates from the bids submitted for main and service installation work are built into the spreadsheet. The spreadsheet also includes actual stock material costs, estimated internal labor rates, and estimated overhead percentages supplied by the Finance Department.²²
- There are currently inconsistencies in the development of complex project estimates. NorthStar reviewed the project estimates for the completed and on-going complex projects, and noted that project managers did not use many parts of the estimating template, as summarized in **Exhibit VI-6**.

²¹ DR 94

²² DR 313



Exhibit VI-6
NorthStar Assessment of NGUSA's Use of Estimate Template
Inputs for Complex Projects

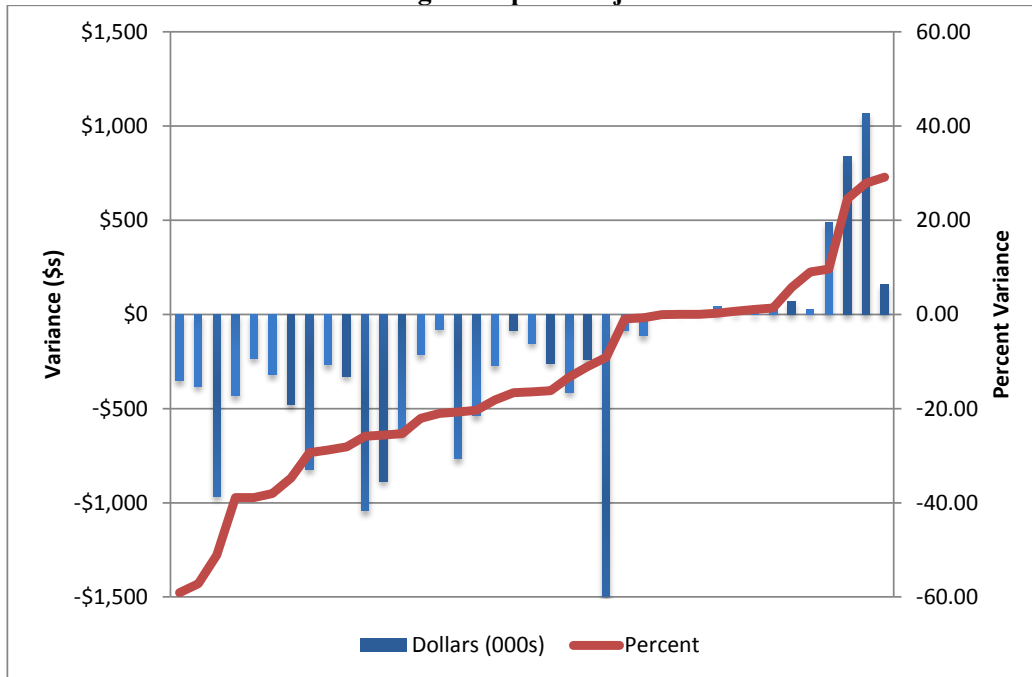
Estimate Template Inputs	Generally Used?		Comment
	Yes	No	
Stock Materials	✓		
Non-Stock Materials		✓	Project managers obtain lump sum from engineering
NGUSA Labor – estimated rates for NGUSA labor	✓		
Contractor Labor		✓	The unit costs are from the mains and services contracts for plastic pipes; complex project typically use steel pipes. Unit price contracts are not utilized on all complex projects. Lump sum bidding is the normal practice.
Miscellaneous	✓		
Non-Destructive Examinations		✓	Template are lower for complex project work
AFUDC	✓		
Overhead Rates	✓		

Source: NorthStar review of estimates provided in DR 461; IR 214 – Working session to review documents provided in DR 461.

- According to the project managers, the current estimate templates are more useful for mains and services work than for complex projects, as the templates use unit costs from the mains and services contracts, and material costs for plastic pipe, rather than the steel pipe typically used on larger projects. As a result, project managers must find cost data in addition to what is provided in the estimate template.
- 4. NorthStar's review of complex project costs shows that actual project costs are often less than final estimates.**
- During the audit period, NGUSA completed 39 large complex projects statewide, representing an estimated \$117 million portfolio. The actual cost of this portfolio is \$107 million.
 - **Exhibit VI-7** shows cost variances for the completed projects.



**Exhibit VI-7
Actual Cost to Final Estimate
Large Complex Projects**



Note: Each bar shows the dollar variance of an individual project. The estimated cost represents the last estimate performed prior to the start of field construction.

Source: DR 241, Attachment 1.

5. NGUSA does not currently use a work breakdown structure (WBS) to estimate, track, and monitor projects.

- Effective capital project management uses a hierarchical work breakdown structure to organize project elements into logical bundles of functional work representing discrete work activities that enable scheduling, resource loading and objective progress measurement. The WBS provides a basic framework to plan, execute, and manage the project.
- The lack of a well-defined WBS may lead to poor project performance – over budget, poor quality, incorrect functionality, delayed schedule. The project schedule, budget, resource requirements, and risks are all derived from the WBS.



6. NGUSA appropriately plans to use a WBS for complex projects following the implementation of Oracle's Primavera P6 Professional Project Management Tool (P6) for gas complex projects.

- NGUSA currently uses Microsoft Project to develop complex project schedules and tracks costs for all gas capital projects using work order from PowerPlan. It uses Primavera P6 to manage electric system projects.²³
- NGUSA states that it is developing plans to use Primavera P6 to build out and track schedules for project-managed gas capital projects and has scheduled the P6 conversion to start in April 2014.²⁴
- Primavera P6 is a more robust project management tool than Microsoft Project. Primavera P6 is project portfolio management software used throughout the construction and utilities industry. Its capabilities include portfolio management, program management, project management, planning and scheduling, resource management, budgeting and costs, and reporting and analytics. It will provide the capability to track project costs and schedule data using a WBS. NGUSA reported that Primavera P6 will also be used to track and monitor schedule performance and variance.²⁵
- NGUSA will model gas project schedules in Primavera P6 using a WBS. Primavera P6 will also allow users to download cost data directly from Power Plant at a project activity level.²⁶

7. NGUSA's project managers do not track schedule variances to determine overall schedule performance. NorthStar's review of project performance identified significant schedule variances.

- Measuring project performance is an important part of project and program management. It allows the project manager to identify cost and schedule problems early and take steps for remediation quickly.
- Baseline schedule data is retained in Microsoft Project; however, the project managers do not routinely track schedule variances or overall schedule performance.²⁷
- Project managers update project schedules on a monthly basis to keep the project team and management informed of on-going project activities, but do not report schedule variances. They review schedule information in weekly meetings at the site, and in the bi-weekly project status meetings with the sponsors.

²³ IR 110

²⁴ DR 558

²⁵ Fact Verification July 15, 2014

²⁶ IR 214

²⁷ DR 461 and IR 214



- In 18 of the 36 complex projects completed during the audit period that are shown in **Exhibit VI-8**, the schedules exceeded the need date by two months (schedule data was not available for three of the 39 completed projects). In six of these projects, the need date was exceeded by one year. It should be noted that several projects were also completed significantly ahead of schedule.²⁸

Exhibit VI-8
KEDLI and KEDNY - Complex Project Schedule Variance

Project Title	Utility	Schedule Variance – Days (Positive is late, Negative Early)
Lynbrook Reg Station QL-05	KEDLI	-240
SL-42 Patchogue	KEDLI	-112
SI West Shore Line Recoating	KEDNY	-104
Huntington SD25 Regulator Rebuild	KEDLI	-78
Paerdegat Basin ILI	KEDNY	-47
Garden City Reg Station ND-74	KEDLI	-10
Flushing Meadows (Shea Rd.)	KEDNY	-9
QD-38 Island Park	KEDLI	-4
H & V Expansion	KEDNY	0
Rotterdam Lock 9	KEDNY	0
Breezy Point Phase II	KEDLI	11
Rockville Centre 450# Valve Replacement	KEDLI	11
Governor 212	KEDNY	23
Varick Regulator Station	KEDNY	24
Inwood Upgrade	KEDLI	32
Sagaponack Upgrade & Reg. Station	KEDLI	38
Riverhead Heater	KEDLI	46
Gov 235 & Midwood Reinforcement	KEDNY	52
Governor 186	KEDNY	67
South Commack MOV	KEDLI	82
New Utrecht Main Reinforcement	KEDNY	85
Babylon SD-04	KEDLI	121
SL-20 Melville Regulator Station	KEDLI	123
Northport VA Hospital	KEDLI	134
Hempstead NL 40	KEDLI	137
JFK Heater	KEDNY	150
Gas Heater - Bay Shore	KEDLI	175
St Albans Gov 187	KEDNY	197
Maspeth Gate Station	KEDNY	214
Elmont Reinforcement	KEDLI	303
LGA Heater	KEDNY	365
Bay Ridge Heater	KEDNY	366
Narrows Crossing ILI	KEDNY	369
Gov 323 Regulator Rebuild	KEDNY	410
Rotterdam Lock 10	KEDNY	425
Aqueduct Heater & Reg Station	KEDNY	457

Source: DR 241.

²⁸ DR 241 and 614



8. NGUSA has an adequate process to keep stakeholders informed of complex project activities.

- Project managers hold bi-weekly meetings with engineering and other project team members to review project activities and discuss any significant issues.
- NorthStar's examination of Project Status Review meeting minutes revealed that projects are discussed in greater detail than the information presented on the Project Summary Status report. Also, for some projects, team members were assigned responsibilities for action items.²⁹
- The monthly Complex Project Reports prepared for the Vice President of Project Management and Complex Construction provide a good summary of the project, although as mentioned in Conclusion 7, there is no schedule variance analysis. Information provided in the report includes brief descriptions of the project phase, milestones achieved and action items, risks/opportunities, and financial analysis.³⁰
- The primary report used to report overall costs and schedule milestones for each project is the Excel-based Monthly Project Summary Report.³¹ The project managers develop this report at the beginning of each fiscal year (to reflect the current fiscal year budget information) and update the report monthly throughout the year. Information provided in the report includes:
 - High-level schedule milestones (actual dates only – target dates are only provided for construction)
 - Current FY budget, actual FY costs, and projected year-end costs
 - Total sanctioned amount, total costs to date, and projected final costs
 - Scope changes (As discussed in Conclusion 9, the scope change information in the report often incorrect).
- The Monthly Project Summary provides high-level information regarding a project's cost and schedule; however, detailed supporting information is seldom provided.
- NGUSA's Resource Planning group is the primary user of the Monthly Project Summary Report. Resource Planning uses the report to track actual major capital and expense categories against plan. In addition, the Project Summary Report is reviewed as part of NGUSA's annual work plan rollout meeting, with Operations, Engineering, Design, and Investment Planning. NGUSA uses the report in part as input for other reports, including reports regarding leak prone pipe, growth, and leak data.³²

²⁹ DR 311

³⁰ DR 668

³¹ DR 97

³² DR 460



9. The project scope change information on the Monthly Project Summary report is often incorrect, and the project change control logs are not up-to-date.

- The project managers are responsible for maintaining the change order log.³³ This log is maintained as a worksheet in the Monthly Project Summary Excel workbook.³⁴
- NorthStar reviewed the Change Order Log, Project Summary Report, and Change Orders for the eleven complex construction projects that were on-going during the audit.
 - Only five of the eleven on-going projects had change orders at the time of NorthStar's review in February 2014.
 - As shown in **Exhibit VI-9**, the Project Summary Report and Change Order log contained all the change orders for only one of these five projects.

Exhibit VI-9
Tracking and Reporting of Change Orders in On-going Projects

Project	Number of Change Orders	Change Orders Reported In		Project Log and Summary Accurate?
		Project Summary	Change Order Log	
Commack M&R	1	0	0	No
East End Reinforcement – Cutchogue	7	0	0	No
Gravesend Heater and Gate Station	1	1	1	Yes
Global Foundries	21	0	1	No
BQI	20	3	3	No

Source: DR 461, Attachment 2.

10. Materials and equipment, vehicles and other logistical support for capital and O&M work are adequately planned and managed.

- The NGUSA Operations Support department provides support to the gas business in New York and New England. Inventory Management and Fleet Services are part of this department.³⁵
- The Inventory Management department is made up of about 235 personnel. Approximately 35 are management employees and about 200 are bargaining unit employees. The department's main functions are material planning, material handling (i.e., warehousing and distribution) and investment recovery. Investment recovery consists of collecting materials removed from service for re-use, disposal or for sale as scrap.

³³ DR 94

³⁴ DR 461

³⁵ DR 143



- All stock material demand for materials needed for NGUSA's projects and programs flows into SAP from one of the following five sources or entry points.
 - STORMS
 - Maximo
 - Mobile Material Assistance (MMA) – handheld scanners used by material handlers in crew stock locations
 - Shopping Cart – an SAP application that allows company employees to procure the goods and services that they need for their work
 - Manual (Material Planner initiated requests).
- Approximately 90 percent of the daily stock material demand is from the Shopping Cart or MMA.³⁶
- Fleet Services is responsible for providing and maintaining all of the vehicles used by NY Gas Operations and Maintenance. The organization consists of approximately 350 people, 85 to 90 percent of whom are represented by a total of sixteen bargaining units. The organization is responsible for about 9,500 vehicles, at forty locations throughout the gas and electric service territory. Approximately 55 percent of these are used by Gas Operations and Maintenance. The Fleet Services organization performs three primary functions: maintenance; asset management; and performance monitoring.
 - Most vehicle maintenance is done in-house, at about 55 garage locations, with about 15 to 20 percent of maintenance outsourced. Outsourcing is used for seldom needed work such as paint and body repairs, wheel alignments, warranty work and windshield replacements.
 - Asset management is performed by a group of engineers who monitor vehicle usage and maintenance records and place orders for new vehicles as necessary. Every item in the fleet inventory is leased. Every asset is kept and used until the amortized value reaches zero. When the item is no longer useful it is sold.
 - Performance monitoring is based on collecting and analyzing maintenance and cost information for each vehicle.

11. Key Performance Indicators (KPIs) for materials and fleet are appropriate, although the accuracy of the materials KPIs is questionable due to some minor problems with data entered into the systems, and the difficulties with NGUSA's SAP implementation have led to the suspension of some fleet metrics reports.

- Inventory management has KPIs in two areas: 1) Operational Bin Accuracy (inventory accuracy) and 2) Material Availability (Fill Rate and Stock Availability). These KPIs are appropriate to assess inventory management.
 - Operational Bin Accuracy compares the actual quantity of materials in the storage bins with the expected quantity based on SAP. Inventory accuracy is

³⁶ DR 541



important to ensure that materials needed to support operations are available, as well as to avoid the cost to maintain excess inventory.³⁷

- Fill Rate measures the availability of materials specifically ordered for projects and programs. Fill rates are calculated for individual line items on an order as well as for the total order. Of particular importance in calculating fill rate is the date the materials are due. Because of problems with getting the correct due dates into its inventory management system when orders are placed, NGUSA has been struggling with the quality of this measure. As a result, the reports show that fill rates performance has remained steady, but low.³⁸ The company is working to improve the quality of the information in order to better assess options for improved fill rates.
- Stock Availability indicates the extent to which materials ordered by operations are on hand for pick-up or delivery from NGUSA's material distribution centers. Current on hand stock is compared to the quantity ordered on a weekly basis, to determine whether stock is available (100 percent), partially available or stocked out (0 percent). Similar to Fill Rate, because of problems with getting the correct due dates into its inventory management system when orders are placed, NGUSA has been struggling with the quality of this measure. As a result, the reports show that Stock Availability is not optimal.³⁹
- NGUSA measures and monitors on-time completion of vehicle inspection reporting and performance of planned maintenance.⁴⁰ It has been unable to produce additional fleet performance metrics since September 2012 because of difficulties with the SAP system implementation. Following stabilization of SAP, NGUSA expects to reestablish production of other fleet service reports which address utilization, preventative maintenance scheduling, repair hours per vehicle repaired, and damage.⁴¹
 - NGUSA is working with a consultant to produce the fleet utilization report in the near term and expects to reestablish production of the other fleet service reports following stabilization of SAP.
 - In the interim, the Fleet group is still utilizing system functionality to track and perform vehicle preventative maintenance scheduling.
 - All fleet repairs are presently tracked on individual work orders that log repair complaint, cause, correction, parts and materials u, plus repair labor hours for all fleet work.⁴²

³⁷ DR 472

³⁸ DR 472

³⁹ DR 472

⁴⁰ DR 278

⁴¹ DR 278

⁴² DR 278



12. NGUSA has a sound procurement process for its construction and engineering contractors.

- NGUSA’s Global Procurement group follows a formal “Strategic Sourcing Process,” for goods, works and services valued at \$100,000 or over. The “Strategic Sourcing Process” is a seven-step strategic process that delineates the steps in the contracting process – from reviewing the project scope, qualifying vendors for the work required, reviewing market pricing, evaluating bids, negotiating with contractors, and awarding the contract.⁴³
- The Strategic Sourcing Process is summarized in **Exhibit VI-10** (next page). As shown in **Exhibit VI-10**, the process has three “gates,” or review points where a team of stakeholders review and approve the process steps to-date:
 - Gate 1 – Approval of sourcing strategy
 - Gate 2 – Review of bid results and negotiation strategy
 - Gate 3 – Review of recommended contract award
- The level of detail in each sourcing step, and the composition of the stakeholder project review team is dependent on several factors including the estimated contract dollar value, level of risk and the complexity of the procurement process.⁴⁴ There is an Excel-based model which assigns points to the various factors and determines the recommended sourcing model.⁴⁵
- NGUSA uses the Ariba e-sourcing system for all communications with bidders, from the invitation to bid and the issuance of RFPs and technical specifications, to responding to bidders’ questions, and the submission of bids.⁴⁶

⁴³ DR 83

⁴⁴ DR s 83 and 547

⁴⁵ DR 547

⁴⁶ DR 547



Exhibit VI-10 NGUSA's Strategy Sourcing Process

Step 1: Project set up — The purpose of this step is to establish an appropriate project team and develop the project plan and timelines. The degree of detail and formality required to produce these tools will depend on the size and nature of the project.



Step 2: Develop category profile — In this step a detailed overview of the category is developed together with a determination of the business requirements. Activities include documenting volumes acquired and used, prices, costs and budgets available and documenting specifications.



Step 3: Develop category strategy — This step is about setting the category approach and tactics based on based on both NGUSA's bargaining position and the importance of the category to business success.



Gate 1: Approval of category strategy — At this review Gate the strategic sourcing strategy is approved by the key stakeholders – typically at Director and Vice President level. Items discussed would include category strategy, baseline spend, savings methodology, potential suppliers and evaluation approach.



Step 4: Develop supplier portfolio — In this step a shortlist of pre-qualified suppliers is developed for consideration as potential sources for the category. Current, alternative, and non-traditional suppliers are included from a broad search of all potential suppliers.



Step 5: Select implementation path — During Step 5 the project team verifies or adjusts the category strategy and develops a detailed implementation plan based on the understanding that it gained in Step 4.



Step 6a: Competitive approach — In Step 6a, the project team requests and evaluates supplier proposals, plans the negotiation strategy, manages the negotiation process with suppliers, and recommends shifts in sourcing to new suppliers or changes in relationships with existing suppliers. The negotiation strategy is developed on fact basis and is documented with the aid of the negotiation plan template.



Gate 2: Negotiation strategy approval — At this Gate a similar team of stakeholders to the Gate 1 review team would review the initial bid results, recommendations for shortlist and the negotiation strategy. Given the commercial sensitivity of the information discussed attendance may be restricted at this review.



Step 6b: Non-competitive approach — Single/Sole sourcing activities are discouraged and can only be undertaken when approved in line with a single/sole sourcing policy. If a single or sole source is authorized, a negotiation strategy is developed by the project team ahead of engaging with the supplier.



Gate 3: Contract award — At this Gate the stakeholder team reviews the results of the evaluation and negotiation process and the recommended award. Again attendance is typically at the Director and Vice President level.



Step 7: Implement and manage category — This step covers the transition from existing to new suppliers, or from old to new ways of working with continuing suppliers, the contract award and implementation process, operational performance management of suppliers, maximization of value from the contract with the supplier and managing internal customers' usage of supplier contracts. It also covers, where this is appropriate, the implementation of a structured Supplier Relationship Management program (SRM), where there is an opportunity to leverage value over and above the existing contractual framework with that supplier.

Source: DR 83.



13. NGUSA has a comprehensive strategy for its pipeline construction contractor sourcing.

- NGUSA's current pipeline construction sourcing strategy was developed in 2010. In developing the strategy, NGUSA performed various analyses, including:
 - Contract and stakeholder analysis
 - Supply market analysis
 - Identification of total cost of ownership levels in the areas of price, usage and process.⁴⁷
- NGUSA is currently updating its pipeline construction sourcing strategy in light of upcoming work. Among other things, the revised strategy will consider NGUSA's sourcing capabilities given the size of the current staff, the availability of internal engineering and construction resources, and the contractor market.⁴⁸

14. NGUSA followed its strategic sourcing process for the selection of complex project construction contractors.

- The general process for the selection of each complex project contractor is as follows:
 - Issue RFP on the Ariba e-sourcing tool.
 - Conduct pre-bid meeting.
 - Respond to bidder questions via Ariba. (Procurement obtains information from Subject Matter Expert and posts it in Ariba.)
 - Receive bids.
 - Conduct clarification vetting meetings with each bidder to ensure the bidder understands the project and to address any bid anomalies. A team comprised of procurement, engineering, and project management personnel conduct these meetings.
 - Receive revised bids.
 - Select and negotiate with bidder.⁴⁹
- NorthStar performed a detailed review of the contractor selection for eight complex construction projects (projects on-going during NorthStar's audit that are estimated to cost over \$1 million and that used outside contractors) and found that NGUSA followed its strategic sourcing process and that the low bid was selected for each project.

⁴⁷ DR 489 CONFIDENTIAL

⁴⁸ IR 213

⁴⁹ DR 547 and IR 213 – Procurement Review Working Session



Exhibit VI-11

NorthStar Review of Construction Contractor Selection for Complex Project Work

Number of Invited Bidders	Number of Bids	Gate 1	Bid Analysis	Gates 2 and 3		Low Bid Selected?	Dollar Value of Contract (\$M)	Comments
16	6	Yes	Yes	Yes	Presentation	Yes	\$14.1	
14	11	No	Yes	Yes	email	Yes	.750	
7	2	No	Yes	Yes	Presentation	Yes	5.5	
18	5	No	Yes	Yes	Presentation	Yes	4.9	
8	8	No	Yes	Yes	Presentation	Yes	2.7	
14	2	No	Yes	Yes	email	Yes	.772 and 1.8	Based on the initial bid results, the bid scope was divided into 2 contracts
11	2	No	Yes	Yes	email	Yes	4.7	
3	3	No	Yes	Yes	email	Yes	.883	

Source: DRs 547 and DR 328 and IR 213 – Procurement Review Working Session.

- As shown in **Exhibit VI-11**, NGUSA does not generally perform separate Gate 1 review of the sourcing process for the selection of contractors as the sourcing strategy is addressed in the composite sourcing strategy for pipeline contractor procurement.
- For some projects, Gate 2/3 review and approval was conducted by email rather than in a formal presentation. This was general done for smaller projects or for the sake of expediency.
- The Gate presentations provide a good summary of the bid process and results, including:
 - Project Scope
 - Team members
 - Stakeholders
 - Bidder participation
 - Comparison of round by round bid submittal results
 - Proposed award scenario.

15. NGUSA used appropriate bidding practices to select its mains and services (unit rate) contractors.

- NGUSA issues multi-year contracts for the installation and replacement of gas mains and services in KEDLI's, KEDNY's and NMPC's service territories. A summary of NGUSA's mains and services contractor competitive selection process for KEDNY and NMPC is shown in **Exhibit VI-12**. According to NGUSA, the same process



was used for KEDLI (NorthStar did not review the selection of the KEDLI contractors).⁵⁰

Exhibit VI-12
Overview of Mains & Services Contractor Selection – KEDNY and NMPC

Company	RFP Date	Geographic Areas	Number of Bidders	Number of Vetting Rounds	No. of Contractors Selected	Date of Contract	Contract Term
KEDNY	11/11/2010	Brooklyn Queens Staten Island	10	2	1	4/1/2011	5 years with 1 year option
NMPC	11/24/2009	Capital Region Central Region	12	3	1	4/1/2010	4 years with 1 year option

Source: DRs 375 and 487.

- NGUSA issues separate RFPs for KEDLI, KEDNY and NMPC, and divides each service territory into multiple geographic bid areas to potentially award individual areas to different contractors based on the best combination of price and the capability to deliver the work.⁵¹
- As part of the contractor procurement process, NGUSA's Global Procurement group analyzes invoice data on installed units, time and material charges to help structure the RFP and to identify cost drivers. This analysis is used to specify unit quantity breakpoints for tier pricing bids.
- The unit rate contractors in all three regions were selected using the Global Procurement group's sourcing process, which included soliciting formal bids through the Ariba RFQ system.
- Contractor bids are evaluated based on total cost, the contractor's ability to perform the anticipated workload along with a comprehensive review of the contractor's safety and quality records.
- A multi-functional NGUSA team comprised of procurement, investment planning and construction personnel conducted several rounds of clarification vetting meetings with each bidder to provide commercial feedback to the contractors and discuss particular areas of concern.⁵² Following each meeting, NGUSA supplied the contractors with excel spreadsheets that contained their pricing submittal. Based on the vetting clarification meetings, the contractors had the opportunity to adjust prices.
- The multi-functional team reviewed the RFP and revised bids and placed contractors' bids into one of three groups:

⁵⁰ DR 487

⁵¹ DR 487

⁵² DRs 487 and 375



- Within Expectations – The response is within NGUSA expectations.
 - Outside Expectations – Bid was higher than NGUSA’s current prices, regional pricing, “should-cost” prices or higher than the best quote.
 - Uncompetitive - Bid was significantly over NGUSA’s current prices, regional pricing, “should cost” prices OR substantially higher than the best quote.
- The bidders had further opportunity to revise pricing.

16. NGUSA selected its Master Service Agreement (MSA) gas distribution engineers as part of an overall solicitation for engineering firms using its strategic sourcing process.

- NGUSA used its seven-step strategic sourcing process for the selection of engineering contractors.⁵³
- The solicitation of gas distribution engineers was part of a general RFP for services in the areas of gas distribution, substation, distribution design, project management, transmission, protection and sub-transmission. Key steps in the process are as follows:
 - The RFP was issued in August 2010 to 58 bidders via Ariba.
 - NGUSA received 36 bids, including 18 bids for gas distribution engineering.
 - Global Procurement and Gas Distribution Engineering representatives reviewed bids against pre-determined criteria. The technical portion of the bid represented 70 percent of the score; the commercial portion 30 percent.
 - NGUSA reviewed the submittals and reduced the number of potential gas distribution engineering firms for negotiations to ten. NGUSA identified technical and commercial concerns to be addressed through negotiations.
 - NGUSA selected ten suppliers for award.
- On April 1st 2011, the Engineering MSA was established. Overall, 20 suppliers were selected, ten of which provide gas distribution engineering services.

17. NGUSA has appropriate policies, training and verification practices regarding interactions between employees/contractors and outside inspectors and regulators.

- NGUSA’s standards of ethical business conduct are documented in “Doing the Right Thing.” As part of NGUSA’s overall governance process, the document is reviewed and updated every three years. The latest version of “Doing the Right Thing” was issued in March 2014, and a hard copy was mailed to all employees and posted on NGUSA’s internal website. There was also a detailed announcement of the roll-out of the revised policy.⁵⁴
- NGUSA ensures that employees are aware of the requirements of its ethics and compliance program through an extensive communications program. The U.S.

⁵³ DR 556

⁵⁴ DR 490



Ethics and Compliance Office issues a formal ethics and compliance communication plan annually.⁵⁵ The ethics and compliance communication plan includes:

- Monthly ethics moments for use at staff meetings
 - Monthly ethical spotlights
 - Quarterly ethics and compliance newsletter
 - Posters
 - Quarterly memo to managers
 - Case studies reviewing real NGUSA investigations of potential ethics/compliance issues
 - Lunch and Learn events
 - Ethics and compliance podcasts.⁵⁶
- NGUSA has an Ethics Liaison network of forty-two employees who represent specific functions or jurisdictions within the company and who serve as a conduit between the Ethics and Compliance Office and the relevant function/jurisdiction.⁵⁷
 - NGUSA has a comprehensive ethics and compliance training program for its employees. The training program includes a global e-learning program on “Doing the Right Thing.” The program was last issued to employees in the 2011-12 timeframe. An updated program, based on the March 2014 update to the “Doing the Right Thing” guidance document, is in development and is expected to be available to employees in spring 2014. NGUSA also uses e-learning training programs on anti-fraud and bribery. These e-learning programs are tracked through NGUSA’s learning management system, Learning Link, to ensure completion by employees.⁵⁸
 - There is an annual Governmental Compliance training program for all employees. This program was developed by NGUSA’s Legal Department to ensure that employees understand the various state and federal lobbying and political interaction laws. NGUSA has also incorporated an ethics and compliance component into its new hire training, Graduate Development program, and Foundations of Leadership (a specialized training program for managers and supervisors). NGUSA also provides ad hoc ethics training when necessary.⁵⁹

18. NGUSA takes appropriate steps to ensure that any interactions between employees or NGUSA contractors and outside inspectors and regulators are conducted in accordance with its ethics and compliance policies.

- NorthStar reviewed NGUSA’s Global Supplier Code of Conduct. The Global Supplier Code of Conduct mirrors the expectations of employees documented in “Doing the Right Thing.” It is provided to vendors during the RFP process and as part of the on-boarding process. The requests for bids contain a Supplier Ethics

⁵⁵ DR 490

⁵⁶ DR 490

⁵⁷ DR 490

⁵⁸ DR 490

⁵⁹ DR 490



Requirements page that includes this document as well as other ethics related information.

- NGUSA's Supplier Ethics requirements are also incorporated into ISNetwork, a web-based contractor and supplier management system that NGUSA uses for contractor procurement.
- NGUSA annually conducts training on the requirements of the Global Supplier Code of Conduct with large vendors, and also issues quarterly communications to vendors, known as Contractor Alerts.⁶⁰
- NGUSA conducts Governmental Compliance training for employees who interact with outside inspectors and regulators. NorthStar reviewed the latest training slides and found them to be clear and thorough. The training program specifically states:

The Department of Public Service (DPS) regulates NGUSA's business in New York. Section 15 of the New York Public Service Law prohibits NGUSA from providing any gift to DPS personnel, which includes Public Service Commission employees. It does not permit any gifts through exemptions to the ban.⁶¹

19. In response to the gas events in San Bruno, CA, and Allentown, PA, NGUSA appropriately established a compliance group to perform records management, verifications, and inspections.

- Records violations make up the majority of issues associated with pipeline safety compliance audits.
- NGUSA is implementing a new gas QA/QC initiative as part of its overall effort to ensure compliance with gas regulatory and industry requirements following the gas events in San Bruno, CA, and Allentown, PA. The effort began in the fall of 2013 when NGUSA established a back office assessment program for company records that document required gas safety tasks/activities.
- As part of the QA/QC initiative, NGUSA established a compliance group to ensure "cradle to grave" compliance management.
 - The responsibilities of the compliance group include monitoring, management and verification of inspection records for completeness and accuracy.
 - The ultimate goal is to reinforce operational ownership of the day-to-day compliance process.⁶²
- The compliance group is comprised of seventeen analysts. Ten of the compliance analysts are located in New York (6 UNY and 4 DNY). Most of these compliance analysts are senior people within NGUSA.

⁶⁰ DR 490

⁶¹ DR 538

⁶² DR 340



- NGUSA plans to develop and implement compliance assessments and field inspections of Playbook projects (Complex Level 1 & 2). This program is anticipated to commence during the first quarter of FY15 and will involve:
 - Periodic, random selection of Level 1 & 2 projects.
 - Back office and field assessment of Project Work Packages for the purpose of ensuring all required documentation is contained in the work package available to installing crew.

20. NGUSA's responses to Hurricanes Irene and Sandy complied with its Gas Emergency Plan (GEP).

- KEDLI, KEDNY, and NMPC have emergency and storm response plans that include procedures that instruct employees in the areas of field operations, system operations, and customer interface.
- The purpose of the procedures is to assign responsibilities and delineate the necessary actions to resume safe system operation.
 - Standards, Policies and Codes
 - Electric & Gas – Meter Reading
 - Gas Instrumentation and Regulation
 - Gas Field Operations Maintain
 - Gas Field Operations – Construct
 - Dispatch and Scheduling
 - Gas Damage Prevention
 - Gas Control
 - Gas Customer Meter Services
 - Customer Organization
 - Energy Procurement & Gas Supply Planning
 - Energy Procurement – Regulated Gas Supply
 - Gas Operations Engineering
- NorthStar reviewed NGUSA's GEP as well as its response to the recent storms and found that restoration and repair efforts were in compliance with the GEP.⁶³
- In the immediate aftermath of Superstorm Sandy, NGUSA also established a physical presence in the areas of its system that experienced flooding, in order to reconnect customers. An aggressive plan was implemented to provide affected customers with emergency funding and logistical support to repair homes and appliances that were damaged by flooding.
 - NGUSA established eight Community Outreach Centers to help customers get reconnected.

⁶³ DR 079 and DR 258



- NGUSA took proactive measures and collaborated with multiple relief organizations, trade allies, city and local officials to help affected customers restore heat before the start of winter.
- By leveraging its trade ally relationships with a network of 250 local plumbers, NGUSA coordinated its efforts to replace customers' flood-damaged gas equipment. In conjunction with the NYC Rapid Repair Program, NGUSA reconnected gas service to more than 12,000 customers.
- NGUSA also launched a \$30 million Emergency Economic and Community Redevelopment Program to address financial needs that were not being covered by federal, state and city aid, private insurance or other funding available to impacted gas customers. The relief program provided funded plumbing inspections (a one-time \$150 bill credit to eligible customers), grants of up to \$6,000 for heating equipment for the most vulnerable customers, and grants of up to \$250,000 to support commercial rebuilding. Over 20,000 customers have benefited from this program, including more than 300 local businesses with more than 7,000 employees.⁶⁴

21. NGUSA conducted appropriate storm-related lessons-learned review and improvement activities.

- Following Superstorm Sandy, NGUSA issued the "After Action Review Report on Superstorm Sandy," a detailed "lessons learned" document based the Company's review of its response to the storm.
- NGUSA identified twenty-seven specific improvement opportunities for its storm response:
 - Many were related to the restoration process, such as evaluating the development of a gas outage management system to track service outages, identifying the breadth of areas and specific equipment affected, and providing detailed information needed to respond to inquiries.
 - Others dealt with logistic support and mutual aid.
 - Two items suggested system modifications that will likely prevent damages from future storms – converting existing low pressure networks to high pressure, and re-examine pressure regulating facilities.⁶⁵ (These items are addressed in Chapter V.)
- NGUSA also made four significant changes to its GEP:
 - Gas Control System – Added a clarification to clearly define that the Gas Control Organization is responsible for monitoring, controlling, and coordinating all gas main line activities, for both planned and unplanned gas system outages and emergencies.
 - Updated the Emergency Organization Structure to fully integrate Incident Command System process.

⁶⁴ DR 683

⁶⁵ DR 80



- Local Governmental interface – added structure around the delivery of information by company liaisons at state emergency operations centers (EOCs) to support communities with estimated times of restoration (ETRs).
- Reporting – added the implementation of a standardized reporting process for large scale emergencies.⁶⁶

D. RECOMMENDATIONS

1. Address deficiencies identified in the Project Management group’s adherence to the Playbook project documentation requirements. This should include:
 - Update the Project Management Documentation Policy to identify the requirements and responsibilities for records management on project-managed projects.
 - Continue periodic audits of project files by Internal Audit or an external auditor.
2. Develop an estimating program for gas projects that is consistent with that used for NGUSA’s electric utilities.
3. Implement a WBS system to organize and manage gas projects as part of the implementation of Primavera P6.
4. Institute a process to track, monitor and report complex project status, including: budget variances, committed costs and actual costs to date, estimated cost at completion, projected year-end expenditures, schedule variance, pending and approved scope changes, and progress-to-date.
5. Institute controls to ensure project change control logs are updated on a timely basis and that accurate change order information is contained in the Project Summary Reports. Include a review of the change order logs and the change order portion of the Project Summary Report as part of the periodic audits of project files recommended in Recommendation VI-1.
6. Resolve data issues regarding the KPIs for materials services and the fleet metrics reports.

⁶⁶ DR 79



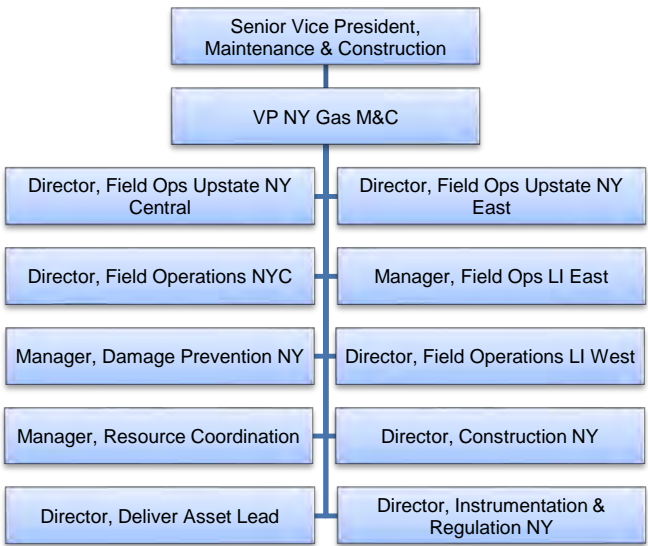
VII: WORK MANAGEMENT (ELEMENT 7)

This chapter focuses on NGUSA’s short-term and day-to-day planning and execution of its maintenance and construction activities, including the oversight and use of its mains and services contractors, and its quality assurance program.

A. BACKGROUND

The Gas Maintenance and Construction department for NGUSA’s three NY gas utilities is shown in **Exhibit VII-1**.

Exhibit VII-1
NGUSA Maintenance and Construction Organization



Source: DR 143

There are Field Operations in five geographic areas: Upstate Central, Upstate East, New York City, Long Island East and Long Island West. Field Operations personnel perform both maintenance and construction work. Each Field Operations group has several supervisors who oversee the work of union personnel, as well as compliance analysts and work planners.¹

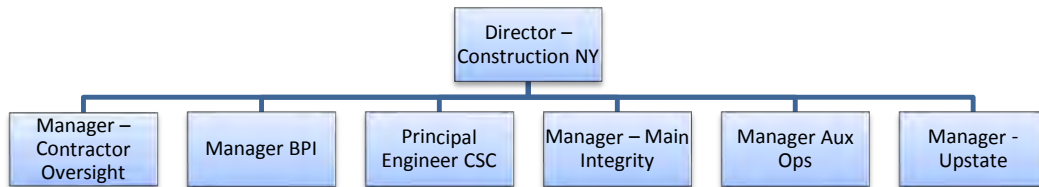
The Construction-NY department, shown in **Exhibit VII-2**, is responsible for execution of the annual capital program for all NY gas utilities, which is in excess of \$600 million for FY 2014. Construction-NY works closely with Network Strategy, Resource Planning,

¹ DR 143



Project Management, Operations Support, Maintenance, contractor resources, and municipal and state agencies to execute the capital plan.²

Exhibit VII-2 Construction-NY Department



Source: DR 143

The Construction-NY department is comprised of the following groups:³

- Contractor Oversight – oversight of contractors working on NGUSA’s gas facilities throughout Downstate and Upstate NY.
- In-house Construction Resources – execution of capital work plans from various work streams that are assigned by Resource Planning. This includes work from the Growth, Public Works and Integrity/Reinforcement Programs.
- Auxiliary Operations – This area is responsible for the following activities in both Downstate and Upstate NY:
 - Management of transfer stations at Greenpoint and Hicksville, which includes the recycling of all construction debris that is brought into each facility as well as proper disposal of unusable material. In Upstate NY, recycling of material is also utilized.
 - Support the Construct & Maintain group in all types of construction activities by supplying the necessary equipment and support services, including: dump trucks, cranes, tractor trailer pipe delivery, roadway plate deliveries and retrieval, debris and barricade pick-ups and scheduling of nuclear compaction operations for protected street backfills.
 - Provide Field Trainers to support Construct & Maintain with specialty tapping equipment such as high pressure tapping and large diameter stop offs, cross fusion, drip pumping, camera and water extraction equipment, as well on-site training for field crews.
 - In-house welding resources support Construct & Maintain with fabrication of welded pipe and fittings. Other responsibilities include coordination and scheduling of all non-destructive evaluation (NDE) services, as well as all NGUSA qualified welder re-qualifications and spot checks.

² DR 455

³ DR 455



- City State Construction (CSC) Program – The CSC, or Public Works, Program consists of work driven predominantly by the NYC Department of Design and Construction, NYC Department of Transportation, NYS Department of Transportation, the Port Authority, various municipalities and private entities. The CSC Program is directed at replacing facilities where third party construction threatens the integrity of those facilities. CSC Program work is performed by a combination of in-house and contractor resources. In-house resources for this work in the Upstate territory are managed by NGUSA's Field Operations Group.
- Mandated Integrity Program – The Mandated Integrity Program consists of main and service leak prone pipe replacement, reliability and reinforcement projects. This work is performed by in-house Construction, Field Operations and contractor resources in Downstate NY, and Field Operations and contractors in Upstate NY. The Mandated Integrity Program Group is also responsible for the execution of NYC Local Law 30 Program that requires every gas service line in NYC to have a gas service valve or other outside emergency shut-off device installed.

NGUSA supplements its in-house work force with mains and services contractors (also referred to as unit rate contractors). The mains and services contractors perform major categories of work, including:⁴

- Gas New Main Installation (excluding Transmission)
- Gas Main Replacement
- Gas New Services Installation
- Gas Service Replacement
- Gas Connections
- Gas Maintenance
- Restoration
- Horizontal Directional Drilling
- Other Time and Material work.
- Gas Leak Pinpointing and Repair
- Labor and Equipment Assistance to supplement NGUSA Internal Crews
- Underground Residential Distribution (URD) and Underground Commercial Distribution (UCD) Joint Trench Electric and Gas Installation

The Resource Planning department develops, manages and coordinates multiple field location work plans that include all of the work represented in the annual work plans.⁵ There are two Resource Planning Managers, one for upstate and one for downstate. In addition, there are four Resource Planning Program Managers covering Upstate Central, Upstate East, New York City and Long Island.⁶

The Resource Coordination organization plans, schedules and monitors the delivery of maintenance and capital work. There is a Resource Coordinator for each of the seven

⁴ DR 375 and DR 487

⁵ DR 326

⁶ DR 321 and DR 385 and Fact Verification July 15, 2014.



Divisions.⁷ The coordinators are responsible for developing the short-term schedules for each barn (upstate) or yard (downstate) based on the work plans developed by Resource Planning.⁸

NGUSA has two Quality Assurance (QA) groups for the NY gas utilities, one upstate and one downstate. The QA/QC activities cover both O&M work (e.g., leak repairs, corrosion repair orders, valve inspections, service replacement) and capital work (e.g., main replacement, pipeline installation, regulator station re-build, main extensions).⁹ The programs provide for both “real time” inspections through the Active Site Inspection Program, and post completion field inspections and assessments under the Re-Dig Program to verify compliance with regulatory, O&M and safety requirements.¹⁰

B. EVALUATIVE CRITERIA

- Are major workforce groups covered by work management systems to assign, execute, and control the work?
- Are work management systems used effectively to schedule and manage field crews, including transportation, equipment, and materials?
- Does NGUSA use work measurement standards to schedule and manage its workforce?
- Does NGUSA use performance data as a basis for continuous improvement? Does it track improvement in processes and workforce performance?
- Do the workforce and work management systems feed back into performance improvement opportunities?
- Does NGUSA Gas measure and manage employee availability, utilization, efficiency, productivity and effectiveness in an appropriate manner?
- Are work program and project schedules managed effectively on a day-to-day basis?
- Are programs and projects effectively converted into short-term and day-to-day work?
- Are staffing levels appropriate to complete planned work on time and within approved budgets?
- Are assumptions documented when planning workforce requirements where history is inadequate to determine staffing levels?
- Is NGUSA Gas’ mix of in-house and contracted resources appropriate given relevant economics and type of work performed?
- Does NGUSA Gas have effective quality assurance and quality control procedures and functions?
- Does NGUSA have appropriate guidelines and procedures when using contractors for O&M work?
- Are the roles and responsibilities of supervisors and inspectors defined and appropriate?

⁷ DR 385

⁸ DR 326

⁹ DR 493

¹⁰ DR 96



- Do excess work and process backlogs exist, and if so, are there plans to eliminate them?
- Does information about rework, failures and repair history get translated into corrective actions, infrastructure aging analysis, and repair versus replace decisions in an effective and timely manner?

C. FINDINGS AND CONCLUSIONS

1. NGUSA uses appropriate work management systems to assign, execute and control its maintenance and construction work.

- A work management system provides a means of collecting and storing the information needed to define the work to be performed, to schedule and manage the work, to measure the performance of individual workers and crews, and to generate reports on the status of work and evaluate productivity.
- NGUSA uses two primary work management systems to support the field supervisors and managers. Both systems are used throughout the utility construction industry:
 - Maximo – Installed in 2001, Maximo is an IBM supported "asset management" software package used by both KEDNY and KEDLI. Maximo generates work request numbers and track jobs by work order. Each work order has one operation or activity. The activity indicates the type of work being performed (e.g., install Plastic Main 6" to 8"). Each job assigned a work order allows for tracking of the status in categories such as design complete, permits satisfied, work scheduled, and field complete

Maximo has direct, real-time interfaces to most of NGUSA's other operations data systems, including Common Work Queue (CWQ), Paving, Permits, Leak Management Systems, Onyx for new customer requests, SAP and PowerPlan.¹¹ Prior to the conversion to SAP, Maximo did not transfer costs to the accounting system at the work order level. Going forward, SAP is intended to provide costs associated with each work order.¹²

- STORMS/iScheduler – installed in the spring of 2004 and used by NMPC, these systems track work flow through the life cycle of a work request. STORMS is used to create work requests for both in-house and contractor work. For construction projects, a work request in STORMS will also generate a work order number in Power Plan. Gas Repair Orders (GRO) are used to track leak and non-leak repairs. The unique GRO number is entered into the Leak Tracking System, which is a separate stand-alone system.¹³ STORMS uses the completion of tasks to advance the status of a work request from initiation to close-out

¹¹ DR 97

¹² DR 540

¹³ DR 540



iScheduler is an internet application built on the same database as STORMS. It is used by Customer Meter Service (CMS) for workload scheduling and dispatching, coupled with the appointment management system. Assignments can be made based on crew skills, availability, need dates, or priority. STORMS/iScheduler has direct interfaces with NMPC's customer and work support systems, including the Customer Service System (CSS), PowerPlan, SAP, and Geographic Information System (GIS).¹⁴

- NGUSA also has a number of maintenance management systems that are used in conjunction with Maximo and STORMS.¹⁵
 - Leak Management System – tracks leaks, resurveys and repair commitments for KEDNY and KEDLI.
 - Leak Tracking System – tracks leak location, date of repair and leak cause, along with other data, for NMPC.
 - Gas Asset Management System – used by NMPC to manage leak and non-leak work.
 - DPMS – tracks paving required on work performed by in-house work crews.
 - Damage Tracking System – used to track damages, associated regulatory requirements and billing for third party damages.
 - CICS – Information system that provide information on gas use for each customer. It is used by KEDNY and KEDLI to determine possible customer impacts during the work planning stages and to track mandated meter changes, mandated regulator inspections, Building of Public Assembly inspections, corrosion inspections, curb valve inspections, vent inspections and warning tags.
 - Valve Management System - used by KEDLI and KEDNY to track valve inspection requirements.
 - F.I.S. – used by KEDNY and KEDLI for simple scheduling and logging of valve inspections and station inspections.
 - CWQ – used by KEDNY to provide an overview of multiple types of work in the vicinity of a work assignment along with permits stipulations.
 - MDSI – dispatching system for short cycle work coupled with appointment management system that used in conjunction with CWQ and the appointment management system that is embedded within the CRIS customer information system.
 - Telvent – used for telemetry related work.
 - Pipeline Compliance System – used to track scheduling of corrosion work and to tack compliance with all requirements
- Collectively, these systems provide the tools for major work groups to assign, execute and control its maintenance and construction work.

¹⁴ DR 97

¹⁵ DR 97



2. NGUSA currently does not use its work management systems or apply work measurement standards to manage its workforce or identify performance improvement opportunities.

- A fundamental element of work management is the quantitative definition of the work to be performed with reasonable time standards for the completion of activities.
 - Time standards provide targets which can be used to measure the productivity of an individual worker, a crew or an entire work force.
 - Analysis of workforce productivity information (manhours per unit) provides managers with the means to focus on improvement opportunities, which will ultimately lead to lower costs.
 - To be effective, work measurement and control requires detailed reporting of all labor hours expended, including travel, site preparation, delays, rework and other activities aside from direct work tasks and activities.
- While NGUSA has adequate work management systems and sound practices for scheduling and monitoring work, the emphasis is almost entirely on getting the work accomplished. NGUSA does not set targets or establish estimates for the work to be performed; nor does it measure crew or employee productivity.
- NGUSA does not routinely provide field operations and construction crews with an estimate or target of hours to complete a job.
 - NMPC uses job cards which show estimated hours required to complete the job. According NGUSA, this estimate (from STORMS) is available to field supervisors as a reference to be used along with current site conditions, weather, project complexity, and personal knowledge to provide an estimate to the crews for the duration of a project.¹⁶ Interviews with field supervisors indicate that these estimates are not discussed with the crews.¹⁷
 - KEDLI and KEDNY do not use job cards and the field supervisors do not routinely provide crews with job hour targets.¹⁸
- NGUSA has not tracked workforce productivity since the implementation of SAP in November 2012.¹⁹ Prior to that point, NGUSA captured manhours per unit data in various reports. However these reports were not useful for assessing workforce productivity to identify opportunities for improvement.
 - KEDLI and KEDNY had “Hours per Unit” reports for leak and non-leak work. Although these reports captured man-hour and unit data, the focus was not on productivity.

¹⁶ DRs 395 and 604

¹⁷ IRs 164, 166 and 169

¹⁸ IRs 141, 142, 143, 148, 150

¹⁹ DR 260



- The data was tracked at a detailed account level which was too granular to provide meaningful results.
- No productivity trends were provided.²⁰
- NMPC's unit cost reports included planned and actual manhours per unit data. While the data were presented for individual yards and at an appropriate activity level (i.e., new mains, replacement mains, new services), no trend information was provided.²¹
- NGUSA has indicated it plans to have man-hour and unit cost data available once the current SAP issues are resolved.
- What NGUSA refers to as a "Productivity Report" is actually a unit cost report.
 - In response to a data request, NGUSA states "Monthly productivity reports are distributed and discussed at monthly project review meetings... [and] then cascaded to the Barn Supervisors. The Barn Supervisors meet with all management and union employees in the barn to review the productivity reports."²²
 - The sample report provided in the data response included unit costs, but no manhour information.²³
 - Thus, any "productivity" analysis is based on the dollars spent, which includes materials, transportation and vehicle costs, overhead costs, and other items not related to worker or crew productivity.
- None of the field operations supervisors interviewed by NorthStar received the Productivity Reports.²⁴
- NGUSA does not track time for travel, delays, rework and other activities not directly related to work performance. Field Operations and Construction personnel charge all time to the work order for the job they are assigned without further breakdown. This precludes meaningful analysis of opportunities to decrease non-productive time.
- NGUSA does not track work force availability, utilization or efficiency:
 - Availability – the percentage of time an employee is available for work (excluding time off for vacation, holidays, sick, jury duty, etc.)
 - Utilization – the percentage of time an employee is utilized for productive work (Available hours minus travel, yard or barn time, material handling, delays, safety meetings, training, etc.)
 - Efficiency – Actual hours spent on productive work divided by the targets or estimated hours.

²⁰ DR 260

²¹ DR 260

²² DR 397

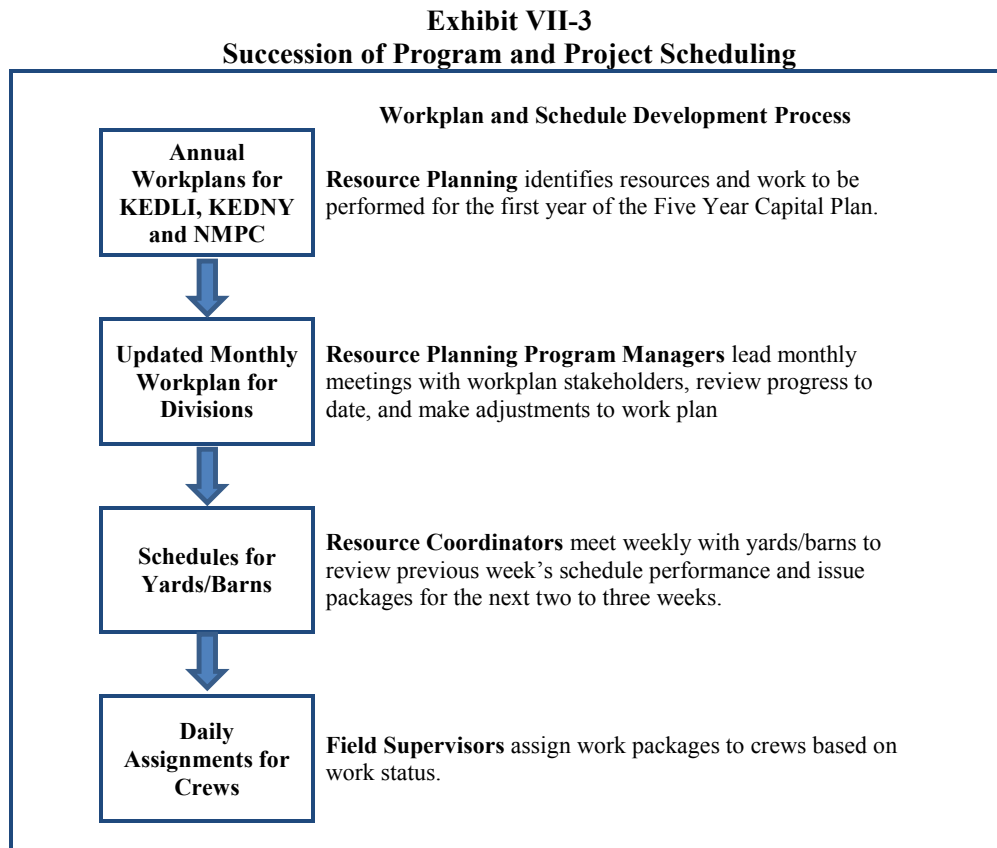
²³ DR 397

²⁴ IRs 141, 142, 143, 148 and 151



3. NGUSA has appropriate steps to convert the programs and projects identified in the Five Year Capital Investment plan into annual, monthly, weekly and, ultimately, daily work assignments.

- **Exhibit VII-3** provides an overview of the succession of planning steps to convert the program and projects from the Five Year Capital Investment plan into daily work.²⁵



Source: DR 334 and IRs 104,105,107, and 166 through 169.

- The Resource Planning department develops work plans to execute the programs and projects identified in the first year of the Five Year Plan. There is a Program Manager from the Resource Planning Department and a Resource Coordinator from the Resource Coordination Department for each Division.²⁶
- The Resource Planning Department is responsible for developing the annual work plan based on the five year capital plan. The annual work plan identifies all non-

²⁵ See Chapter VI, Program and Project Planning and Management for additional discussion of the Five Year Capital Investment plan.

²⁶ DR 385



emergency work to be performed during the course of the year and assigns the work to in-house and outside contractor resources.

- On a monthly basis, the Resource Planning Program Manager in each Division updates the work plan to reflect progress to-date.
 - Resource Planning tracks progress for each project and program at a yard and contractor level using information from Maximo and STORMS.
 - The Resource Planning program manager meets monthly with the Operations, Network Strategy, Meter Services and other work plan stakeholders for work plan reviews.²⁷ The Resource Coordinator for the Division also attends this meeting.
 - Resource Planning adjusts the plan as needed to address any factors that may impact the work plan such as changes in the volume of customer requests, weather impacted delays or emergencies that may divert resources from planned work.²⁸
- The Resource Coordinators for each Division schedule and manage the short term operations and capital and operations in accordance with the work plan prescribed by Resource Planning. The following factors inform scheduling decisions:²⁹
 - Union/labor agreement obligations
 - Unit Costs (based on historic productivity and unit cost data prior to September of 2012, until more recent reporting becomes available)
 - Crew availability
 - Vacation/Training/Sick schedules
 - Scope of work
 - Skill set levels (Welders, Field Training)
 - Weather
 - Temperature constraints
 - Third Party Transmission Outages
 - Municipality regulations/restrictions/schedules
 - Customer availability/appointments
 - Job site readiness
 - Permit delays
 - Equipment availability
 - Changes to project schedules
 - Change to design scope
 - Budget changes
- On a weekly basis, the Resource Coordinators meet with the field operations and construction, either through meetings (downstate), or visits to each barn (upstate). Items addressed in this meeting typically include:³⁰

²⁷ DR 88

²⁸ DR 88

²⁹ DR 308

³⁰ DRs 390 and 308



- Previous week's schedule reports
 - Updated schedule for next two to three weeks
 - Updated welding Workplan
 - Review remaining program projects
 - Return completed work packages
- NorthStar attended a Resource Planning/Resource Coordination weekly meeting and observed the meeting to be an effective means to communicate schedule and work assignments.³¹
 - On a daily basis, the Field Operations and Construction Supervisors assign work to crews based on the schedule provided at the weekly scheduling meeting and the work completed the previous day.³²
- 4. NGUSA's process to determine manpower requirement for maintenance and construction work does not ensure that the resulting mix of contractors and in-house resources will deliver the work for the lowest practical cost.**
- NGUSA has multi-year contracts for the installation and replacement of gas mains and services in KEDLI, KEDNY and NMPC. If NGUSA does not have sufficient in-house resources, work is assigned to contractors.
 - Because there is no workforce productivity data (manhours per unit), Resource Planning estimates manpower needs based on the volume of units to be completed and an educated guess as to how much labor will be required, based on prior years' experience.³³
 - For the annual work plan, Resource Planning estimates the amount of the work that could be performed by in-house resources in the coming year, based on the two prior years of work volume completions and average unit costs.³⁴ The average unit cost data combines all direct charges for internal labor, contract labor, materials, permits and vehicles, with indirect charges for supervisors, employee benefits, materials handling and clerical support. The labor costs associated with the various tasks and activities cannot be separated from other charges in the total unit cost data.³⁵
 - Resource Planning develops monthly plans and assigns the work between internal crews and external contractors based on a number of factors, including required by dates, in-house crew availability, union rules and needs for specialized equipment or skill sets.³⁶

³¹ IR 110

³² IRs 166 through 169

³³ DR 260

³⁴ DR 88

³⁵ DR 410

³⁶ DR 88



- NGUSA states that, among other factors, the assignment of work to in-house or contractor crews is based on unit cost and productivity.³⁷ NorthStar found this is not the case:
 - NGUSA does not have productivity information for its contractors. NGUSA historically has not tracked contractor hours since their services are provided on a unit cost basis in accordance with the pricing in each contract, not based on the number of hours worked to complete each job. NGUSA does not have a mechanism to capture and report the number of hours spent by the contractors to complete work.³⁸
 - NGUSA does not have data to compare KEDNY and KEDLI unit costs to contractor unit costs. (NGUSA does have unit cost data for both contractors and in-house crews at NMPC.³⁹) KEDNY and KEDLI have not had system-generated reports to track and compare unit costs for in-house and contractor crews. It was possible to manually compile custom reports to compare unit costs between in-house crews and contractors. However, these reports were cumbersome and time consuming to produce.⁴⁰
- Determining the appropriate allocation of work between in-house and contractor crews requires good knowledge of how much of the planned work can be done with internal resources. To establish realistic assessments of internal capabilities, the Resource Planners need to have data on labor hours and costs, separate from charges materials, transportation, overheads and other non-labor costs

5. NGUSA currently does not track overtime rates and so cannot identify opportunities for eliminating unnecessary overtime to improve performance.

- NGUSA's field operations management personnel determine when it is necessary to have field operations and construction personnel work overtime hours.
- The rules by which overtime hours are offered and assigned to individual field workers are established within the bargaining unit labor contracts and local agreements between NGUSA and each of its bargaining units.
 - The contracts and agreements generally require the equalization of overtime among the different types of workers.
 - In accordance with the bargaining unit contracts, overtime is paid at a premium and shared equally among field workers to the extent practical. NGUSA normally offers overtime work first to those qualified workers with the least amount of overtime worked.⁴¹

³⁷ DR 88

³⁸ DR 457

³⁹ DR 376

⁴⁰ DR 457

⁴¹ DR 398



- NGUSA uses scheduled overtime, as well as authorized end-of-day extensions, for certain routine activities in order to timely complete a critical task that may require work beyond the normal workday or for efficiency and productivity reasons (e.g., avoiding next day return, supporting a reduction in non-productive activities such as travel time, site set-up and takedown, as well as gaining an available resource for a new task for the entire next day).⁴²
- Use of unscheduled overtime is driven by several factors, including: accelerated work deadlines, unanticipated changes in customer and/or municipal work requirements, and increases in the overall volume of work, especially when such increases in volume directly impact currently established work plans and schedules.⁴³
- NGUSA has not tracked overtime rates (percentages) since 2010.
- Monthly financial reports of budget and actual overtime spend (dollars) are distributed to the Maintenance & Construction and Customer Meter Services (CMS) Vice Presidents and their direct reports. These reports detail overtime spending at the Division level, but no manhours are provided.⁴⁴

6. NGUSA has a comprehensive real time site inspection program to assess technical work methods, worker safety, and site safety.

- Under the Active Site Inspection Program, the QA group conducts unannounced site inspections at active and operational job sites for both in-house and contractor crews on a year-round basis. The focus is on technical work methods, worker safety, and site safety.
- The real time assessments are conducted by both bargaining unit quality assessors and management employees.
 - The inspections conducted by bargaining unit employees are anonymous (i.e., the identities of the crew and workers and the assessor are not disclosed due to bargaining unit requirements). The assessments include both technical and safety compliance. Corrective action is taken immediately to correct any deficiencies identified.⁴⁵
 - The inspections conducted by management employees have full disclosure of crew, worker and inspector identity. These inspections similarly cover both technical and safety compliance.⁴⁶
- The QA inspectors use standard inspection templates for each of Construct & Maintain, Instrumentation & Regulation and CMS. Inspectors post the inspection results directly into the on-line QA/QC database.

⁴² DR 398

⁴³ DR 398

⁴⁴ DR 399

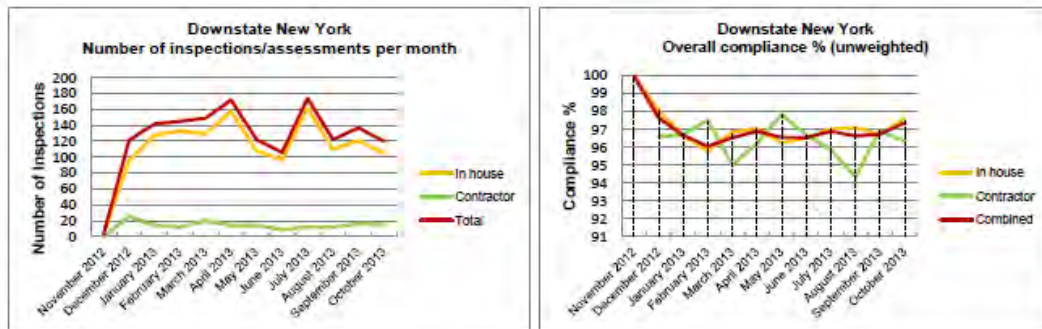
⁴⁵ DR 96

⁴⁶ DR 96



- The QA group issues monthly reports that provide information at the regional (i.e., UNY and DNY) and individual yard levels. Reports include specific non-compliant findings at the local yard and process level and any issues that are trending over a 12-month rolling history. NGUSA assigns a risk factor from one to three to each non-compliance item, and reports overall compliance risk in its monthly reports.⁴⁷
 - Regional master QA/QC reports provide the number of assessments performed, instances of non-compliance and risk scores for each region and process for the previous month, along with 12-month rolling performance summaries. It includes data on for contractors, in-house workers, and total work force.
 - The monthly QA/QC Summary Report is a compilation of all QA/QC monthly findings for all of Instrument & Regulation, Construct & Maintain and CMS, and provides overall compliance information for NGUSA and for UNY and DNY.
 - Monthly program reports provide the same information at a yard level.
- The QA group also communicates non-compliant observations that are considered high risk on a near real time basis.⁴⁸
 - When non-compliances are observed, the QA inspector remains on site until the deficiency is corrected and is documented on the inspection form as “Closed.”
 - On the occasion that a non-compliance matter cannot be corrected on site, the finding is documented as “Open” and a follow up action item is identified and tracked to completion.
- As shown in **Exhibit VII-4**, the site inspection results indicate that overall, NGUSA and its contractors have compliance rates better than 95 percent.

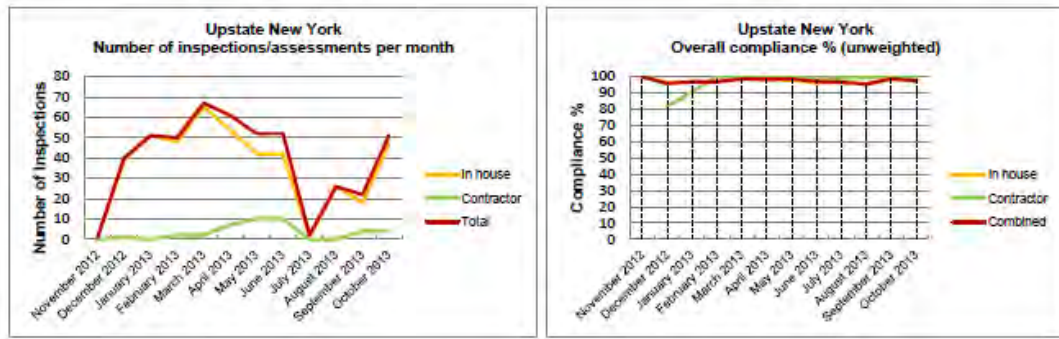
Exhibit VII-4
QA Site Inspections



⁴⁷ DR 358

⁴⁸ DR 95 and Fact Verification July 15, 2014.





Source: DR 368.

7. NGUSA's Re-Dig Program inspects leak repairs, new and replacement main and service installations and gas corrosion work to ensure compliance with regulatory and company O&M requirements.

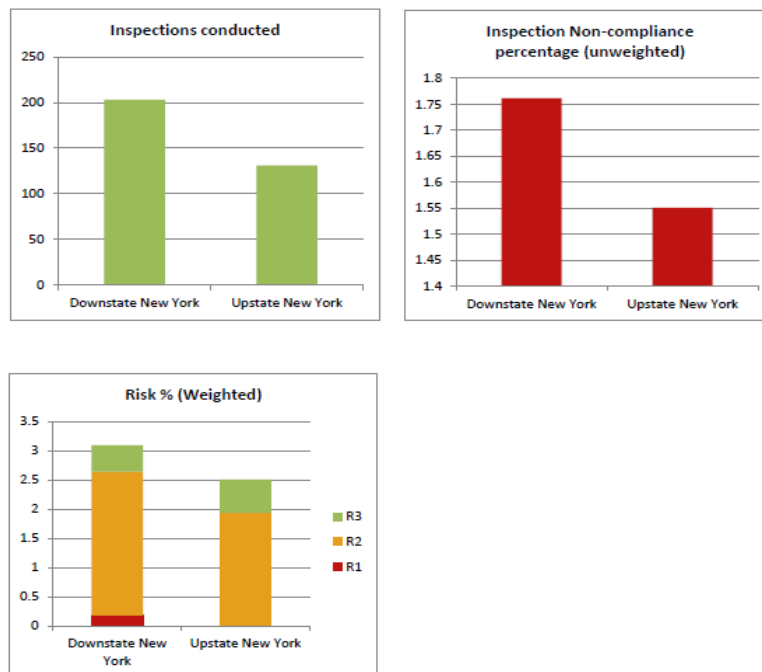
- On an annual basis, the QA group performs post-completion inspections on a small sub-set of completed work from that calendar year using the Re-Dig Audit Program Inspection Form.
- The work covered by the Re-Dig program includes leak repairs, new and replacement main and service installations, and gas corrosion work activities. The program targets jobs that have been completed within the previous 30-45 days.
- The Re-Dig Program is conducted within all operating regions. Program sampling and size is based upon regional work load and crew complement. The selected locations are proportional to the overall volume of work crews and work types, and include both in-house and contractor crews.
- Low-dig methods are used to excavate over the highest risk components of the job in order to adequately conduct an assessment of the completed work as compared to regulatory and NGUSA requirements.
- Where feasible, corrective action is taken immediately to correct deficiencies that are identified.⁴⁹
 - Requirements for corrective actions that cannot be taken on the spot are reported to responsible Field Operations personnel for completion.
 - High level deficiencies are communicated immediately to Operations for remediation.
 - Lower risk deficiencies are communicated through the final report
 - Corrective actions are tracked and completion dates for remedial actions are monitored by QA inspectors.

⁴⁹ DR 95



- A final report on the Re-Dig Program is issued annually and provides the rate of compliance for the organization overall and by region, yard and contractor. As in the Active Site Inspection Program, non-compliance items are assigned a risk factor, and risk-weighted non-compliance results are also shown in the report.⁵⁰
- **Exhibit VII-5** provides the summary data for 2012, and shows that the Re-Dig Program inspection non-compliance rate is less than two percent.

Exhibit VII-5
2012 Re-Dig Program Summary Results (Combined In-House and Contractor)



Source: DR 339.

8. NGUSA has appropriate oversight of its mains and services and restoration contractors.

- The Contractor Oversight group is responsible for contractor oversight downstate. Upstate, contractor oversight is the responsibility of the Upstate Construction Organization. In both regions, contractor oversight is divided between mains and services work, and restoration work.⁵¹
 - Downstate, in addition to the Contractor Oversight Director, there are four supervisors and 84 inspectors all of which are union.

⁵⁰ DR 339

⁵¹ IR 220



- Upstate, there are eight inspectors (referred to as Field Construction Coordinators or FCCs) and supervisors responsible for construction oversight. The FCCs are not union personnel.
- The Resource Planning department assigns work to each mains and services contractor, and each contractor provides Contractor Oversight their daily work schedules a day or two before crews will be on site. Representatives from Contractor Oversight go to the job locations as indicated on the daily work schedule and monitor the work being performed.⁵²
- Supervisors assign inspectors based on skill set, and rotate the inspectors to different geographic areas.⁵³
- All inspectors have at least 15 years of field construction experience. They receive technical training and become familiar with the mains and services contract language.⁵⁴
- Downstate, the inspectors record unit quantities and manage change control, but the Supervisors approve contractor invoices and authorize time and material work. The inspectors are required to complete the following forms:
 - Daily Sheets (Daily Checklist – Gas Field Operations & Construction) – This checklist captures the type of work performed, units installed, a description of any time and materials work, and basic evaluations regarding safety, mark-outs and workmanship. The Inspectors upload the Daily Sheets and the Supervisors use this data to review and approve contractor invoices.
 - Compliance Assessment Sheet – primarily an assessment of safety. Inspectors are required to complete five compliance assessments per week, as well as documenting any unsafe practices. The selection of sites for this inspection is at the discretion of the supervisor. If non-compliance, the inspector forwards the sheet directly to his supervisor, and they usually follow-up on the issue the next day. These sheets are completed on-line, and uploaded directly into information management system.
 - Diary/Log – inspector's personal record of work performed by the contractors, which contains essentially the same information as the Daily Checklist.⁵⁵
- Upstate, both the FCCs and the Supervisors approve contractor invoices and can authorize time and material work. Tracking sheets are used to document work performed.
 - Tie-In Retirement Tracking Sheets
 - Main and Tie-In Tracking Sheets
 - Service Tracking Sheets

⁵² DR 83

⁵³ IR 220

⁵⁴ IR 220

⁵⁵ DR 552 and IR 220



- Diary/Log to document observations
- Contractor Oversight inspects a randomly selected sample of restoration and paving work, consisting of not less than five percent of all completed paving orders.
 - These paving orders are field inspected, with any identified deficiencies sent to the contractor for remedial action at their cost.⁵⁶
 - The paving inspector verifies the cut size, and inputs data directly into the DPMS paving management system. If the size differs than what is in DPMS, the inspector inputs the new information, which must be approved by the supervisor.⁵⁷
- These inspections are in addition to the Active Site Inspection and ReDig QA/QC programs discussed earlier.

D. RECOMMENDATIONS

1. Develop and implement, within the existing work management processes and systems, a program to track and manage crew and individual worker productivity.
 - At NGUSA, emphasis in the field is appropriately focused on getting the work done on time and installing the units specified or completing the activities delineated in the annual work plans. NorthStar is aware that NGUSA's ability to capture productivity data is limited due to problems with SAP implementation. Nevertheless, NGUSA should undertake to do the following.
 - Assign targets or estimated durations for all of the work activities in the annual work plans.
 - Track actual labor expenditures (manhours) against the targets and estimates. NGUSA will need to develop a means of documenting the targets and estimates, and may also have to modify time reporting procedures in order to collect the necessary information.
 - At a minimum, NGUSA should calculate and monitor employee availability, utilization, efficiency and effectiveness as defined below.
 - Availability – the percentage of time an employee is available for work (excluding time off for vacation, holidays, sick, jury duty, etc.)
 - Utilization – the percentage of time an employee is utilized for productive work (Available hours minus travel, yard or barn time, material handling, delays, safety meetings, training, etc.)
 - Efficiency – Actual hours spent on productive work divided by the targets or estimated hours.
 - In addition to developing a means of measuring individual and crew Availability, Utilization and Efficiency, NGUSA should eventually develop a means of

⁵⁶ DR 553

⁵⁷ DR 361



aggregating information that can be used to improved work methods and processes, such as reducing time spent in the yards or barns, windshield time, delays and other things that contribute to less than optimum Utilization.

- NGUSA should also include in its time reporting process the capturing of overtime hours, so that targets can be set and measured as a percentage of straight time hours.
- Once sufficient data is compiled, NGUSA should have a means of analyzing specific activities with projects and program work, in order to improve efficiency and complete more work with fewer labor hours.

2. Develop a manpower planning program.

- Manpower planning is the process of combining forecasted work volumes, work schedules and productivity goals to quantitatively determine the number of workers required. Without a quantitative manpower planning process, staffing levels are necessarily determined by management fiat, hiring freezes or other arbitrary methods or are based on the argumentative abilities of key managers and executives.
- NGUSA's current method of translating the annual work plans into work assignments for the respective barns, yards and crews should be supported by quantified data that can be collected using the time reporting and work management approach described in Recommendation 1, above
 - Once the individual jobs are assigned, managers should use the labor hour targets and estimates to determine the volume of productive hours that will be needed.
 - The number of workers required can then be determined based on the Utilization and Availability factors that will be produced by the time reporting approach described in **Recommendation #1**.
 - Based on a comparison of the number generated by this effort, NGUSA can then determine the volume of contractors required on a monthly basis or even smaller planning periods if desired.
 - The manpower required for each planning period can be adjusted as changes to the annual plan emerge, or in response to a rising or falling work backlog. Options would include using overtime or increasing the use of contractors, depending upon cost, schedules, weather, etc.



VIII. LOAD FORECASTING (ELEMENT 2)

This chapter presents the results of NorthStar's review of National Grid's Load Forecasting processes as they relate to the NY gas utilities.

A. BACKGROUND

Load forecasts are a fundamental input to a number of utility strategic and planning considerations. Forecasts for peak design day provide inputs to reliability considerations including distribution system design, required natural gas storage and pipeline capacity, and city gate maximum daily throughput. Natural gas commodity sales forecasts provide inputs into supply planning, rate design, financial projections, and marketing programs. Accurate forecasts are critical to rate stability and reliability.

Assumptions such as weather, price elasticity, and economic drivers are key inputs in the modeling process. Understatement of variables such as weather and economic conditions may result in suboptimal sizing of system infrastructure requirements or, in extreme situations, supply shortages. Overstatement of assumptions can result in unnecessary capital expenditures, resulting in higher rates. For this project, the focus how National Grid forecasts load for the three NY gas utilities, including the extent to which common assumptions and models are used. We also reviewed how National Grid aggregates individual company models into a system-wide forecast, and how those forecasts are then used in related planning activities, particularly gas supply and system infrastructure planning.

NorthStar's recent experience indicates that natural gas utility load forecasts are often less accurate than optimal due to a number of factors, including:

- The forecasting models may not be robust or their technology may be outdated.
- Volumes supplied by third-party gas suppliers may not be forecast using the same models or assumptions as system supply gas.
- Meter data collection activities may be inadequate to support development of end-use modeling.
- Projected effects from energy efficiency initiatives may not be appropriately included in the forecasts.
- The impacts on consumption of inter-fuel competition and resulting commodity price changes do not reflect current research.
- Incorporation of retail access trends may be based on outdated assumptions of consumer behavior.

KEDLI, KEDNY and NMPC provide retail natural gas service to over 2.3 million residential and business customers. Customers include both firm and interruptible services



for both customers receiving commodity supply by KEDLI, KEDNY or NMPC or a third-party natural gas marketer.

Exhibit VIII-1
KEDLI, KEDNY, NMPC Historical Number of Customers

Year	KEDLI	KEDNY	NMPC
Total Customers			
PY2008 (Note 1)	539,015	1,192,598	581,655
PY2012	556,800	1,222,068	593,757
Annual Average Growth (%)	0.8	0.6	0.5
Residential Customers			
PY2008	480,896	1,130,290	535,547
PY2012	498,262	1,154,561	547,604
Annual Average Growth (%)	0.9	0.5	0.6
Commercial/Industrial (C/I) Customers			
PY2008	56,013	45,191	46,084
PY2012	56,738	48,468	46,127
Annual Average Growth	0.3	1.8	0.0
Residential Heating Customers			
PY2008	346,802	521,008	496,354
PY2012	378,517	559,524	503,073
Annual Average Growth (%)	2.2	1.8	0.3
2008 Heating Customer Penetration (%)	72.1	46.1	92.7
2012 Heating Customer Penetration (%)	76.0	48.5	92.0

Note 1: PY = Planning Year. The planning year begins November 1 and ends on October 31. It coincides with the winter planning season.
Source: DR 177

The New York gas utilities have historically seen negligible growth as measured by net number of total customers (termed “net growth” and includes all new customers less attrition of existing customers). **Exhibit VIII-1** shows that on average all three utilities have experienced less than one percent net growth annually over the past five years. However, while overall net growth appears stagnant, KEDLI and KEDNY have seen a two percent annual net increase in residential heating customers. The net increase is largely due to non-heating customers converting to natural gas heating, resulting in increased usage by existing customers.

Exhibit VIII-2 provides an overview of retail sales, peak day send out, and weather statistics for KEDLI, KEDNY, and NMPC. The net growth in heating residential customers is best seen when comparing PY2009 with PY2011. The weather, as measured in heating



degree days (HDD)¹, was slightly milder in PY2011 than 2009 but retail sales exhibited a net increase.²

The northeast experienced a mild winter in PY2012, and all three utilities experienced record low sales. HDD were 20 percent below normal. Both the peak day send out and retail sales are indicative of the weather patterns with the exception of NMPC in PY2009. NMPC reported an unusual amount of sales to non-firm transport customers that occurred only in PY2009. Non-firm customers receive service when it is available and the customer elects to receive it. The decision to receive service is an economic consideration of the customer.

Exhibit VIII-2
KEDLI, KEDNY, NMPC Retail Volumes

Year	Actual Firm Throughput (MDth)	Peak Day Firm Send Out (MDth)	Annual HDD	Peak Day HDD
KEDLI				
PY2008	85,916	698	4,603	49
PY2009	90,128	744	4,850	52
PY2010	84,616	731	4,271	48
PY2011	92,599	740	4,781	50
PY2012	76,929	687	3,657	45
KEDNY				
PY2008	143,948	1,117	4,603	49
PY2009	147,705	1,116	4,850	52
PY2010	139,970	1,167	4,271	48
PY2011	155,022	1,158	4,781	50
PY2012	129,569	1,081	3,657	45
NMPC				
PY2008	137,392	656	6,570	57.5
PY2009	194,643	693	6,738	59
PY2010	140,027	688	6,041	60
PY2011	151,760	708	6,540	66.5
PY2012	158,429	656	5,251	58.5

Source: DRs 40, 41 and 177

¹ HDD are the difference between the daily average temperature and 65 °F. They are summed monthly and annually.

² Comparing weather-normalized sales from planning year to planning year would provide a better measure of net system growth. National Grid began doing such analyses in January 2011 (DR 259).



Load forecasting is provided on a centralized basis by National Grid’s Analytics Modeling and Forecasting Organization (see **Exhibit VIII-3**). This organization reports to Customer Analytics and Risk Management Organization in the US Customer functional organization. Blocks shown in light background are related to the forecasting function.

Exhibit VIII-3
US Analytics Modeling and Forecasting



Source: DRs 1 and 177

B. EVALUATIVE CRITERIA

- Does National Grid Gas have well-defined forecasting platforms including multiple forecasting horizons, appropriately segmented customer models, and sufficient data sources?
- Does National Grid Gas accurately account for the effects of third-party supplied customers in their forecasting methodologies?
- Does National Grid Gas effectively and accurately use models, assumptions, key drivers and other inputs to forecast local and system-wide load and supply requirements?
- Does National Grid Gas include consideration of the dynamic nature of the current natural gas markets and new business and customer growth opportunities (such as natural gas vehicles and heating fuel conversion mandates) in its load forecasting activities?
- Is the impact of supply price variations and increased supply options appropriately captured in the forecasting processes and models?



- Are the impacts National Grid's load growth associated with its natural gas heating program realistically quantified and appropriately accounted in the forecasting process?
- Does National Grid Gas appropriately integrate both region-specific and company-wide load forecasts into its overall business processes and strategies, including gas supply and system planning?
- Are inputs, including demand response, energy efficiency, inter-fuel competition, and other similar factors given appropriate consideration in the forecasting process?
- Are deviations between the load forecasts and actual experience investigated and promptly corrected?
- Are forecasting functions organized and staffed appropriately?
- Do the load forecasting functions/products meet the needs of finance and rates, supply procurement, regulatory compliance, system planning and other organizations within National Grid Gas?

C. FINDINGS AND CONCLUSIONS

1. National Grid has a well-defined forecasting platform including multiple forecasting horizons, appropriately segmented customer models, and sufficient data sources.

- National Grid develops sales forecasts for five years, send out forecasts for the winter season, and five years, and design day forecasts for five years. Winter season forecasts include scenarios for both normal and design weather.
 - The **sales forecast** represents monthly retails sales by system, sector and rate class. The sales forecasts are used to develop revenue forecasts and support regulatory requirements related to ratemaking. The sales forecast represents monthly retail sales by system, sector and rate class.
 - The **send out forecast** represents the volume of natural gas required to be delivered to the service territory to serve customers, including allowance for company use, losses, and unaccounted for gas. The send out forecast is provided to Energy Procurement for use in capacity planning and supply procurement, as discussed in **Chapter IX – Supply Procurement**.
 - Send out is real time while sales have a lag component where sales are recorded when the meter is read.
 - National Grid creates annual, winter, monthly, and daily send out forecasts for both normal and design weather. The monthly send out forecast is based on a reapportionment of the sales forecast (to account for billing lag), with a further adjustment factor based on the ratio between historical reapportioned sales and actual SCADA monthly send out. The adjustment factor for NMPC has been less than one percent historically. For the PY 2014 forecast, the KEDLI/ KEDNY adjustment factors were also less than one percent. In the past, the adjustment factors for KEDLI/KEDNY were as high as nine percent due to a number of retail accounts that were not being captured in the forecasting process. These accounts have been systematically identified and



included in subsequent forecasts, resulting in the much lower adjustment factor.

- The **design day forecast** represents the maximum KEDLI, KEDNY, or NMPC daily send out based on extreme weather.³Daily send out is a regression analysis developed utilizing historical monthly send out, daily send out, and weather. The regression equations are applied to normal and design weather and the monthly forecast send out. The maximum send out during design weather is the design day forecast. **Exhibit VIII-4** provides the normal and design weather parameters used to develop the forecasts.⁴ The KEDLI and KEDNY design day has a 0.5 percent probability of occurrence. The NMPC design day is designated as the HDD that occurred on February 27, 1979. The design day forecast is an input to system planning and capacity planning.

Exhibit VIII-4
Normal and Design Weather (HDD)

Company	Normal Annual	Design Annual	Design Day
KEDLI and KEDNY	4,607	5,363	65
NMPC	6,571	7,397	75

Source: DR 36, DR 177 and DR 295

- National Grid’s modeling platform utilizes a hierarchical regression analysis that forecasts by system (KEDLI, KEDNY, and NMPC), sector, and rate class. The hierarchical regression analysis allows the individual forecasts of rate and customer class to work within the constraints of a system wide forecast. This modeling technique, also known as multi-level linear regression analysis, is an accepted practice for applications where data are organized in such a manner that one data point is a member of multiple levels such as the type of utility customer (customer, residential customer, heating residential customer).
- **Exhibit VIII-5** provides a simplified illustration of how the hierarchal methodology is applied to the residential and C/I rate classes.⁵ Volumes of customers are shown for KEDNY for PY2012.
- Third-party supplied customers are modeled within all rate classes as a sub-group. KEDLI, KEDNY, and NMPC have experienced wide variances from year to year in customer migration to third-party suppliers. National Grid utilizes a linear migration in its forecast that shows approximately a two percent annual net increase in third-party supplied customers for NMPC and KEDLI and a four percent annual net increase for KEDNY.⁶

³ DR 177

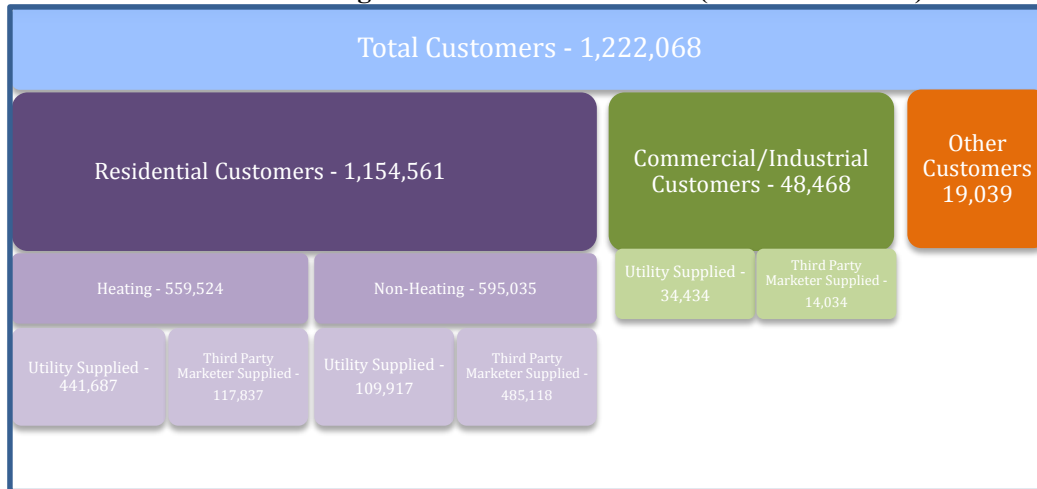
⁴ DR 295

⁵ This exhibit is simplified to illustrate the hierarchical methodology, and does not portray the actual number of rate classes and sub-rate classes.

⁶ DR 177



**Exhibit VIII-5
Hierarchical Regression Model Illustration (KEDNY PY2012)**



Source: DR 177 and DR 289

- National Grid has two primary data sources for developing its forecasts:
 - National Grid obtains its economic drivers from Moody's Economics. Moody's develops forecasts by county and National Grid aggregates data as necessary for each service territory. Moody's Analytics is an independent provider of data, analysis, modeling and forecasts on national and regional economies, financial markets, and credit risk.⁷
 - National Grid maintains historical billing, customer, send out, and weather data.
- The load forecasting functions/products meet the needs of finance and rates, supply procurement, regulatory compliance, system planning and other organizations within National Grid Gas.
- **Exhibit VIII-6** provides the send out and design day forecasts for KEDLI, KEDNY, and NMPC. All three utilities continue to show net growth of less than one percent per year.⁸

⁷ www.economy.com

⁸ DR 36



**Exhibit VIII-6
2012 Load Forecast (MDth)**

Company	Design Day Firm Send Out (Note 1)	Annual Firm and Non-Firm Send Out for Design Weather	Annual Firm and Non-Firm Send Out for Normal Weather
KEDLI			
PY 2012-2013	958	106,304	93,490
PY 2013-2014	974	107,321	94,380
PY 2014-2015	1,007	108,488	95,465
PY 2015-2016	1,023	111,287	97,777
PY 2016-2017	1,040	109,221	96,098
PY 2017-2018	1,063	110,218	96,887
KEDNY			
PY 2012-2013	1,453	177,492	161,232
PY 2013-2014	1,479	173,684	157,861
PY 2014-2015	1,505	177,051	160,884
PY 2015-2016	1,532	187,721	165,328
PY 2016-2017	1,564	174,287	157,846
PY 2017-2018	1,588	180,379	163,188
NMPC			
PY 2012-2013	817	188,155	174,719
PY 2013-2014	841	187,125	173,673
PY 2014-2015	836	188,356	176,648
PY 2015-2016	826	190,897	177,906
PY 2016-2017	825	191,440	176,780
PY 2017-2018	820	192,438	179,777

Note 1: Non-firm send out is not included in the Design Day figures
Source: DR 36

2. National Grid utilizes a high-powered modeling system that could appear to be overly complex for the forecasting requirements. NorthStar found that while the relative benefits of this system justify the increased complexity of the model the tracking and evaluation of model performance could be improved.

- The National Grid modeling system can best be compared to a “tree”, where the “trunk” represents the utility forecast and the “leaves” represent individual customer groups. Sectors and aggregations of customer groups can best be described as the “boughs.” The forecast is not simply the summation of the “leaves” but a sophisticated statistical optimization of all parts of the forecast at multiple levels.
- With the exception of the Gas Control’s day-ahead forecast (discussed in Conclusion 5, below), all National Grid forecasts are the result of one integrated model.
- New customer growth is integrated into the design day forecast by rate class and usage pattern rather than simply adding a projected number of customers with system-average usage patterns to the previous design day forecast.



- Individual customer billing patterns are reconciled with actual weather to reallocate sales across the billing month to adjust for billing lag. This provides key information on customer weather response. This information is critical to market assessments for energy efficiency programs.⁹
- Modeling results are not provided to upper management and internal customers in a useful manner. NorthStar found no reports or performance measures that explain the accuracy of the model and areas for improvement.¹⁰

3. National Grid effectively and accurately uses models, assumptions, key drivers and other inputs to forecast local and system-wide load and supply requirements.

- National Grid’s forecasting platform is based on number of customers multiplied by use per customer for a weather scenario to develop its forecasts. National Grid uses MATLAB to develop the hierarchical regression equations.¹¹ In total there are in excess of 100 different regression equations developed for each service territory.
- The Customer Forecast uses the hierarchical regression relationship as was illustrated in **Exhibit VIII-5**. Historical number of customers is correlated to historical economic drivers. A regression equation is developed in MATLAB that is applied to forecast economic drivers resulting in a forecast of number of customers.
 - One facet of the customer forecast is the forecast of the conversion of non-heating customers to heating customers. **Exhibit VIII-7** provides the forecast net growth rates. Net growth rates are less aggressive than previously achieved (shown in **Exhibit VIII-1**, above) but twice as fast as overall customer net growth. The net growth rates are consistent with National Grid’s growth initiatives and overall forecast system net growth.¹²

Exhibit VIII-7
Forecast of Customer Net Growth Rates
2012 through 2018 (Percent)

Service Territory	All Customers	Residential		Commercial/ Industrial
		Heating	Non-Heating	
KEDLI	0.35	0.99	-1.70	0.05
KEDNY	0.43	1.01	-0.17	0.67
NMPC	0.32	0.40	-0.16	-0.11

Source: NorthStar analysis of DR 177

⁹ DR 177

¹⁰ NorthStar analysis of DR 289

¹¹ MATLAB® is a high-level language and interactive environment for numerical computation, visualization, and programming. MATLAB assists in the development of algorithms, and creation of models and applications. It is a product of MathWorks.

¹² Kick Off Meeting Presentation and DR 177



- The model forecasts number of customers in the Natural Gas Vehicles and Distributed Generation rate classes separately. Natural Gas Vehicles and Distributed Generation customers represent a small (less than 100) number of customers and are forecast by National Grid to decline further through 2018.¹³
- **Use per Customer** is based on correlating historical weather, measured in Heating Degree Days (HDD), and economic data with actual usage. Economic data includes historical values from January 2003. Normal weather is a 30-year average that was mandated in the 2012 rate case for NMPC and the 2008 rate case for KEDLI/KEDNY. Design weather is a one in forty year probability.¹⁴MATLAB develops regression equations that are used with forecast economics and HDD to determine forecast retail sales. HDD can represent normal weather or design weather.
- Forecast number of customers multiplied by use per customer results in the load forecast. Drivers for the largest rate classes are shown in **Exhibit VIII-8**.¹⁵The drivers include natural gas prices and the ratio of fuel oil to natural gas. Fuel price is a consideration in customer choice of heating fuel.

**Exhibit VIII-8
Customer Model Drivers**

Variable	Total	All Res	Res Non-Heating	Res Heating	All C/I	C/I Non-Heating	C/I Heating
Total Households				X	X	X	X
Total Population				X	X	X	X
Total Net Migration (Population)				X	X	X	X
Gross Product	X	X	X	X	X	X	X
Income				X	X	X	X
Employment/Unemployment	X	X	X	X	X	X	X
Housing Starts				X			
Permits: Residential				X			
Median Existing Home Sales Price				X			
Affordability Index		X	X	X			
Existing Home Sales		X	X	X			
Housing stock				X	X	X	X
Total Retail Sales					X	X	X
Employment By Industry				X	X	X	X
Gross Product: Total	X	X	X	X	X	X	X
CPI: Urban Consumer -	X	X	X	X	X	X	X
Natural Gas Residential Price		X	X	X			
Natural Gas Commercial Price					X	X	X
Natural Gas Industrial Price					X	X	X
No 2 Distillate Price by Sector		X	X	X	X	X	
Natural Gas and Oil Ratio by sector		X	X	X	X	X	

Source: DR 291

¹³ DR 177

¹⁴ IR 62

¹⁵ DR 177



- NorthStar's review of the regression equations found that for large homogeneous rate classes such as residential heating, the R-squared¹⁶ values are above 0.98 for number of meters and 0.85 for use per meter. In less homogeneous rate classes the R-squared values fall well below 0.50 indicating the specified regression equations do not accurately predict history, thereby limiting the predictive capability of the model.¹⁷ However, because of the type of modeling used by National Grid, individual R-squared values are not indicative of the overall accuracy of the model. The hierarchical regression equations optimize poor fits with other aggregations where better statistical fits are found. The impacts of poor fit within any one rate class are minimized.

4. Inputs, including demand response and energy efficiency are given appropriate consideration in the forecasting process. The methodology utilized for energy efficiency is consistent with other utilities and eliminates the potential of double counting achieved results.

- Energy Efficiency is addressed in the forecasting process as a post model adjustment.
 - Achieved energy efficiency savings are included in the forecast as a constant and applied to historical and forecast sales.
 - Incremental energy efficiency goals (e.g., energy efficiency goals less the savings already achieved) identified by New York State Energy Research and Development Authority (NYSERDA) and approved by the PSC are allocated to each applicable rate class, sector, and system.
 - The design day and send out forecasts are then reduced by the incremental energy efficiency goals for each year, thereby incorporating an assumption that the full savings set by the goals will be achieved. There is a potential for understating design day requirements if energy efficiency goals are not achieved.
 - National Grid does not prepare a forecast that deviates from the goals agreed to by the PSC.¹⁸
- KEDLI and KEDNY have demand response customers. They are identified in the forecast as Temperature Response customers. These customers are required to switch fuels when the temperature is forecast to drop below 15° F.¹⁹ They are forecast as a separate rate class and are removed from the supply requirements during system peak conditions. In 2012, KEDLI had 150 and KEDNY had 3,459 customers on temperature controlled rates.²⁰

¹⁶ R-squared indicates how well data points fit a statistical model. They range in value from 0.0 to 1.00.

¹⁷ DR 291 Attachment 6

¹⁸ DR 177

¹⁹ Most of these customers are equipped with equipment that automatically shuts off gas service when the temperature at the specific location falls below 15 degrees.

²⁰ DR 177



5. Day ahead forecasts for day-ahead supply planning and gas purchasing are prepared by Gas Control and are unrelated to the forecasting products developed in Model Analytics and Forecasting. The performance of these forecasts compared to actual throughput cannot be determined because the data is not retained.

- Regression equations are used to determine day ahead send out and sales. The equations are in the form of a base and slope formula. The components include base load, forecast weather, forecast wind and previous day's weather.
- Forecast HDD are applied to the equations to determine send out. The send out is split between third party supplied and utility supplied.²¹
- A "SIMDAY"²² model is used to determine hourly send out. The forecast send out is allocated hourly based on historical similar days.²³
- NorthStar was unable to evaluate the accuracy of the day-ahead forecasts. The spreadsheet template is updated numerous times during the forecast period and only the final is retained.²⁴

6. National Grid's load forecasts provide a reasonable prediction of future load for supply procurement and system planning needs. However, short-term forecasts under abnormally warm winter weather showed greater variability compared to actual experience.

- The performance of the forecasting models is reviewed each year as a new forecast is developed. National Grid re-specifies models each year based on the most recent actual data.²⁵ The resulting forecasts change from year-to-year in response to the incorporation of new data into the forecasting system.
- National Grid compares weekly actual send out versus the send out predicted by the model using actual weather. This is an appropriate method for assessing the accuracy of the forecasting model. The prediction during winter weeks is typically within five percent of actual.²⁶ Based on NorthStar's experience in evaluating load forecasting results at other natural gas utilities, this level of accuracy during the winter season is typical, and acceptable for very short term (up to a week out) supply procurement planning.

²¹ DRs 500, 501 and 502

²² A day that is similar to the forecast day.

²³ IR 129

²⁴ IR 129

²⁵ IR 62

²⁶ DR 42



- National Grid also prepares monthly variance reports that compare weather-normalized firm sales to forecast firm sales on a monthly basis that are accumulated into fiscal year-to-date and rolling 12-month variance reports.²⁷
- As shown in **Exhibit VIII-9**, the models currently provide accuracy for firm sales volumes on a rolling 12-month basis within seven percent for all three utilities.²⁸
 - All three utilities have shown improvement in forecasting C/I firm sales. Model results typically improve each year, as more data is available to specify the regression equations.
 - The model did not perform as well during 2012 as in the previous years.²⁹ In particular, residential sales for KEDNY exhibited a ten percent variance from forecast in 2012. National Grid attributes the higher variance levels to the unusual weather pattern during 2012, where the utilities experienced the warmest winter on record.

Exhibit VIII-9
Variance of Forecast Firm Sales to Weather Normalized Firm Sales
(Percent)

Twelve Months Ending:	Jan 2011 (Note 1)	Dec 2011	Dec 2012
Total			
KEDNY	-3.0	-6.2	7.2
KEDLI	-3.6	-3.4	2.2
NMPC	-2.2	-6.7	0.6
Residential			
KEDNY	0.2	-4.4	10.0
KEDLI	-1.8	0.4	4.6
NMPC	-0.3	-3.5	1.6
Commercial/Industrial			
KEDNY	-8.1	-8.8	3.0
KEDLI	-6.1	-8.7	-0.9
NMPC	-4.2	-10.2	-0.4

Note 1: Aggregate data for 2010 was not available. NorthStar used the first rolling 12-month report, which was produced in January 2011.

Source: DR 289

- National Grid's review of the models' performance has not shown variations sufficiently significant to warrant a mid-year model change.³⁰ A mid-year change would be warranted due to extreme and long-ranging changes in exogenous variables such as an unpredicted steep economic decline as seen in 2007, where there were extreme and severe sudden losses in customers.

²⁷ Sales forecasts are prepared for normal weather.

²⁸ Excludes Temperature Control and other interruptible customers.

²⁹ NorthStar analysis of Attachments 2, 13 and 25 of DR 289

³⁰ DR 42



7. National Grid’s forecasting functions are organized and staffed appropriately. The current centralized organizational structure results in consistency across the business enterprise and for the development of core competencies.

- Forecasting for all National Grid utilities, gas and electric is conducted by a single centralized group within National Grid's Customer function. The same model and methodology is applied across the New York, Massachusetts, and Rhode Island natural gas utilities.
- The forecasting function is supported by three data organizations.
 - Quantitative Analysis – provides assistance with model and data development
 - Corporate Economist – supports economic forecasts and regulatory process
 - Customer & Marketing Forecasting and Analytics Team – saturation studies and market forecasts.
- The organization is staffed by a total of 16 FTEs. The level of staffing appears appropriate, given the responsibilities of the group. In addition to natural gas forecasting, this group also provides modeling and non-financial analysis support and associated regulatory support to all National Grid gas and electric utilities and to other National Grid functions.³¹

D. RECOMMENDATIONS

1. Establish a process to retain day-ahead forecasts of send out volumes, and of weather and other input assumptions for each of the operating companies. On a regular basis, prepare comparisons of forecast to actual send out under forecast and actual weather conditions. Develop a process for assessing and reporting on the performance of the day-ahead model.
2. Re-evaluate the residential forecasting model to identify opportunities to improve accuracy in forecasting during warm winters and to reduce variations from year to year in forecast results.
3. Due to the complexity of the forecasting platform, improve reporting of forecast results and model performance on a level that is easily understood by upper management, internal customers and users, and outsiders. Examples include forecasts of number of customers by rate class, sales by rate class, separate reporting of firm vs non-firm customers, and reporting accuracy.
4. Analyze the treatment of energy efficiency goals in the sales, send out and design day forecasting processes and models to identify opportunities to improve accuracy and minimize impacts of over-forecasting future savings. In collaboration with PSC staff, determine an appropriate approach for handling energy efficiency program goals and achieved savings in future modeling.

³¹ DR 177 and IR 62





IX. SUPPLY PROCUREMENT (ELEMENT 3)

This Chapter addresses the processes related to the development of the capacity delivery portfolio and procurement of gas supply for the New York gas utilities.

A. BACKGROUND

Delivery capacity and natural gas supply is purchased for NY ratepayers by National Grid's centralized Energy Procurement group. For Gas Year (GY) 2013 National Grid purchased 204 million dth of gas for its New York gas customers, at a total cost charged to ratepayers of \$1.1 billion. The GY runs from September 1 through August 31. As shown in **Exhibit IX-1**, the volume of gas purchased by National Grid has declined almost 20 percent since GY2008, due in part to the migration of sales customers to the competitive supplier (Choice) program, but also due to the generally mild weather experienced over that time. GY2012 saw gas purchases almost 35 percent below GY2008 levels due to the extremely mild weather that winter.

The cost of gas charged to ratepayers is comprised of demand charges paid for pipeline and storage capacity rights plus the cost of the gas itself and volumetric delivery costs to get the gas to the National Grid city gates, adjusted for various credits and charges, including revenues from asset optimization activities, various fees received from marketers under the Choice program, and credits received from non-core/ non-firm customers for use of National Grid system assets.

- **Asset Optimization:** National Grid has authorization from the PSC to enter into various transactions with a goal of optimizing the value of the assets in the delivery portfolios. These asset optimization transactions include asset management agreements (AMAs), capacity release transactions, off-system sales (OSS), and the Washington Storage Service (WSS) incentive program. Under PSC guidelines, the net revenues from these optimization transactions are generally split 85 percent to ratepayers, 15 percent to National Grid.
- **Marketer Fees:** While National Grid is the supplier of last resort for all residential, commercial and non-interruptible industrial customers on all three of its New York gas utility systems, approximately 20 percent of gas consumers in National Grid's NY gas service territories have elected to purchase their gas supply from alternative suppliers (marketers) under the NY state competitive gas supplier programs, called the Choice program. The fixed and variable fees paid by the marketers for released pipeline capacity storage and cash out charges for commodity under the terms of the Choice programs are credited to ratepayers.

Over the past six years, while National Grid has increased the amount of pipeline capacity under contract by 16 percent, fixed demand charges have almost doubled as a result of increases in rates for pipeline and storage capacity. The commodity cost of gas has declined drastically, reflecting the decline in the market price of gas over that period. Credits



to ratepayers have fluctuated over the same period, reflecting both the decline in the cost of gas and the changing value of specific capacity in the competitive market. In total, the cost of gas charged to ratepayers has declined by 57 percent between GY2008 and GY2013.

Exhibit IX-1
New York Gas Supply Purchases and Costs, GY2008 to GY2013
(Dollars in Millions)

	GY2008	GY2009	GY2010	GY2011	GY2012	GY2013	Percent Change 08 - 13
Volume of Gas Purchased (MMdth)	253,115	245,253	215,211	223,733	164,674	203,507	-19.6
Total Commodity & Variable Capacity Costs	\$ 2,834.7	\$ 2,124.1	\$ 1,554.5	\$ 1,475.3	\$ 757.9	\$ 866.9	-69.4
Fixed Demand Charges							
Pipeline Capacity under Contract (Mdth)	3,375	3,638	3,958	3,884	3,967	3,916	+16.0
Fixed Demand Charges for Pipeline Contracts	\$ 208.6	\$ 262.8	\$ 281.0	\$ 257.2	\$ 302.1	\$ 333.4	+59.8
Fixed Demand Charges for Storage	38.1	90.0	125.6	120.4	89.5	105.3	+176.1
Revenues Credited to Ratepayers							
OSS	\$ (37.2)	\$ (42.6)	\$ (25.2)	\$ (45.0)	\$ (45.9)	\$ (29.9)	
AMA	(1.5)	(6.9)	(11.5)	(11.0)	(162.6)	(80.9)	
Capacity Release	(14.3)	(49.4)	(51.8)	(69.6)	(87.9)	(108.0)	
Other Charges/Credits (Note 1)	(568.6)	(167.1)	(234.5)	(253.9)	112.7	(30.2)	
Total Cost of Gas Charged to Ratepayers	\$ 2,458.9	\$ 2,211.2	\$ 1,638.2	\$ 1,473.3	\$ 965.8	\$ 1,056.7	-57.0%

Note 1: Other charges/credits include recoveries and credits related to prior period reconciliations, non-core revenues, pipeline refunds, marketer revenues, demand charges related to non-firm gas, non-firm customer penalties and the Lost and Unaccounted For incentive/disincentive.

Source: DR 582, DR 582 Supplement

Gas costs are tracked and recovered from ratepayers on a specific utility basis. **Exhibit IX-2** summarizes gas purchases and costs for the three NY gas utilities for GY2013. KEDNY is the largest of the three NY gas utilities in terms of gas consumption, consuming just under 50 percent of all gas purchased in GY2013. The average cost of gas (COG) charged to ratepayers was highest for KEDLI, at \$5.63/dth and least for NMPC, at \$4.66/dth. KEDNY and KEDLI both received significant benefits from off-system revenues and other credits, reducing the total commodity and demand charges by 20 and 25 percent respectively.



Exhibit IX-2
Supply Purchases and Costs for NY Gas Companies, GY2013
(Costs in Millions)

	KEDNY	KEDLI	NMPC	Total
Volume of Gas purchased (MMdth)	97,247	58,349	47,911	203,507
<i>Percent of NY Gas Purchases</i>	<i>47.8%</i>	<i>28.7%</i>	<i>23.5%</i>	
Total Commodity & Variable Capacity Costs	\$ 399.3	\$ 291.8	\$ 175.8	\$ 866.9
<i>Average Variable COG (\$/dth)</i>	<i>4.11</i>	<i>5.00</i>	<i>3.67</i>	<i>4.26</i>
Fixed Demand Charges				
Pipeline Capacity under Contract (Mdth)	930	1,937	1,048	3,916
Fixed Demand Charges for Pipeline Contracts	\$ 154.9	\$ 131.0	\$ 47.5	\$ 333.4
Fixed Demand Charges for Storage	74.8	16.7	13.7	105.3
Revenues Credited to Ratepayers				
OSS	\$ (15.3)	\$ (10.6)	\$ (3.9)	\$ (22.1)
AMA	(44.4)	(35.3)	(1.2)	(78.5)
Capacity Release	(43.6)	(48.4)	(16.1)	(75.9)
Other Charges/Credits	(21.2)	(16.7)	7.6	(72.5)
Total Cost of Gas Charged to Ratepayers	\$ 504.5	\$ 328.6	\$ 223.5	\$ 1,056.7
<i>Average Total COG (\$/dth)</i>	<i>5.19</i>	<i>5.63</i>	<i>4.66</i>	<i>5.19</i>

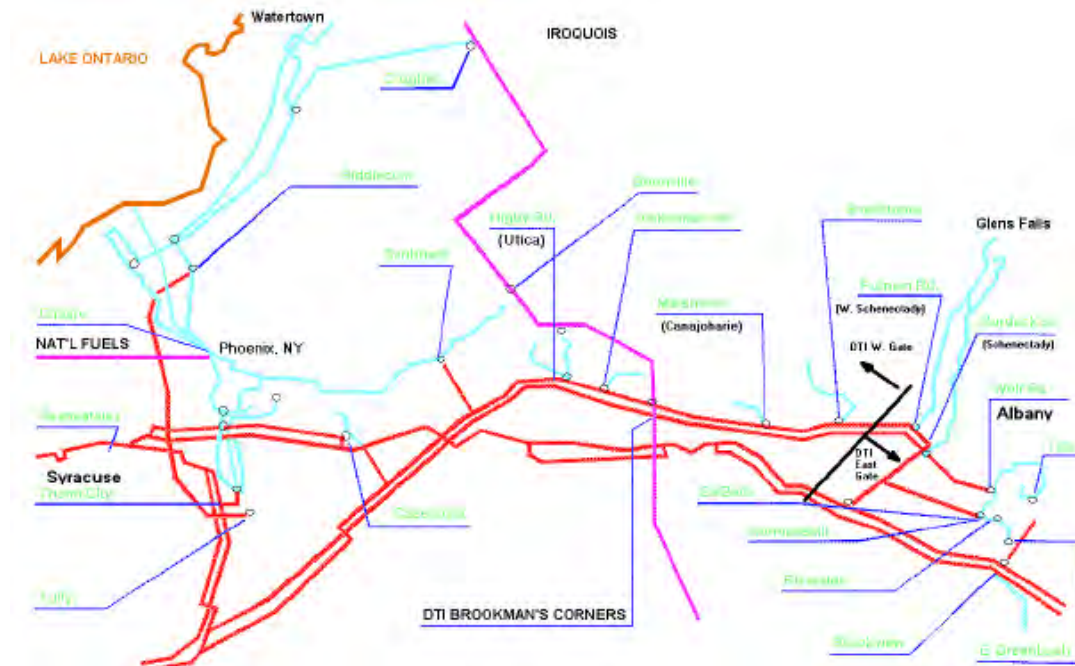
Source: DR 582, DR 582 Supplement

National Grid serves the NMPC service territory exclusively through interconnections with Dominion Transmission, Inc. (DTI) pipelines.¹ **Exhibit IX-3** shows the gate stations for NMPC – nine connections with DTI on the eastern side of the service territory and ten on the western side. NMPC holds contracts with DTI for firm pipeline supply and for no-notice storage agreements with DTI. Through upstream connections, NMPC has access to Canadian gas through the Iroquois Pipeline. There is also a connection with Tennessee Pipeline into the NMPC service territory. However National Grid does not hold firm contracts with Tennessee for delivery to that point, so it is used only by transportation customers or by National Grid on an interruptible basis.

¹ All pipeline and storage contracts are with the operating companies, not National Grid.



Exhibit IX-3 NMPC Service Territory Pipeline Connections



NOTE: DTI pipelines are in red
Source: DR 45

Gas supply for KEDLI and KEDNY are generally managed on a consolidated basis. The bulk of gas supply for the DNY utilities is delivered through Transcontinental Gas Pipeline Line Corp. (Transco), but interconnections with Texas Eastern Transmission (TETCO), Tennessee Gas Pipeline Company (Tennessee) and Iroquois Gas Transmission Company are critical delivery points for the DNY utilities (see **Exhibit IX-4**). Some of the physical delivery points with these pipelines are located in Consolidated Edison's (Con Edison) service territory. There is a long-standing agreement addressing the management of the New York City (NYC) pipeline receipt points (NYC Facilities System), allowing KEDLI, KEDNY and Con Edison to take delivery of gas through NYC gate stations from pipelines with which they do not have physical connections. KEDLI and KEDNY have contracts for storage capacity with Transco both in the Gulf Coast production areas and upstream near the Marcellus production area.² The DNY utilities have other upstream pipeline contracts, as well as additional storage in the Gulf Coast area.

² The Marcellus region encompasses 104,000 square miles and stretches across Pennsylvania and West Virginia, and into southeast Ohio and upstate New York.



**Exhibit IX-4
KEDLI and KEDNY Pipeline Interconnections**



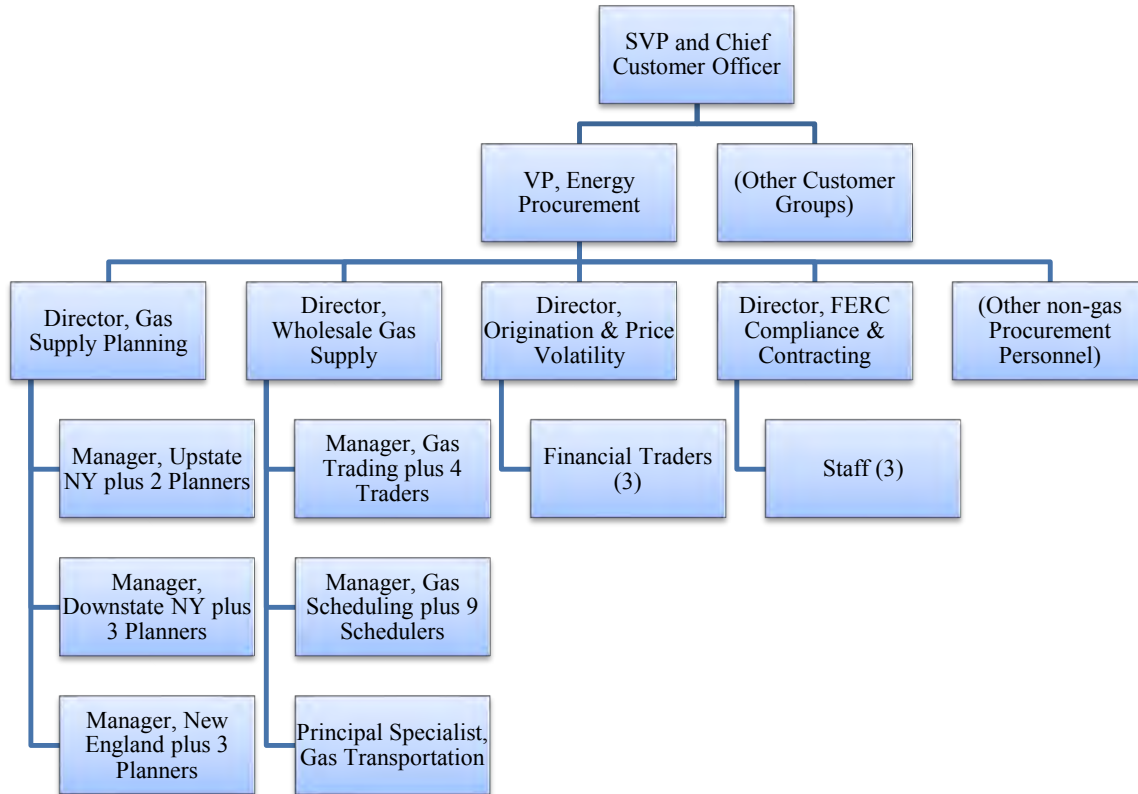
Source: DR 45

The Energy Procurement group which is responsible for the procurement of natural gas supply for the NY gas utilities is part of the Customer functional area. Energy Procurement is headed by a Vice President who reports to the SVP Customer. The VP Energy Procurement has four direct reports with responsibilities for, or related to, natural gas planning and procurement as shown in **Exhibit IX-5**. In total, there are 34 personnel involved in planning, procurement and scheduling of natural gas supplies for all NGUSA utilities in New York and New England.³

³ DR 143, DR 32



**Exhibit IX-5
Organization of Energy Procurement Group**



Source: DR 30

The responsibilities of the Energy Procurement group are:⁴

- Gas Supply Planning – support and analysis related to longer-term capacity portfolio decisions and associated contracting.
- Wholesale Gas Supply – short-term procurement and scheduling of all gas supply.
- Origination and Price Volatility Management – development of hedging plans and execution of non-physical supply-related transactions for both gas and electric operations.
- FERC Compliance and Contracting – coordinates solicitation and negotiation of portfolio and long-term supply agreements, and compliance with state and federal contracting requirements for gas operations.

⁴ DR 31, DR 33



The Energy Procurement group is also responsible for electric supply planning and coordination for National Grid's electric utilities. Electric planning and execution are the handled by a separate team of planners, traders and schedulers.

B. EVALUATIVE CRITERIA

- Does National Grid have appropriate supply portfolio principles, goals and objectives for its mass market default customers?
- Does National Grid have effective supply procurement strategies, policies, processes, and methods that properly balance long-term and short-term considerations of cost and reliability of supply?
- Has National Grid appropriately monitored, evaluated, and responded to new gas supply and storage options as they arose?
- Are the decision-making processes adequate and effective with respect to portfolio oversight and control?
- Are future load requirements and the migration of retail customers to competitive suppliers appropriately incorporated in the portfolio planning and procurement processes?
- Does National Grid appropriately consider customer rate impacts in its supply procurement planning and execution?
- Are there appropriate risk management strategies and practices in place?
- Are National Grid's financial and physical hedging practices appropriate and effective, and are they applied appropriately for each customer class?
- Does National Grid set portfolio performance goals appropriately to achieve goals and objectives and improve and monitor procurement performance?
- Is the centralized organization structure for gas planning and procurement activities appropriate, given the operational and geographic separation of the distribution utilities?
- Are the affiliate transaction processes used for gas supply planning and procurement, and for the allocation of gas portfolio costs, appropriate and consistent with company and PSC cost allocation guidelines and practices?

C. FINDINGS AND CONCLUSIONS

1. National Grid has an appropriate overall strategy for its gas supply portfolio management and procurement activities.

- Annually National Grid files its plans for the upcoming gas supply year with the DPS. The filings address specific questions from the DPS and include information about future load forecasts, the current contracted portfolio, and near term supply plans. There is some information regarding future years, but most of the information filed concerns the upcoming winter season, which is the focus of the DPS' interest.



- The annual gas supply submittal includes several statements regarding the gas supply strategy. These statements have remained consistent for at least three years (FY2012 to FY2014).⁵
- National Grid's overall strategy is to maintain reliable, flexible and cost minimizing capacity portfolios, to contract for gas commodity in a manner to maintain a least cost, reliable supply portfolio and to meet the price diversity and volatility mitigation guidance from the PSC.⁶
- The strategy is to be achieved through:⁷
 - Daily dispatch under a least cost strategy that recognizes the operational and balancing requirements of the load distribution systems and the contractual provisions of the supply and capacity contracts.
 - Maintenance of a diverse portfolio of gas supply, storage and transportation capacity with varying terms and pricing provision.
 - Execution of a formal hedging program to mitigate price volatility.
- In the discussion of the gas capacity portfolio in each year's annual plan, National Grid indicates that it reviews its portfolios, particularly when contract renewal decisions arise to confirm the portfolios remain reliable, flexible and minimize all fixed and variable costs.⁸
- In relation to the strategy for off-system sales, National Grid indicates its obligation is first to reliably meet firm customer requirements at the lowest possible cost, while seeking to optimize portfolio assets when they are not being used by the firm customers.⁹
- There is a good understanding of these strategies and objectives throughout the gas procurement group.¹⁰

2. The centralized organization structure for gas planning and procurement activities appropriately allows for efficiencies in staffing and leveraging of specialized skills.

- The Energy Procurement group provides its services to all National Grid utilities on a centralized basis, with considerable collaboration and coordination between the various responsibilities.
- Gas Supply Planning is organized geographically, with each area – NMPC, DNY, and New England – having a dedicated team of supply planners. This is appropriate as effective planning to meet load and system constraints requires knowledge of the

⁵ DR 36

⁶ DR 36

⁷ DR 36

⁸ Attachment 1 to DR 36, p. 5

⁹ Attachment 1 to DR 36, p. 11

¹⁰ Gas Procurement Interviews (IRs 20, 89, 90, 117 to 126, 132, 155, 211, 212, 215)



details of each operating utility. There is a considerable amount of shared knowledge and cross training between the geographic groups, allowing for coverage if needed.¹¹

- Gas procurement and scheduling activities are conducted from a single location (Hicksville, NY). The gas traders and schedulers are physically located in one large room and there are frequent interchanges between personnel regarding pricing and other market and pipeline matters.¹²
- Both procurement and scheduling activities are assigned to specific personnel by pipeline rather than by utility.¹³
 - National Grid gas utilities transport gas on many of the same pipelines. Each pipeline has its own operational procedures and constraints, and requires interface with the pipeline's specific Electronic Bulletin Board (EBB) for nominations. Thus, it is appropriate for specific traders and schedulers to work with one or a few specific pipelines.
 - Traders communicate closely with short term supply planners and each other, and have full access to pricing data across all pipelines so purchases can be made on a least cost basis.
 - Traders and schedulers are periodically rotated to different pipelines for cross training and internal control purposes.
 - There is one after-hours scheduler who handles all pipelines at nights and on the weekends in case Gas Control requires adjustments to volumes outside of business hours. In addition, the other schedulers rotate to back up the after-hours scheduler as needed. Traders rotate after-hour coverage.
- Financial transactions are conducted by a single group for all National Grid utilities. This is appropriate because these transactions all take place in the same futures markets with the same set of counterparties regardless of the receiving utility. Additionally, the associated monitoring and tracking calculations are identical, using the same models and data.¹⁴
- Oversight and support for the capacity and supply contracting processes and FERC compliance monitoring is provided by a centralized group for all National Grid utilities. This is appropriate as it allows for leveraging of expertise and skill sets across the utilities, where no single utility has sufficient need for these services on its own.¹⁵
- Without a centralized organization for Energy Procurement, there would undoubtedly be an increase in personnel as each operating company would require senior level management and oversight and its own planners, traders, schedulers, financial traders, contract specialists and support analysts. On a standalone basis most of these

¹¹ DR 30, DR 32, DR 33, Gas Procurement interviews

¹² NorthStar observation

¹³ DR 33, DR 35, Gas Procurement interviews, NorthStar observation

¹⁴ DR 31, DR 58, IR 119, IR 121, IR 131, IR 155

¹⁵ DR 31 IR 89, IR 120, IR 155



functions would require a minimum of two staff to allow for sufficient coverage and separation of duties.

3. The current governance structure for the NY jurisdiction does not provide for an appropriate level of regular direct interface between Energy Procurement and the jurisdiction.

- The Energy Procurement group is responsible for meeting the most basic requirement of a natural gas utility – the delivery of gas to customers – and is accountable for approximately \$1 billion annually, compared to approximately \$600 million for all other controllable costs for the New York jurisdiction.¹⁶
- The NY Leadership Team does not include any representation of the Energy Procurement group.¹⁷
- The Customer Functional representative on the NY Leadership Team is the VP Customer & Business Strategy, who has responsibility for developing and monitoring various customer growth programs (e.g., conversions and energy efficiency), and its economic development and corporate citizenship activities for all of National Grid's US operations.¹⁸ His experience is in the area of customers and marketing, not energy procurement, so he cannot appropriately represent energy procurement matters with the NY leadership.
- National Grid reported that there are informal conversations between the NYJP and the VP Energy Procurement as needed.¹⁹ However, the lack of regular participation by the Energy Procurement group on the NY Leadership Team handicaps discussion of supply matters and the impact of supply considerations on other programs and activities.

4. National Grid's long-term delivery and gas supply portfolios for the NY gas utilities appropriately meet the needs of all customers for whom it retains the obligation as supplier of last resort.

- To be able to meet its supplier of last resort obligation, National Grid develops the long term gas supply delivery portfolio for each utility to meet the needs of all of the utility's customers, including Choice customers, on a design day. As discussed in Chapter VIII Load Forecasting, Choice customers are specifically incorporated in the load forecasting process and growth in Choice volumes is treated appropriately.
- As set forth in the terms of the Choice programs, National Grid releases firm capacity to marketers using FERC-qualifying capacity release protocols.

¹⁶ NorthStar analysis of DR 439 and DR 582

¹⁷ DR 275

¹⁸ DR 143, IR 31, IR 229

¹⁹ IR 132, IR 229



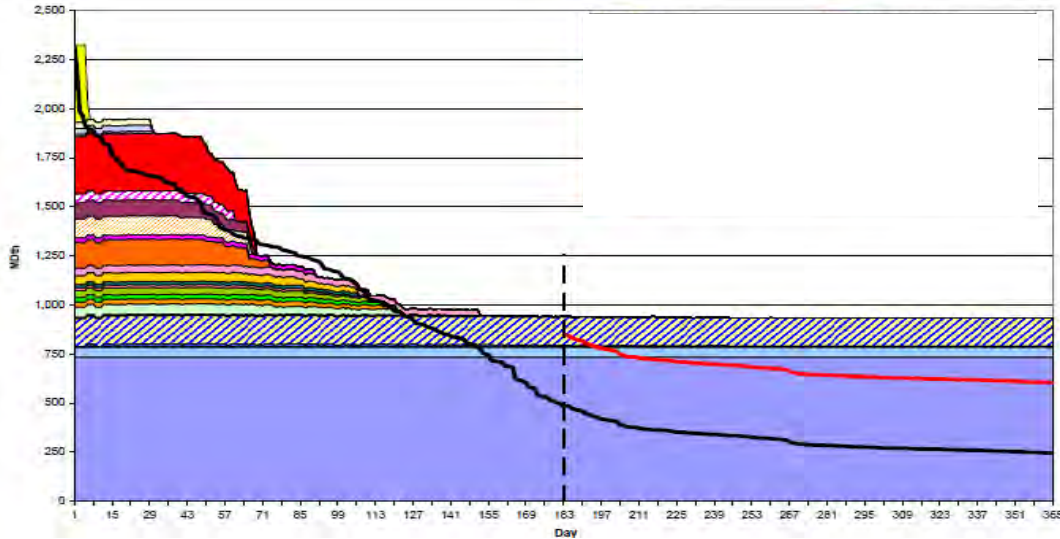
- National Grid retains the right to use the capacity in the event a marketer were to fail to fulfill its obligations under the Choice program.²⁰
 - In response to feedback from marketers and after working with the PSC staff, National Grid has requested approval from the PSC to modify the Choice programs for KEDLI and KEDNY so that marketers will receive released storage capacity, rather than using National Grid's storage contracts for swing supply.
 - Consistent with current industry standard practice, National Grid meets its supply requirements using winter season contracts, storage withdrawals, monthly contracts, and daily gas purchases.²¹
- 5. The current supply portfolios for the DNY utilities require the procurement of annual peaking contracts to meet design day requirements; the amount of incremental winter capacity needed for supply reliability is increasing such that additional firm capacity contracts likely will be necessary within five years.**
- Because pipeline capacity must be procured in blocks, natural gas utilities often hold some capacity over design day requirements in the near-term (one to two years). For the longer term utilities' portfolios can show a capacity deficit, indicating a need for the utility to contract for additional firm delivery capacity in the three to five year planning period. In the current gas market many utilities obtain the true peaking supplies (supply that would only be needed for a few days in the event of true design weather) through short-term (five-day to 30-day) city gate contracts. These supplies are generally less expensive than holding year round or even winter-season pipeline capacity.
 - **Exhibit IX-6** shows the combined design load duration curve (LDC) for KEDLI and KEDNY, and the sources of supply by contract that would be used to meet the load for the 2012-13 winter.
 - Base load gas supply is obtained through multi-month supply agreements, delivered via Transco firm pipeline contracts (shown as the large blue and yellow striped areas in the Exhibit).
 - Winter gas supply is purchased through a combination of storage withdrawals and one-month agreements to expected minimum base load requirements (e.g., warm weather), and daily purchases to meet incremental needs (the red and pink bands in the Exhibit). Because the storage agreements with Transco are non-notice contracts (the volumes can be varied with prior notice required), National Grid is able to vary storage withdrawals to meet intra-day swings in load due to weather.

²⁰ DR 39

²¹ DR 36



**Exhibit IX-6
KEDLI and KEDNY Combined LDC and Supply Sources
2012-13 Winter**



Note: The Black line is Firm plus Temperature Control customer requirements. The Red line includes storage injections. See text for additional explanations.

Source: DR 44

- Design peak day requirements are expected to be met using company-owned LNG facilities (the yellow bar at the top of the LDC in the Exhibit), but LNG may be used to meet customer load on non-design days based on cost relative to other supplies.
 - National Grid also has rights to some gas supply from industrial customers and obtains short duration (30-day) peaking supply contracts that can be called upon in the case of design day situations (the thin bands directly under the LNG volumes).
- **Exhibit IX-7** summarizes the planned sources for design day supply for the downstate utilities through 2017-2018, based on contracts in place as of July 2013. At that time, National Grid showed a design day shortfall of 92,700 dth (four percent) in 2013-14.
 - National Grid's DNY capacity plan shows a 100,000 dth/day increase in capacity in 2014-15 as a result of completion of the Transco Pipeline Northeast Connection project,²² which is somewhat offset by reductions in design day supply available through contracts with cogenerators. On net, the DNY design day shortfall increases to almost 300,000 dth (11 percent) in 2017-18.
 - For the 2013-14 winter, National Grid appropriately contracted for 60,000 dth of 20-day supply and 45,000 dth of ten-day supply, both city gate deliveries, to fill the

²² Fact Verification review



remaining design day requirements.²³ With this additional design day supply, contracted supply and design day volumes for 2013-14 were essentially equal.

Exhibit IX-7
Downstate Peak Day Capacity and Design Day Requirements
(dth)

	Fiscal Year				
	2013-14	2014-15	2015-16	2016-17	2017-18
Flowing Supplies	967,500	1,067,500	1,067,500	1,067,500	1,067,500
Storage Withdrawals	890,300	890,100	890,100	890,100	890,100
LNG Plant	394,500	394,500	394,500	394,500	394,500
Cogen/Other Supplies	99,000	66,700	66,700	66,700	11,100
Total	2,351,300	2,418,800	2,418,800	2,418,800	2,363,300
Design Day Requirements (Note 1)	2,444,000	2,503,000	2,546,000	2,595,000	2,642,000
Excess/ (Shortfall) Volume	(92,700)	(84,200)	(127,200)	(176,200)	(278,700)
Percent of Requirements	(4%)	(3%)	(5%)	(7%)	(11%)

Note 1: Removing 9,000 dth each year associated with temperature controlled (TC) customers.

Source: 2013-14 capacity and all Design Day Requirements from DR 36 (Table 1a, Table 2a and Table 2b) future year capacity data provided in Fact Verification.

- Not only does the design day capacity shortfall increase significantly in future years, but the duration of the shortfall (e.g., the number of days each winter) will also increase. As **Exhibit IX-6** showed, there is already very little unused capacity during the winter shoulder season. As the number of days for which incremental supply that must be obtained increases, the economics of short-term city gate contracts compared to utility-contracted pipeline supply will change.
 - National Grid indicated that it would resolve the shortfalls and meet future design day requirements through winter peaking supply contracts.²⁴
 - The precedent agreement with DTI signed by National Grid in 2013, designed primarily to support the eastern portion of the NMPC service territory, will provide additional access to Marcellus shale supplies for the DNY utilities, but does not provide additional capacity.²⁵ Additional interconnections and firm supply options are reportedly being evaluated but these plans are not documented in the annual filings with the PSC.
- 6. NMPC's capacity and supply portfolio provides adequate design day capacity through at least 2017-18, and appropriate steps have been taken to address the reliability needs for the eastern part of the service territory.**
- As shown in **Exhibit IX-8**, the NMPC peak day delivery portfolio provides for seven percent capacity over design day requirements in 2013-14.

²³ Attachment 10 to DR 36

²⁴ Data provided in Fact Verification

²⁵ DR 224, Gas Procurement Interviews



- The plan for NMPC shows a capacity addition of 30,000 dth/day beginning in 2016-17 as the DTI capacity comes on line. Capacity available from cogenerators declines significantly over the planning period, however NMPC continues to have capacity greater than design day requirements through 2017-18.

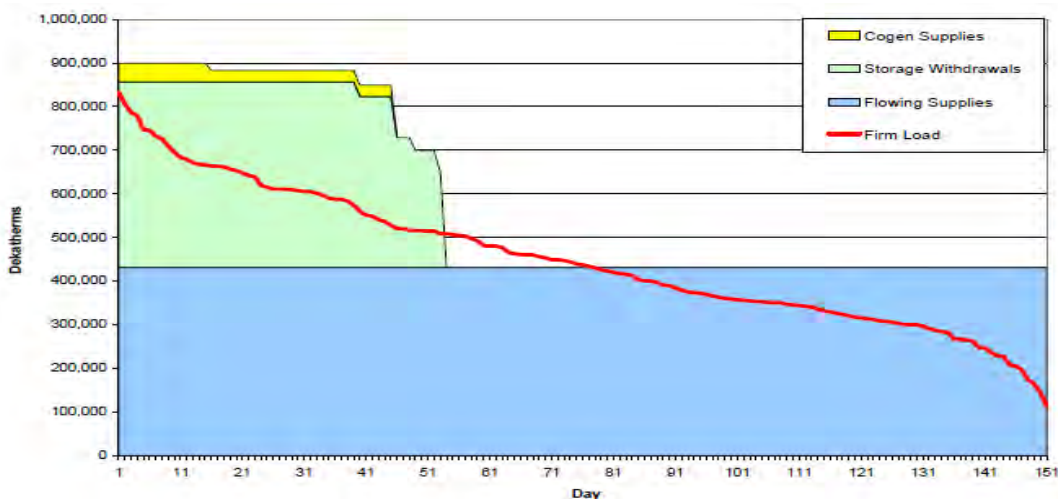
Exhibit IX-8
NMPC Peak Day Capacity and Design Day Requirements
(dth)

	Fiscal Year				
	2013-14	2014-15	2015-16	2016-17	2017-18
Flowing Supplies	419,300	419,300	419,300	449,300	449,300
Storage Withdrawals	435,100	438,100	438,100	438,100	438,100
Cogen Supplies	42,500	42,500	17,000	17,000	3,000
Total	899,900	899,800	874,300	904,300	890,000
Design Day Requirements	841,000	836,000	826,000	825,000	820,000
Excess/ (Shortfall)	58,800	63,800	48,300	79,300	70,300
Excess/ (Shortfall) percent	7%	8%	6%	10%	9%

Source: 2013-14 capacity and all design day requirements from DR 36 (Table 1b and Table 2c), future capacity data from Fact Verification.

- The match between the design LDC and supply sources for NMPC is much simpler, as shown in **Exhibit IX-9**, because of the terms of the DTI contracts. As with the DNY utilities, the base gas supply is met with multi-month supply contracts, augmented in the winter with a series of one-month and winter-term agreements, delivered via DTI. Winter load is met through storage withdrawals.

Exhibit IX-9
NMPC LDC and Supply Sources
2012-13 Winter



Source: DR 44



- Because of the design of the NMPC service territory, National Grid is somewhat constrained in its ability to deliver gas to the eastern portion of the service territory. National Grid has agreements with cogenerators for short term gas to meet some peak hourly requirements at the East Gate, and occasionally must implement operational flow orders on large customers. In 2013, National Grid signed a precedent agreement with DTI for additional capacity to serve this portion of the NMPC service territory and for increased access to low cost gas for the DNY utilities.²⁶

7. National Grid has appropriate decision-making processes with respect to portfolio changes and long-term supply options, but neither the process nor the decisions are appropriately documented.

- National Grid does not have written policies and procedures covering the development and evaluation of the long-term gas supply portfolio.²⁷ However, the process used by the Energy Procurement group for these decisions appropriately incorporates a range of options, consistent assumptions and input data, and is based on least cost supply to the ratepayers.
- National Grid reviews its supply and delivery portfolio for each of the NY Gas utilities at least annually as part of preparation of the annual supply plan filing with the PSC. As a matter of practice the portfolio is assessed more frequently, including in preparation for decisions on winter supply, development of the storage management plan, and assessment of pipeline contracts that are open for renewal.²⁸
- National Grid uses the SENDOUT™ model to develop a resource portfolio to meet the forecasted load and energy requirements.²⁹ SENDOUT is a linear-programming optimization software tool used by many gas utilities to develop optimal portfolio plans. SENDOUT uses detailed data on pipeline and storage contract volumes and rates and forward natural gas price curves to solve for the dispatch of resource to minimize the cost of serving the specified demand requirements.³⁰
- SENDOUT can efficiently model multiple scenarios of portfolio options, allowing consideration for example of the cost to serve with and without a specific contract that is up for renewal, or using firm winter city gate supply compared to a pipeline contract with market gas. SENDOUT incorporates both fixed demand charges and delivery rates in determining total cost to the ratepayers of each scenario.
- Once a need for new or adjusted delivery capacity is identified, National Grid has formal, documented guidelines to assure that precedent agreements and final contracts are subject to appropriate levels of approval.³¹

²⁶ DR 224

²⁷ DR 35

²⁸ Gas Procurement Interviews

²⁹ See Chapter VII. Load Forecasting

³⁰ DR 33

³¹ DR 33, DR 349



- NorthStar reviewed several of the portfolio decisions made over the past five years.
 - Energy Procurement personnel had good knowledge regarding the decisions, and a clear understanding of evaluation process and why specific decisions were made.
 - Materials supporting the decisions, including SENDOUT results and e-mail communications, could generally be located and provided within a reasonable time. However, there was no consistency in what supporting materials were maintained or where.
 - Few of the decisions had any summary document that specified why the decision was needed, what options were considered, what analysis was done, and why the particular decision was made.
 - Decisions that had to go before the Energy Procurement Risk Management Committee (EPRMC) had good summaries and more complete documentation.³²
- The support documentation reviewed showed that portfolio decisions were based on the least cost of delivered gas to ratepayers.³³

8. Although the role and responsibilities of the EPRMC and other Procurement review groups are set forth in written policies, there is minimal guidance regarding how decisions are to be made, and actual oversight by the EPRMC has been irregular.

- The EPRMC serves as the central review and control group for all natural gas procurement activities – both physical and financial.³⁴ Some EPRMC decisions are referred through a delegation of authority to the Commodity Management Committee (CMC). Some Energy Procurement decisions are subject to review by the Energy Procurement FERC Gas Compliance Committee (EPFGCC) and the Energy Procurement Deal Approval Committee (EPDAC). The membership and scope of authority for these committees are shown in **Exhibit IX-10**.

Exhibit IX-10
Energy Procurement Oversight Committees

Committee	Membership	Scope of Authority
EPRMC	Director, Global Tax and Treasury (Chair) SVP Regulatory Affairs VP US Treasury SVP/US General Counsel	Approve annual Supply Plan Approve annual Transactions Strategy Approve transactions >\$100M or >5 years Approve non-typical transactions Monitor market and credit exposure related to hedging transactions Monitor compliance with annual Transactions Strategy

³² DR 224, DR 502

³³ DR 224, DR 502

³⁴ DR 35, DR 226, DR 348



Committee	Membership	Scope of Authority
CMC	Director, Quantitative Risk and Financial Reporting (Chair) Manager, Accounting Director, Customer Choice Lead Analyst, Credit Operations Director, Accounting Solutions Director, Regulatory and Pricing (non-voting)	Approve non-repetitive term transactions <\$100M and <5 year term (Note 1) Conduct reviews for transactions requiring EPRMC approval
EPFGCC	Director, FERC Compliance & Contracting (chair) Director, Wholesale Gas Supply Manager, Gas Trading Legal representative	Approve all AMAs and new transaction types for compliance with FERC requirements. Assure compliance of regular transactions with FERC requirements Monitor compliance with training requirements
EPDAC	Director, FERC Compliance & Contracting (chair) Director, Origination and Hedging Director, Gas Supply Planning Director, Wholesale Gas Supply Legal representative	Assure AMAs and new transaction types are consistent with internal requirements and annual supply plan

Note 1: Spot and standard term transactions (physical and financial) less than \$50M per transactions may be executed by individual traders.

Source: DR 225, DR 226, DR 351

- The current formal EPRMC policies and procedures are focused on risk management and do not address the committee's role regarding non-hedging Energy Procurement activities.
 - The policy calls for regular reports on credit risk exposure and market information to be provided to the EPRMC.³⁵
 - The policy does not provide for any reporting on other Energy Procurement activities.
 - The policy does not specify what documentation is required to support recommended actions.
 - The policy does not address retention of documentation either for risk-related (hedging) or physical transactions.
- The EPRMC is a high-level group, meets irregularly and is operating with only four members, rather than seven when it was first established. As a result, it does not provide regular review of Energy Procurement activities.³⁶
 - When its approval is required for a procurement transaction, the EPRMC receives an appropriate amount of information regarding procurement strategies and proposed transactions from the CMC and other procurement review committees.

³⁵ Attachments 1, 2, 3, 4, and 5 to DR 35

³⁶ DR 424, DR 61



However, there is no consistency in what information is provided or in what level of detail.

- The risk monitoring report prepared when the EPRMC does meet includes appropriate information on market and credit risk and recent transactions.³⁷
- National Grid has announced a planned restructuring of risk oversight governance.³⁸
 - A new, high-level Executive Energy Risk Committee (EERC) will focus on energy risk, metrics, energy strategy, financial implications, National Grid shareholder interests and US utility franchise risk.
 - The EPRMC is to be restructured, with a “greater focus on jurisdictional issues, regulatory strategies, reliability requirements and appropriate metrics to monitor hedging and energy procurement activities.”
- As the restructuring has yet to be implemented and NorthStar was only provided with a summary overview of the planned changes, NorthStar is unable to assess its effectiveness in monitoring and guiding procurement activities relating to the NY gas utilities.

9. National Grid appropriately monitors, evaluates and responds to changes in the gas markets, including new sources of gas supply and pipeline and storage options.

- The personnel in Energy Procurement group demonstrate a strong understanding of trends in pricing, supplies and delivery initiatives in the natural gas market.³⁹
- The discussions of changes in market conditions, sources of supply, and possible delivery and storage options provided in the annual supply plans filed with the PSC are current, and there are direct links between the identified market trends and supply and delivery decisions made by National Grid as documented in the annual filings.⁴⁰
- Portfolio modeling conducted in support of PSC filing and portfolio decisions explicitly incorporate changes in the natural gas markets.
- Over the past five years, National Grid has implemented numerous adjustments to its supply portfolio in response to the continued development of the Marcellus Shale fields, the most significant recent gas market change, including:⁴¹
 - Termination of transportation contracts between both KENDY and NMPC, and Texas Gas Transmission from the Gulf production area.
 - Termination of KEDLI’s transportation contract with Tennessee Gas Pipeline from the Gulf production area.

³⁷ DR 59, DR 270

³⁸ DR 623

³⁹ Gas Procurement Interviews

⁴⁰ DR 36

⁴¹ DR 48, DR 502, DR 224



- Termination of some agreements for storage in the Gulf production area that were no longer needed for core customers and contractually could not be released to other shippers. .
 - Restructuring of short haul transportation agreements between each of KEDNY and KEDLI and Tennessee to increase access to the Marcellus production area.
 - Restructuring of Millennium Pipeline agreement with KEDLI to improve access to the Marcellus production area and related storage fields.
 - Execution of precedent agreements with DTI to increase delivery capacity for NMPC and improve access to the Marcellus production area and related storage fields for all three utilities.
- The amount of gas National Grid obtains from the Gulf production areas has declined significantly over this period, particularly for NMPC, and has been replaced with a greater reliance on Marcellus gas (**Exhibit IX-11**). The reduced reliance on Gulf gas is appropriate given the current price advantage of Marcellus gas. The trends in sources of gas supply seen here is similar to that seen with other Northeast gas utilities.

Exhibit IX-11
Trends in Sources of Gas Supply (percent)

Source of Gas Supply	2010-11	2012-13
KEDLI/KEDNY		
Firm Transportation		
Gulf Coast	44	41
Canadian	21	20
Marcellus Shale	2	13
Total Firm Transportation	66	75
Storage Withdrawals	30	25
Peaking/LNG	4	<1
NMPC		
Firm Transportation		
Gulf Coast	28	4
Canadian	18	15
Marcellus	23	50
Total Firm Transportation	69	68
Storage Withdrawals	31	32
Cogen	<1	<1

Source: Attachment 1 and 4, DR 36

10. National Grid appropriately uses AMAs, capacity release transactions and OSS to the benefit of ratepayers.

- National Grid regularly enters into between ten and 20 AMA transactions annually.⁴² Over the past six years, AMA revenues credited to ratepayers total \$270M with annual amounts ranging from \$1.5M in GY2008 to \$160.5M in GY2012.
- Many of the AMAs involve capacity to move Canadian gas to New York. Canadian gas is currently uneconomic for National Grid compared to other supply

⁴² DR 36, DR 505, Gas Procurement Interviews



sources. As a result, National Grid is not active in the Canadian gas markets and believes that other entities with more Canadian presence can be more effective in managing those agreements.

- Other AMAs are undertaken to leverage pipeline capacity that is not often used at full capacity by National Grid, but has value to other market participants.
 - The value of the AMAs varies from year to year, depending on the amount of interest in particular pipelines and paths.
- Short-term (one month) and multi-month releases of capacity are used by National Grid to optimize the value of capacity that will not be required to serve ratepayers during the month.
 - These releases are common in the summer and the shoulder months when National Grid has firm pipeline capacity that will not be needed. Less capacity is available for release in the winter months, as National Grid must stand ready to serve customers in the event of cold weather.
 - National Grid determines how much and which capacity is eligible for release as part of its monthly portfolio procurement plan set-up.
 - Capacity release transactions are handled through pipeline bulletin boards and are only executed with third parties who meet National Grid's credit standards.
 - As with the AMAs, the value of capacity released to the market varies greatly month to month and year to year. Revenues credited to ratepayers from non-Choice related capacity release transactions have increased from \$23M in GY2009 and GY2010 to \$76M in GY2013.⁴³
 - OSS are made daily by traders to obtain value from capacity that is not needed that day. OSS transactions are typically made on a bundled basis (delivery and commodity). Traders are given discretion to execute OSS trades, and have access to delivered price spreadsheet tools that allow them to quickly determine if there is sufficient margin in a transaction. All OSS transactions are entered into Allegro, National Grid's Gas Management System, as a buy/sell pairing.⁴⁴
 - In addition, National Grid is authorized by the PSC to use a portion of the Transco Washington Storage Service (WSS) capacity on the Transco Pipeline system for off-system sales (the WSS Program). In the past, 15 bcf of the 20 bcf of storage capacity has been available for off-system sales.⁴⁵ The net margin from the WSS program is credited 100 percent to ratepayers until the annual fixed costs for the entire WSS storage contract is reimbursed; after that the net margins are shared 85 percent to

⁴³ DR 582

⁴⁴ Allegro was brought on-line beginning August 1, 2012. Prior to then trade deals were recorded in a similar system called Nucleus.

⁴⁵ Under National Grid's proposed adjustments to the Choice program, Marketers will have the option of receiving an allocation of the WSS volumes.



customers, 15 percent to National Grid.⁴⁶ The WSS optimization transactions may be either physical transactions or financial transactions leveraging gas in storage.⁴⁷

11. National Grid has appropriate financial and physical hedging risk management strategies, practices and controls.

- National Grid's hedging strategy for the NY Gas utilities protects ratepayers from volatility in natural gas prices through two vehicles: use of physical storage and execution of financial hedges. Under direction of the PSC, the total amount of gas hedged should not be planned to exceed 60 percent of the total normal winter firm load (November through March).⁴⁸ Warmer than normal weather can result in the actual hedge percentage being greater than 60 percent.
- National Grid executes financial hedges so that 100 percent of the volume to be hedged is protected by September 1, prior to the start of the winter season. The purchase procedures are mechanical, with minimal discretion available to the trader.⁴⁹
 - Eighteen months prior to a given Gas Year, the Energy Procurement group looks at the most current forecast of the normal winter firm load and determines the maximum amount of volume that can be hedged (60 percent of the forecast load).
 - The average volumes that will be available from storage contracts are backed out of the planned total hedge target to establish the volume that will be hedged financially. The volume to be hedged is then averaged over each of the five winter months.
 - The financial hedge volumes for the five winter months are then spread evenly over the eighteen month period from May to August of the next year to establish the number of financial contracts (10,000 dth per contract) the traders will purchase each month.
 - The purchases are made on a regular schedule (specific days within each month) to minimize the opportunity for traders to manipulate the timing of purchases for any purpose.
 - The total volume of gas to be hedged (storage and financial) is reviewed periodically and adjusted for changes in forecasted winter load and storage contract modifications to keep the total hedged volume below the 60 percent threshold.
- Each year, National Grid prepares a written Gas Cost Volatility (GCV) Reduction Transaction Strategy that reviews the overall strategy and established guidelines and controls. The GCV Strategy is reviewed and approved by the EPRMC.⁵⁰

⁴⁶ DR 58, DR 59

⁴⁷ DR 58

⁴⁸ DR 58

⁴⁹ DR 62 and DR 63, Gas procurement interviews

⁵⁰ DR 62



- The GCV Strategy sets quarterly targets for completion of the financial hedges purchases (e.g., August 1: 19 percent of total, November 1: 38 percent of total), with allowed tolerances for each quarterly target (+/- 2 percent).
 - The quarterly targets represent three months of the monthly targets established in practice.
 - National Grid explained that the quarterly targets allow for some flexibility in case of either short-term gas market disruptions or internal logistical events that precluded the monthly execution.
 - Current practice for purchasing financial hedges complies with the purchasing guidelines set forth in the GCV Strategy.
- The benefits of the financial hedging program are applied equally to all core sales customer classes. Transportation and Choice customers are appropriately excluded from the benefits.
- NorthStar reviewed the purchases of financial hedging instruments for several selected months from the prior five years. The review confirmed that the purchases were made in conformance with the GCV practice (e.g., monthly purchases).

12. National Grid's processes for determining short-term (monthly and daily) gas supply requirements are appropriate and consistent with processes used by other natural gas utilities.

- National Grid's monthly gas supply plans are developed for each utility during the third week preceding the end of the month, so the plan is in place to buy monthly index gas during each month's "bid week."⁵¹
- The monthly plans are based on projected send out volumes under normal weather conditions, converted into an average daily normal volume for that month.⁵² National Grid also prepares "warm" and "cold" send out forecasts based on historical weather patterns. These send outs provide additional information on the magnitude of possible swings in gas volumes.
- In the winter months, National Grid determines the volume of gas that can be purchased through monthly contracts as the net of projected total load, less projected storage withdrawals and in-place seasonal contracts, based on projected load at between a warm month and a normal month.
- In the summer, National Grid sets monthly purchases at a level that exceeds forecasted send out, with the additional gas going to storage injections that support the annual storage plan.

⁵¹ DR 500, DR 501

⁵² Attachment 15 to DR 35



- National Grid develops its daily gas purchase plan using a rolling seven-day process, with forecasted loads updated daily based on current weather predictions.
 - Each afternoon, the Supply Planning group sets the preliminary purchase plans for the gas day two days out, based on then current weather forecast and known pipeline and system conditions.
 - The next morning, the preliminary plans for daily gas purchases are reviewed with the traders and Gas Control (part of Operations) and adjusted to reflect updated weather and operating information.
 - If the weather is changing, the load forecast may be updated throughout the morning and appropriate adjustments made to the planned daily purchases plan. Nominations are due by 12:30 pm for the next gas day.
 - Updates to nominations are allowed in the middle of the gas day (by 6:00 pm) and again towards the end of the gas day (by 11:00 am) to address any shortfalls or overages.⁵³ Because National Grid has no-notice storage capacity both UNY (on DTI) and DNY (on Transco), mid-day adjustments are made using those contracts.

13. Existing procedures for developing short-term procurement plans are insufficient, and no provision is made to retain daily set-up sheets for review or to identify opportunities for improving the set-up processes.

- National Grid has written procedures for the monthly and daily set-up processes, nominating, and scheduling of gas purchases through the various pipelines web interfaces, and entering purchases into Allegro.⁵⁴
 - The procedures for the monthly and daily set-up are focused on the management of the spreadsheets with minimal discussion of the parameters of the actual planning process.
 - The procedures for nomination, scheduling and data entry are appropriately mechanical. The accuracy of these activities is confirmed through verification of nominations by the counterparty, and other controls executed by the Back Office.
- On-site testing of the monthly and daily set-ups found the spreadsheets used to document the plans to be difficult, time consuming and inconsistent.⁵⁵
 - The spreadsheets used for the monthly set-ups for UNY and for DNY are not at all similar in structure or appearance, complicating managerial review of monthly and daily supply procurement plans for the utilities.
 - The spreadsheets used for daily setups do not adequately identify term gas and monthly gas volumes separate from volumes needed for purchase on that day.
 - The written procedures are insufficient to track and understand either the monthly or daily set-up processes.

⁵³ Attachment 13 to DR 35

⁵⁴ Attachments 6, 8, 9, 10, 13, 14, 15, 16, 17 and 19 of DR 35

⁵⁵ DR 501, IR 211, IR 215



- National Grid indicated it was in the process of modifying the spreadsheets used to establish the monthly and daily procurement plan to make them have a more consistent presentation of information. NorthStar was not able to review the modified sheets to evaluate if they have improved the presentation of the plans for review, because they were still in process.
- The short term set-up processes are somewhat of an “art”, depending on a broad range of factors, and relying heavily on the experience of the planners. However, the lack of written guidelines for this critical activity leaves the process too dependent on individual perspective. Without written policies and procedures:
 - New personnel would be challenged to learn the process, resulting in possible inefficiencies in the short term.
 - Management cannot evaluate the performance of the portfolio planning and procurement area and it is difficult to identify opportunities for improvements.
- National Grid does not maintain copies of the initial daily set-up plan. The morning set up sheet is revised throughout the day as purchases are made and weather changes. Only the final end of day actual is kept. As a result, it is not possible to compare the initial daily set-up with actual activities and volumes to be able to identify inconsistencies or areas for improvement.⁵⁶

14. National Grid appropriately considers the delivered cost of gas to ratepayers in its short-term supply procurement activities.

- National Grid has a general policy of least cost supply, subject to operational factors and the availability of upstream and downstream pipeline capacity.
- The monthly and daily supply delivery set up is done based on existing contracts and associated requirements and system constraints (e.g., storage must takes). The actual procurement decisions (which pipeline to take the gas from) is generally left to the discretion of the traders.
- National Grid traders seek to purchase the least cost gas on a delivered (city gate) basis.
 - Because there are multiple upstream receipt points available to National Grid on each pipeline system, traders have the flexibility to buy and receive gas at the lowest cost available point.
 - Some available gas is priced on a delivered, city gate basis. The traders have easy access to spreadsheets that allow them to determine delivered prices for production area gas to compare with city gate supply, so they can quickly take advantage of city gate supply if it is lower cost.
 - On occasion traders may find the daily price of flowing gas to be less than the price of gas in storage that had been part of the daily plan. In these instances,

⁵⁶ DR 500, DR 501



traders can reduce withdrawals from storage (within the constraints of the storage plan) for lower cost supply.

- NorthStar was not able to verify the purchase of least cost daily supply because it is not possible to determine after the fact the universe of supply options available but not taken, given, for example, the number of possible gas suppliers and supply sources, pipeline routes, city gate offers, and timing of purchases within the market day, and the lack of readily available data of all bid/ask prices in the natural gas market for any given day. Comparison to published indices for the same pipeline is not meaningful because National Grid purchases are part of calculating the indices.
- Direct observation of the trading floor indicated:⁵⁷
 - Close attention to delivered prices.
 - Active negotiation of prices, resulting in final price several tenths of cent less than the initial offer.
 - Careful monitoring of price movement on multiple pipelines.
 - Continual presence of one of the short-term planners on the trading floor.
 - Frequent sharing of information among traders and the short-term planner regarding price movement or possible impacts of operational constraints.
- Review of price data for gas purchases for the NY gas utilities over the past five years did not reveal any obvious large price differentials or other anomalies.

15. National Grid has a strong system of controls for the tracking and settlement of gas procurement costs.

- Energy procurement activities are typically divided into Front, Middle, and Back office activities, with strong controls and separation of duties to assure that transactions are verified and appropriate.
 - The Front Office is responsible for the planning and execution of procurement activities.
 - The Middle Office is responsible for risk control, validation, testing and verification and management of counterparty risks.
 - The Back Office is responsible for the settlement of procurement transactions – preparing and reconciling invoices, determining appropriate accounting treatments and preparing journal entries.
- The Energy Procurement group is National Grid's Front Office. National Grid has a designated Middle Office group under US Treasury, and Back Office responsibilities are housed within the Finance Function, fully independent of the Middle Office group.⁵⁸

⁵⁷ IR 89, IR 212

⁵⁸ DR 268, DR 354



- National Grid has extensive written policies and procedures that address the roles and responsibilities of the Middle and Back office groups. All natural gas transactions – physical and financial, AMAs, capacity releases, OSS and WSS – are recorded in Allegro and are verified and confirmed electronically through the Allegro system. Review of a sample of transactions and observation showed compliance with the policies and procedures for both Middle Office and Back Office activities.⁵⁹
- Policies and procedures also cover deal approvals, levels of authority, code of conduct and mandatory vacation.⁶⁰

16. National Grid procures gas supply specifically for each NY gas utility and does not allocate gas supply or delivery costs between affiliated entities; assignment of contracts between DNY entities is done without bias.

- All gas procurement transactions executed by Energy Procurement are made on behalf of a specific operating company – the legal entity that can enter into contractual relationship.⁶¹
- When the traders purchase supply or financial hedges, they do so as agents for one of KEDLI, KEDNY or NMPC. Transactions are entered into Allegro by utility and the costs are recorded on that utility's financial books.⁶²
- Purchases for NMPC supply are identified as such throughout the purchasing transaction.
- Because the downstate utilities share receipt points both upstream and at the city gate, traders are authorized to determine which of KEDLI or KEDNY will be the purchaser of record for a given transaction after the purchase has been made.
- Review of physical transaction records did not identify any bias in prices for gas purchases between the two DNY utilities.⁶³ Purchases made on the same day for KEDLI and KEDNY were typically executed within a few minutes of each other, and prices within one or two cents, with no bias as to which utility was assigned the (slightly) higher priced gas.
- KEDLI and KEDNY each hold separate contracts for storage capacity with the same storage facilities. Although there are separate contracts, the weighted average cost of gas in storage is the same.⁶⁴

⁵⁹ DR 227, DR 282

⁶⁰ DR 35, DR 226, DR 348

⁶¹ DR 33, Gas Procurement Interviews

⁶² DR 227, IR 155, IR 89

⁶³ DR 227

⁶⁴ DR 36, Fact Verification review



- While the role of storage gas in the two utilities' portfolio is similar, the actual use of storage gas differs because of, for example, differences in customer load factors and system-specific operating factors.

17. Recent trends in non-gas operating expenses of the Energy Procurement group do not reflect reasonable application of allocation procedures, with NY gas utilities bearing a greater burden of costs than would expected.

- Under National Grid's allocation procedures, expenses are to be directly assigned to the entity for which the work is performed, if that can be specified. For the Energy Procurement group, costs that cannot be directly assigned are to be allocated among the benefiting utilities based on customer count. Thus, an employee who works on behalf of multiple gas companies is allocated to those gas companies, while an employee who works for just one gas company (e.g., NMPC gas) would be charged directly to that company.⁶⁵
- The NY Gas utilities comprise approximately 30 percent of National Grid's US customers, but are paying 40 percent of the Energy Procurement group's non-gas costs (see **Exhibit IX-12**).⁶⁶ While some deviation from the allocation cost basis can be expected, absent a compelling reason for significant differences, charges to the NY Gas utilities would be expected to be reasonably close to 30 percent.

Exhibit IX-12
Non-Gas Energy Procurement Group Costs
Charged to NY Gas Utilities
(dollars in thousands)

	FY2009	FY2010	FY2011	FY2012	FY2013
All Non-Gas Costs from Energy Procurement Group					
Total	\$ 7,585.4	\$ 7,586.8	\$ 6,479.0	\$ 5,937.3	\$ 6,415.4
To NY Gas	2,005.9	1,990.4	1,461.0	2,181.7	2,552.2
Percent to NY Gas	26.4	26.2	22.6	36.7	39.8
Energy Procurement Labor Costs					
Total	\$ 4,554.9	\$ 4,046.5	\$ 3,946.8	\$ 4,170.2	\$ 4,327.3
To NY Gas	1,413.9	1,475.2	1,443.4	1,896.0	2,277.0
Percent to NY Gas	31.0	36.5	36.6	45.5	52.6

Source: DR 583

- Over the past two years, non-gas expenses (labor and other non-gas costs) charged to the NY gas utilities by the Energy Procurement group increased by \$1.1M or 60 percent while the group's total costs remained flat.
 - From 2011 to 2012 total non-gas Energy Procurement costs declined by \$540,000, but charges to NY Gas increased by \$720,000.
 - From 2012 to 2013, Energy Procurement costs increased by \$478,000, to approximately the same level as in 2011. Total charges to the NY gas companies increased \$370,000, or 77 percent of the group's additional charges.

⁶⁵ DR 583, DR 5

⁶⁶ DR 12, DR 583



- Labor charges from Energy Procurement to the NY gas utilities have increased by \$830,000 since FY2011 and for FY2013 the NY gas utilities were charged for more than 50 percent of all Energy Procurement labor costs.

18. National Grid does not have metrics that assess the performance of the Energy Procurement group in managing the gas supply portfolio.

- The only metric related to natural gas procurement that is used by National Grid is the Net Margin from Off-System Sales and Capacity Releases (OSS Net Margin).
 - This metric is a KPI in the initial NMPC SLA, although no target is specified.⁶⁷
 - Performance monitoring reports include a target for each of UNY and DNY.⁶⁸
 - The 2013 SLAs include a target metric for the OSS Net Margin.⁶⁹
- OSS Net Margin does not provide a measure of how well the group has managed the capacity and supply portfolios for core sales customers. Instead, the revenues received from optimization activities are as much dependent on the overall market for the assets (value, supply and demand) as the effectiveness of the group in marketing the assets when they are not needed by customers. Over the past six years, revenues credited to ratepayers from the various optimization activities have ranged from a low of \$26.3M in GY2008 to a high of \$256M in GY2012 (see **Exhibit IX-1**, above).⁷⁰
- National Grid acknowledged a lack of performance measurements for the Energy Procurement group. The basic performance criteria was that there was sufficient gas delivered to the city gate, and that there were few situations requiring intra-day purchases or other supply adjustments.⁷¹
- The Energy Procurement group reported that it had tried to compare the price of its purchases at different locations with the reported “market” prices at those locations. The National Grid purchases were found to be very close to the reported market price. Since National Grid’s transactions are included in setting the “market” price, and that for many of the delivery points there are few transactions, this result is not surprising.⁷²
- While the performance of the hedging portfolio is monitored on a regular basis and progress towards the hedge volumes is tracked, none of these measures are reported to functional or jurisdictional management.⁷³
- While Energy Procurement indicated it had not explored other possible performance assessment tools for gas procurement, the most recent SLA includes a KPI for

⁶⁷ DR 7

⁶⁸ DR 56

⁶⁹ DR 146

⁷⁰ DR 582

⁷¹ Gas interviews

⁷² Gas interviews

⁷³ DR 270



“Electric Residential Commodity Volatility”, and the Performance scorecards include a place for “Electric Residential Commodity Rate” as a KPI.⁷⁴ Further, the presentation on the 2013-14 Winter Overview to the PSC included comparison of the volatility of the NY Gas portfolios to the volatility on NYMEX.⁷⁵

D. RECOMMENDATIONS

1. Modify policies and procedures regarding the documentation and approval for the procurement of long-term supply and delivery commitments (longer than one year). Modifications should address:
 - Require all requests for approval of long-term supply and delivery commitments to have a summary memorandum that identifies options considered, summarizes the required analyses performed and the results of such analyses for both supply reliability and financial considerations, and clearly identifies the recommended decision. The memorandum should have attachments that document the information contained in the summary.
 - Require the EPRMC (or its equivalent) to meet monthly to review activities and results from financial and physical gas transactions and optimization activities, relative to plan and benchmarks/targets. Additionally the monthly meeting should review market trends and other factors influencing gas prices and reliability, both near and longer-term.
 - The EPRMC should include a senior representative from Energy Procurement and a representative with knowledge of National Grid’s NY gas distribution systems to provide operational and gas market expertise.
 - All documentation regarding long-term contracting decisions should be retained in a central (electronic) location for a period of three to five years.
2. As part of the annual gas supply plan submitted to the PSC, or in a separate filing, specifically document the five-year supply/demand balance. For capacity contracts that are up for renewal during the five-year planning horizon, provide a discussion of the current expectations regarding those plans. If the long-term supply portfolio review, including contracts not expected to be renewed, shows the need for new capacity to meet design day requirements, provide information on options being explored. Update information provided in previous plans regarding new capacity and capacity renewals.
3. Add a representative from the Energy Procurement group to the NY Leadership Team as a regular full participant.
4. Modify policies and procedures covering the monthly and daily procurement forecasting and “set up” processes for each of the operating companies. The policy and procedure document should:

⁷⁴ DR 56, DR 146 Supplement

⁷⁵ DR 36



- Include the actual processes used by Gas Control to generate the monthly and daily send-out forecasts (as discussed in Chapter VIII, Load Forecasting).
 - Provide for consistency in the spreadsheets and presentation format from company to company, while recognizing the differences in the delivery portfolio and system operations. The spreadsheets should clearly identify annual supply arrangements, monthly and seasonal contracts, storage injections and withdrawals, anticipated use of LNG and other supplies, and the volumes of gas to be procured in the daily gas market.
 - The parameters, objectives and guidelines for the daily set up, such that a substitute trader or new manager would understand the criteria under which expected purchases are identified (the morning set up) and within which traders exercise judgment on sources of gas supply.
 - The parameters, objectives and guidelines for the monthly set up, such that a substitute planner or new manager would understand the criteria under which monthly gas supply is planned. Include the contributing elements such as storage plans, must take contracts, the impact of third party supply etc.
 - A requirement that both the load forecast and the morning set up sheets be retained in their morning state for comparison and analysis purposes for a period of three years.
 - Include some trigger points, such as significant intraday increase in prices when National Grid had to execute intraday purchase, where screen shots would be required to document the changes in the market.
 - Provide for quarterly review of morning forecasts compared to actual send out for a representative sample of days during the quarter. The review should assess the variance in loads and determine the impact of weather. Non-weather forecast variances of significance should be reviewed to determine contributing factors and whether there is a need for any adjustments to the morning forecasting processes.
 - Similarly, provide for quarterly review of morning set up plans compared to actual purchases for a sample of days during the quarter. The review should differentiate between the sources of variance in volumes, use of storage and delivery pipelines caused by weather, market conditions, operational constraints or other factors. Variances should be reviewed for patterns and opportunities to improve the morning set-up process
5. Develop a gas supply performance review process, including a monthly metrics scorecard and associated reporting that assesses the overall performance of the Energy Procurement group in managing the gas supply portfolio.
- At a minimum, the metrics scorecard should include:
 - The OSS Net Margin metric included in the 2013 SLAs.



- A measure of the volatility of delivered natural gas prices relative to the overall volatility in the natural gas market in general. National Grid is already preparing this information for the EPRMC. Targets can be set to achieve volatility of x percent less than market, and then raise the bar as the target is achieved.
 - Measures of the effectiveness of the trading/procurement function in terms of cost/price compared to a benchmark or comparison group. Options include:
 - A comparison of the delivery price to other gas utilities in the Northeast. There are a large number of other gas utilities, and while each have their “unique” features, the delivered price for KEDLI, KEDNY and NMPC compared to other Northeast gas utilities would provide at least minimum comparison.
 - Comparison of actual delivered cost of gas (COG) with a “theoretical” COG developed using futures prices as of a particular date and a system modeling tool, such as SENDOUT, run without optimization credits.
 - Any other metrics/performance data currently reported to the EPRMC or developed by National Grid.
 - All scorecard metrics should be provided to Energy Procurement management on a monthly basis and used to improve performance, included as part of the routine EPRMC review packets, reported to the SVP and Chief Customer Officer at least quarterly, and provided to the DPS as part of the annual gas supply filing.
 - The price comparison metric should be included in the monthly scorecards reviewed by the NY Jurisdictional President.
 - National Grid should investigate the performance management methods/scorecards used by other utilities or the AGA to identify other potential scorecard metrics and industry best practices.
6. Conduct a thorough investigation of the allocation and assignment of costs, particularly labor costs, from Energy Procurement to the NY gas utilities to identify the reasons for the NY Gas utilities receiving an apparent disproportionate share of costs. Verify that costs charged to the NY gas utilities by other parts of the Customer functional areas, including the Analytics Modeling and Forecasting group that prepares the forecasts used for gas supply planning and procurement, are appropriate and supportable. Modify cost assignments, time reporting and allocation procedures to resolve any identified inconsistencies. Document the results of the investigation and resulting recommendations to the PSC within six months.



X. CUSTOMER INFORMATION SYSTEMS (ELEMENT 9)

This Chapter provides the results of NorthStar's review of the customer information systems (CIS) of KEDLI, KEDNY and NMPC.

A. BACKGROUND

At the initiation of the audit, each of National Grid's New York operating companies had separate customer information and billing systems, each performing the same general functions.

- Customer Service System (CSS) is used by NMPC electric and gas customers. National Grid also uses CSS in Rhode Island and Massachusetts. CSS was implemented in 1999.
- Customer Related Information System (CRIS) is used by KEDNY gas customers. CRIS was implemented in 1990.
- Customer Accounting System (CAS) was used by KEDLI gas customers until December 2013. CAS was developed in 1975 and also served as the CIS for the LIPA electric customers under the Master Services Agreement between National Grid and LIPA.

Prior to December 2013, National Grid maintained the LIPA electric accounts and KEDLI gas accounts in CAS. With the transition of the LIPA contract from National Grid to PSEG-LI, KEDLI customer accounts were moved out of CAS and into CSS. The CAS system and associated electric accounts were turned over to PSEG-LI. CAS is an older system, made up of a 1970's-era IBM® mainframe and software written in COBOL and PL1. The system was designed and built in-house. The user interface is run under IBM® Customer Information Control System (CICS®) along with some web-based functions added for bill presentation.¹

LIPA Conversion

In 2011, LIPA notified National Grid that it would be terminating its contract with National Grid for the oversight, management and operation of its electric system. This necessitated the removal of KEDLI accounts from CAS in order to provide LIPA with a stand-alone system. As part of its longer-term strategy to transition to one CIS, National Grid began the process of migrating the KEDLI customers to its newest system, CSS.²

In November 2012, the National Grid US Sanctioning Committee approved \$25.952 M +/- 10 percent for the development work associated with the conversion of the KEDLI CAS

¹ DR 15 and IR 170

² IR 27

customers to CSS.³ In early 2012, the Sanctioning Committee had approved initial research and development activities related to the migration. The conversion was expected to provide the following benefits:⁴

- Enhanced features and functionality (i.e. web access, billing presentment and self-service).
- Lower information systems and business operating costs associated with application support and the integration of customer inquiry and collections activities. National Grid estimated information system support cost savings of \$350k annually.
- Integrated call centers for back-up and emergencies.
- More efficient implementation of regulatory and business requirements.
- Improved service levels.

The conversion involved all necessary stakeholders and technology resources, executive management and used a structured process addressing:

- Business requirements⁵
- Testing requirements including product, regression, life cycle, user acceptance and dress rehearsals⁶
- Migration audit plans⁷
- Project governance⁸
- Conversion costs and benefits⁹
- Business readiness scorecards for each business area¹⁰
- IT resources and retention/contingency plans¹¹
- Communication plans¹²
- Call center training and transition plans.¹³

The conversion was successfully completed in December 2013.¹⁴ As with any major IT project, a number of challenges presented themselves both during the development and testing process as well as the actual “go live” process. These were addressed and provide lessons learned for future conversions.

³ US Sanctioning Paper (DR 137, Attachment 4)

⁴ US Sanctioning Paper (DR 137, Attachment 4)

⁵ DR 166

⁶ DR 166 and 435

⁷ DR 166

⁸ DR 166

⁹ DR 167

¹⁰ DR 435

¹¹ DR 436

¹² DR 172 and 330

¹³ DR 173 and 331, IR 30 and 44

¹⁴ IR 27, 40, 156, 170, 171 and 186

B. EVALUATIVE CRITERIA

- Do National Grid's customer information and billing systems adequately support National Grid's technical business needs and processes?
- Are system interfaces appropriate?
- Do National Grid's customer information and billing systems facilitate compliance with state laws and regulations?
- Do the customer information and billing systems provide accurate and timely information to allow customer service representatives to address customer inquiries? Is the information available to the customer service representatives adequate?
- Do National Grid's customer information and billing systems adequately support achievement of customer service goals?
- Are there opportunities to integrate systems throughout the National Grid New York gas operations to increase efficiency and effectiveness?
- Are the existing customer information and billing systems effective in minimizing redundant or manual processes?

C. FINDINGS AND CONCLUSIONS

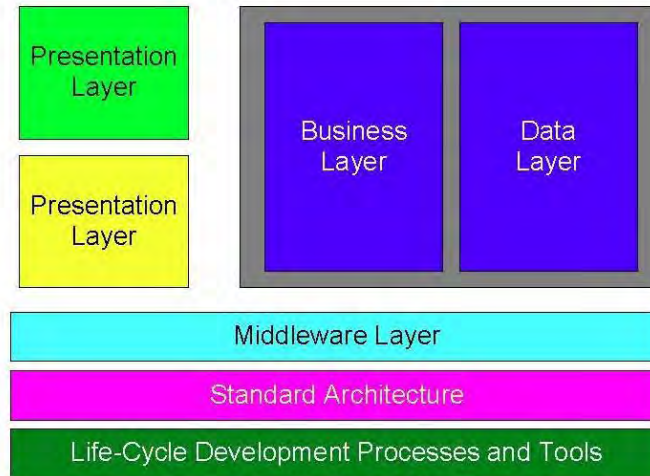
1. **Although both systems support National Grid's business needs, CSS is newer and more efficient than CRIS.**

- CRIS and CSS are both client/server-based systems. Client server applications are still the standard for application interfaces. While most current applications have abandoned legacy languages like COBOL, for newer C++, Microsoft® .NET and C#, once the application is compiled it is just as efficient for execution. Customers and users do not see the underpinnings of the application.
- Both systems (CSS and CRIS) have overall system availability of over 99 percent for the period of July 2009 through February 2014.¹⁵
- CRIS is a 24 year old system; CSS was implemented 15 years ago. Unlike CAS and CRIS, CSS is structured, scalable, open, and has a standard development methodology and tools. It also provides a flexible configuration environment. Additionally, the core CSS system is significantly more complete than either CRIS or CAS. **Exhibit XI-1** provides an overview of the system architecture, which demonstrates its 1990s state-of-the-art design with flexible open architecture.
- Each of the systems maintains customer information, and is used by customer service representatives (CSRs) to respond to customer inquiries. The systems accept meter reads, calculate and produce customer bills, and accept bill payments. The systems also process customer requests for service, and interface with work management

¹⁵ DR 600

systems to ensure that the work is completed. They process payment plans, handle collections work, and provide a number of applications for customer use.¹⁶

Exhibit XI-1
SS C/I System Architecture



Source: DR 15.

- CSS was initially implemented as the system of record for NMPC's approximately 1.7M customers.¹⁷ CSS uses Microsoft® Windows-based workstations as presentation clients, a Transmission Control Protocol/Internet Protocol (TCP/IP)-based network to pass information from the middleware, business logic and database servers to the clients (see **Exhibit X-1**).¹⁸ The core CSS system provides the following services: orders/customer services, billing engine, and finance system. CSS interfaces with numerous other systems in the areas of billing, finance, order processing, and the website. These include other internal systems, data inputs/data transfer, interfaces with third-parties or outside agencies and reporting.¹⁹
- CRIS is designed as a client/server system using a database with code-driven tables to facilitate updates. CRIS uses event-driven processing, which allows for real-time updates for cancel and re-bill, payment processing and wrap-up sessions. CRIS is a gas-only system. CRIS also has numerous internal and external interfaces.²⁰
- CSS is easier to navigate than CRIS. CSS uses drop-down menus and is more user-friendly. CSS also has quick pick buttons located at the bottom of the screen for frequently used functions.²¹ A front-end, referred to as Agent Desktop, was added to

¹⁶ DR 15

¹⁷ DR 465

¹⁸ DR 15. TCP/IP is a set of networking protocols that allows two or more computers to communicate

¹⁹ DR 15

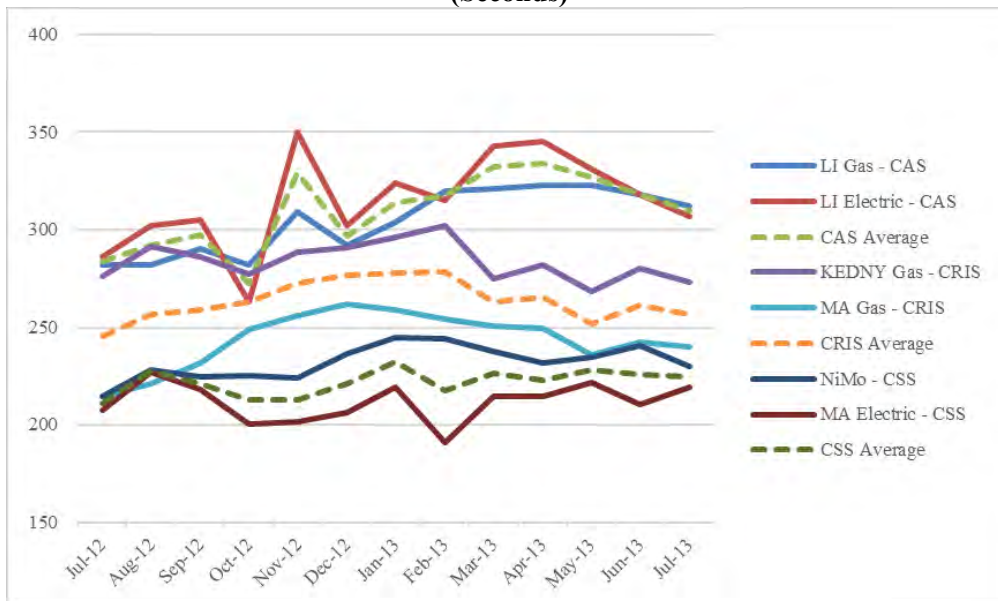
²⁰ DR 15

²¹ CSS demo and CSR side-by-side (IR 36 and 37)

CRIS to improve the user interface; however, CRIS CSRs are still required to remember a number of conversation codes and other information. As a result, training times are longer for CRIS than CSS.²²

- National Grid reports that the CRIS system tends to go down more frequently, and for longer durations, than CSS.²³
- According to National Grid, the average handle time (AHT) – the length of time it takes a New York CSR to handle a customer phone call - is about 60 seconds longer with CRIS than CSS. New England also uses both systems and has had the same experience.²⁴ **Exhibit XI-2** provides an AHT comparison. CAS handle times were even greater than CRIS or CSS.

Exhibit XI-2
AHT Comparison
(Seconds)



Source: DR 159 and 332.

- NorthStar's observations confirm that CSS is more user friendly and faster to navigate.²⁵ NorthStar observed a minor lag time when using CRIS and Agent Desktop.²⁶

²² IR 44 and NorthStar direct observation (CRIS and CSS demos and CSR side-by-sides (IR 34, 35, 36 and 37))

²³ IR 44

²⁴ IR 44

²⁵ CRIS and CSS demos and CSR side-by-sides (IR 34, 35, 36 and 37)

²⁶ CRIS demo and CSR side-by-side (IR 34 and 35)

2. Both of National Grid Gas' current customer information and billing systems facilitate compliance with state laws and regulations.

- New York utility operations are governed by Section 16 of the New York Codes, Rules and Regulations (NYCRR). Part 11 of Section 16, also known as the Home Energy Fair Practices Act (HEFPA), was enacted in 1981 to provide residential customers protection in the areas of services, billing and payment procedures. (Part 13 establishes rules governing the provision of service to nonresidential customers which are similar, but not identical, to the residential rules in HEFPA). HEFPA sets forth specific utility requirements governing the provision of service, including:
 - Application for residential service, including requirements for written applications, denials of service, and timelines for initiation of service.
 - Deposits, late payment and other charges, and deferred payment arrangements.
 - Meter reading and billing, including estimated bills, back billing and budget billing.
 - Bill content and notification requirements.
 - Termination, disconnection and suspension of service, including cold weather provisions.
 - Procedures for cases involving medical emergencies, elderly, blind, disabled, financial hardship and heat-related customers.
 - Service to two-family and multiple dwellings.²⁷
 - Utilities are also subject to a number of other state and federal regulations including the Fair Debt Collection Practices Act, bankruptcy laws, and the Fair and Accurate Credit Transaction Act (FACTA).
- NorthStar's review of CSS and CRIS evidenced coding implemented to assure compliance with various State and Federal requirements.²⁸ Examples include:
 - Enhancements established in 2009 to address requirements under FACTA.²⁹ Features in both systems included upgrades allowing applicants to be positively identified by providing name and social security number or by previous address and date of birth or driver's license number.
 - Credit Alert windows in CRIS identify non-active accounts with a remaining balance for that customer. Accounts that are in bankruptcy, direct voucher, guaranteed payment or any accounts beyond the collections statute of limitations are not visible to prevent unauthorized collections activity.
 - Passwords must be re-entered to change rates.
 - The systems maintain different customer "types" consistent with state requirements. New York has three types of accounts: new applicant, applicant and continuation of service customers. In the New England region there are two types: new applicant and applicant, as there is no Continuation of Service rule in New England.

²⁷ Section 16 of the New York Codes, Rules and Regulations

²⁸ CRIS and CSS demos and CSR side-by-sides (IR 34, 35, 36 and 37) and DR 160

²⁹ FACTA contains provisions to help reduce identity theft.

- The systems reflect the differing state requirements allowing denial of service (e.g., premise conditions, unpaid bills). New York-required denial of service letters are system generated.
 - Medical certification is coded in the customer's account.
 - Other state differences (e.g., allowed payment arrangements) are handled through training or differing procedures.³⁰
- 3. CSS and CRIS provide adequate, accurate and timely information to allow customer service representatives to address customer inquiries.³¹**
- CRIS and CSS provide the CSRs with visibility into the status of field orders.
 - Most letters can be generated and emailed or faxed directly from CRIS and CSS.
 - CSS contains scans of customer applications, correspondence and proof of identity. CRIS does not contain scanned documents.
 - Equifax software runs automatically when the CSR inputs a new customer's social security number. If the software is unable to verify the customer's identity an alert notifies the CSR that additional documentation is required.
 - CRIS maintains 12 months of billing history and Agent Desktop provides CSRs with a side-by-side comparison of two bills which is useful in addressing high bill complaints or meter reading questions. CSRs can also perform yearly comparisons showing information for the same billing period for the current bill and prior three years. CSRs can see an exact image of the bill in CSS.
 - If CSRs input or select an order date, CRIS and CSS will display available times. The systems do not automatically generate next appointment availability.
 - Account Alerts in Agent Desktop provide CSRs with notices, collections activity and other information. Procedures and talking points are also available through Agent Desktop.
 - Controls built into CSS alert the CSR if they try to input a payment promise amount that does not cover the full past-due balance.
 - Various screens provide access to customer, premise and meter information, payment history, credit and collections status, billing information, account activity, service orders, field visits, and notes.

³⁰ DR 160

³¹ DR 158 and 160, CRIS and CSS demos and CSR side-by-sides (IR 34, 35, 36 and 37)

4. Both of National Grid Gas’ customer information and billing systems adequately support achievement of customer service goals.

- **Exhibit XI-3** provides a comparison of internal targets and actual call center performance for the three-year period January 2011 through December 2013.

**Exhibit XI-3
Call Center Performance – January 2011 through December 2013**

Call Center Metric	NMPC (CSS)	KEDNY (CRIS)	KEDLI (CAS)
Average Handle Time (sec)			
Min	208	269	276
Max	258	308	364
3-Year Straight Average	231	288	298
Internal Target	280	315	330
Average Speed of Answer (sec)			
Min	12	33	102
Max	48	253	490
3-Year Straight Average	26	96	186
Internal Target	No internal target	No internal target	No internal target
First Call Resolution (percent of calls)			
Min	76.4	73.2	62.1
Max	87.2	87.0	82.5
3-Year Straight Average	79.9	80.2	73.8
Internal Target	79.0	79.0	79.0
Customer Satisfaction CSR (percent satisfied)			
Min	77.1	74.8	56.3
Max	88.7	91.0	88.5
3-Year Straight Average	84.3	83.4	72.2
Internal Target (Overall target, not CSR specific)	79.9	83.4	69.6

Source: DR 599.

- Over the three year period, National Grid met or exceeded internal targets.

5. National Grid Gas currently plans to integrate the CRIS and CSS systems throughout its US operations to increase efficiency and effectiveness.

- National Grid currently has over 80 applications that contain customer data; 25 of which update and/or delete customer-related data.³² Some of these could be eliminated with conversion to a new CIS.
- The existence of multiple CIS systems adds many complexities to National Grid’s operations including:
 - Increased costs for multiple hardware and software platforms.
 - Duplication of resources to provide the training for different systems.
 - Excess manpower to provide maintenance, feature enhancements and upgrades for multiple systems.

³² DR 137, Attachment 3

- Complexity in providing for disaster recovery.
- Inability to move manpower between various locations as needed.
- In 2007, National Grid conducted an assessment of CIS consolidation options, and developed a plan for a phased conversion of all National Grid Gas customers to the newest of its systems – CSS. CSS was considered to be the most economic and lowest risk option at that time.³³ The initial plan called for the conversion of the Rhode Island customers, followed by the serial conversion of the Long Island customers (KEDLI and LIPA) and then KEDNY.³⁴
- The consolidation plan was revisited in 2009 and 2012 and the migration of all US customers to CSS remained the preferred option.³⁵
 - CSS was considered to be the most stable of the current customer applications, with viable internal and external IT support resources.
 - CSS was sufficiently scalable to address the current and projected future customer base.
 - Migration costs were lower than for other systems.
 - CSS was able to support SMART metering pilots.³⁶
- As of December 2013, National Grid had successfully completed three conversions: New England electric customers in January 2008 (approximately 1.8M customers), Rhode Island Gas customers in early 2012 (270k customers) and the KEDLI conversion in December 2013 (569k customers).³⁷ All three conversions were at a lower cost per meter than the average of a benchmark panel of 36 CIS conversions performed by Five Point Partners in 2012. The panel average total cost per meter was \$62 in 2011 and \$63 in 2012. National Grid Rhode Island conversion cost was just under \$60 per meter; the KEDLI CAS conversion was about \$45 per meter. The New England Electric cost in 2008 was just over \$30 per meter.³⁸
- In September 2013, the National Grid US Sanctioning Committee approved \$12.0 M +/- 10 percent for the requirements and design activities associated with the migration of the Massachusetts and New York gas customers from CRIS to CSS. The total projected investment is estimated at \$36.0M +/- 25 percent, with a completion date of March 2016.³⁹ The project was scheduled to start on September 2013, but was delayed until completion of the CAS conversion.⁴⁰ Alternatives considered were conversion of CRIS to SAP, upgrading CRIS, or deferring the project. Benefits and justification for the conversion include:

³³ DR 137, Attachment 1

³⁴ DR 137. As a result of the transition of the LIPA contract from National Grid to PSE&G, LIPA customers remained on CAS and were not converted to CSS.

³⁵ DR 137

³⁶ 2009 US Systems Strategy and Routemap (DR 137, Attachment 2)

³⁷ DR 137, IR 27, 156, 159, 170, 171, 186 and Fact Verification

³⁸ DR 137, Attachment 69

³⁹ CRIS Migration U.S. Sanctioning Paper (DR 167)

⁴⁰ CRIS Migration U.S. Sanctioning Paper (DR 167) and IR 186

- Ability to leverage existing team and resources already in place.
 - Integration of all call centers for back-up and emergencies.
 - Consistency of customer experience associated with a single system.
 - More efficient implementation of regulatory and business requirements. CSS offers all retail billing choice options and has the regulatory build out for all jurisdictions. The vast majority of downstate differences were already captured by the CAS conversion.
 - Potentially reduced risk and cost upon conversion to the next generation billing system.
 - Enhanced self-service, website experience and bill presentment.
 - Lower vendor license fees, support and other information systems costs.
 - Lower business operating costs.
 - Improved reporting and analytics.
 - Lower conversion cost per customer resulting from the simultaneous conversion of both New York and Massachusetts customers.⁴¹
- National Grid Gas identified a number of lessons learned through its New England, Rhode Island and KEDLI conversions that can be applied to improve the upcoming CRIS migration process, including: improved governance processes adopted during the CAS conversion; past conversion process lessons learned; and, the use of the same key technical, management and business process owner resources as the recent CAS conversion.⁴²
 - The project was kicked off on February 26, 2014, with a presentation to the Presidents of the New York and Massachusetts jurisdictions.⁴³
- 6. The use of two customer information and billing systems results in duplicative processes and work activities as regulatory and business requirement changes must be made to each system. Conversion to a single system will not address all inefficiencies or operating differences.**
- Differing business, regulatory or program requirements may result in differing, and potentially duplicative interfaces systems. As an example:⁴⁴
 - Currently National Grid NY maintains two retail marketing transportation and balancing systems: Transportation Services Application (TSA) which is used by NMPC and which interfaces with CSS; and a combination of a MicroStrategy/Wipro data warehouse and a spreadsheet model which is used by KEDNY and KEDLI. These programs are used to determine the amount of capacity to release to marketers and the volumes of gas the marketers must deliver.
 - The ESCO programs are different in many respects between UNY and DNY. Due to the differing program requirements, when KEDLI customer were moved

⁴¹ DR 137, Attachment 5, CRIS Migration U.S. Sanctioning Paper (DR 167) and DR 465

⁴² DR 464

⁴³ DR 465

⁴⁴ IR 232

onto CSS a new interface was developed between CSS and the data warehouse/spreadsheet, rather than building an interface to the more efficient TSA application.

- National Grid is currently developing a new system to be used by KEDLI and KEDNY (called GTIS) which will replace the data warehouse and spreadsheet models. Following development of GTIS, National Grid will still maintain GTIS and TSA.
- According to National Grid, due to the regulatory differences in the UNY and DNY ESCO programs, modifying GTIS to handle NPMC is not feasible. As a result, two retail marketing transportation and balancing systems will be required even after all National Grid NY customers are moved onto CSS.

7. While CSS meets National Grid Gas' current business needs, it does not represent a long-term solution. National Grid US is currently exploring options for a long-term solution.

- CSS is nearing the end of its useful life.⁴⁵ As a result, National Grid will likely begin to experience maintenance and support challenges as CSS-skilled resources retire and/or are re-deployed.
 - Accenture ceased development and support of CSS in the late 1990s.
 - The program is COBOL, C and DB2 based, while current CISs are usually built using Oracle[®] or Microsoft[®] SQL databases, development environments such as Microsoft .NET, C++ and Web technologies like C#, Java[®] and Adobe Flash.
 - Additionally a number of other utilities have migrated away from CSS.⁴⁶
- Longer-term, National Grid plans to transition to a new CIS, but has not yet selected a platform.⁴⁷ One option under consideration is to convert the CIS to SAP within the next ten years.⁴⁸

D. RECOMMENDATIONS

None.

⁴⁵ DR 137, Attachment 3

⁴⁶ US Customer Systems Strategy 2012 Review (DR 137, Attachment 3)

⁴⁷ IR 170

⁴⁸ DR 137, Attachment 3

XI. PERFORMANCE MANAGEMENT (ELEMENT 8)

This Chapter provides the results of NorthStar’s review of National Grid’s performance management systems and processes for its New York gas operations and the links to the broader NGUSA and NG-plc performance management processes.

A. BACKGROUND

Performance management is an ongoing process that consists of planning, measurement, review, feedback and corrective action. Key elements of performance management include monitoring and metrics (often termed “Key Performance Indicators” or KPIs), reporting and communication, and the design and implementation of an appropriate employee review process which links employee objectives and performance targets to achievement of overall corporate goals and objectives.

Performance measures should be meaningful and linked to an organization’s mission, objectives, and strategic/operational plans as part of a comprehensive performance management process. They should provide early warning of potential issues and be used to initiate corrective action. Another important aspect of performance management is the linkage between results and compensation. Targets for compensation must be realistic and attainable and they must be in alignment with a corporation’s real challenges and objectives. Management personnel should have a clear understanding of how corporate objectives and KPIs relate to their compensation.

Performance measures can be classified as leading or lagging. Lagging indicators measure the outcomes that have resulted from past actions. Leading indicators provide information about the current situation that may affect future performance. Used properly, leading indicators help an organization identify changing circumstances and take proactive steps to achieve desired outcomes or avoid unwanted outcomes.

National Grid Performance Management

National Grid US refers to its performance management process as its Line of Sight program. The intent of the Line of Sight program is to cascade corporate goals and objectives from the corporate vision, strategy and values throughout the organization, to provide a “line of sight” from the employee to the corporate objectives. NG-plc’s vision serves as the starting point for the performance management process. The strategy and core values are also set at the NG-plc level. Annual priorities are established for NGUSA and National Grid UK, which conceptually tie to the NG-plc values, strategy and mission. Each state within the US develops ambitions, goals and objectives linked to the US priorities. For FY14, the three NY operating companies also developed business objectives. NMPC developed business objectives for FY13; however, KEDLI and KEDNY did not. **Exhibit X1-1** provides an overview of the Line of Sight concept.



Exhibit XI-1
Line of Sight Overview – FY14



Source: DR 98.

For FY14, NGUSA Annual Priorities were:

- Drive our focus and behaviors to prevent injuries and safeguard the public.
- Redefine the customer experience through end-to-end process excellence and delivery of our work plan on-time and on-budget.
- Build upon USFP to effectively run the business.
- Embed into our business practices and systems a regulatory focus and rate case readiness.
- Engage with and volunteer in our communities.
- Accelerate future growth by meeting customer expectations.





In late 2012, as a construct for employee communication and to further the Line of Sight concept, NGUSA introduced the “Elevate 2015” framework. Elevate 2015 focuses on four ambitions: Safety and Reliability, Stewardship, Customer Responsiveness and Cost Competitiveness.¹ The intent of the program was to drive performance in these areas over the next three years. NGUSA considers Elevate 2015 to be supportive of the Line of Sight

¹ Prior to FY13, performance reports included financial metrics and metrics/initiatives reported at the functional level – Operations, Network Strategy, Shared Services, Customer, IS and People Strategy. Some elements of Elevate 2015 were present such as customer satisfaction and Alva scores. (DR 99, Attachment 7)



program and inclusive of the US Annual Priorities. Elevate 2015 serves as the foundation for NGUSA's performance reporting.² It is also considered in NGUSA's performance improvement processes. **Exhibit XI-2** provides the Elevate 2015 framework with the FY14 Annual US priorities. FY13 priorities were similar.

Exhibit XI-2
Elevate 2015 Framework

	 Safety and reliability	 Customer responsiveness	 Stewardship	 Cost competitiveness
Ambitions	Our customers trust everyone at National Grid to provide safe and reliable service everyday	Our customers depend on us to anticipate and provide timely response to their needs	Our communities welcome our partnership and recognize us as a responsible leader	Our customers experience the value of our services as we drive and demonstrate efficiencies
Metrics	<ul style="list-style-type: none">Regulatory reliability goalsLTIs / RTCs	<ul style="list-style-type: none">Customer surveysJD Power	<ul style="list-style-type: none">ALVA scoresJD Power corporate citizenship	<ul style="list-style-type: none">Controllable cost target
Line of Sight Annual Priorities	<ul style="list-style-type: none">Drive our focus and behaviors to prevent injuries and safeguard the publicRedefine the customer experience through end to end process excellence and delivery of our work plan on time and on budgetBuild upon USFP to effectively run the businessEmbed into our business practices and systems a regulatory focus and rate case readinessEngage with and volunteer in our communitiesAccelerate future growth by meeting customer expectations			
Empower employees with the tools and support they need				

Source: DR 98.



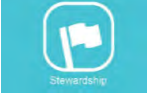

Performance metrics were developed for each of the four ambitions and are shown in **Exhibit XI-3**. As discussed later in this Chapter, most of these are tracked at the US level. The Elevate 2015 metrics were introduced in FY13; however, the framework was not fully implemented until FY14.³ Each of the broader metrics shown in **Exhibit XI-2** actually comprise a number of sub-metrics as shown in **Exhibit XI-3**.

² DR 135

³ DR 169 and 208



**Exhibit XI-3
Elevate 2015 FY13 Goals**

Category	Ambition	Elevate 2015 Metric	Sub-Metrics
Safety and Reliability 	Our customers trust everyone at National Grid to provide safe and reliable service everyday	<ul style="list-style-type: none"> Regulatory Reliability Goals 	14 reliability sub-metrics in FY13 <ul style="list-style-type: none"> SAIFI and CAIDI Upstate (2 metrics) Gas Leak Backlog by OpCo (3 metrics) Gas Emergency Response Time by OpCo (3 metrics each representing various response times-9 total)
		<ul style="list-style-type: none"> Lost Time Incidents (LTI) 	<ul style="list-style-type: none"> LTI OSHA Recordables
		<ul style="list-style-type: none"> Road Traffic Collisions (RTC) 	<ul style="list-style-type: none"> RTCs
Customer Responsiveness 	Our customers depend on us to anticipate and provide timely response to their needs	<ul style="list-style-type: none"> Customer Surveys 	<ul style="list-style-type: none"> Contactor Survey Satisfaction Website Customer Satisfaction Gas Conversion Process Satisfaction Electric Order Fulfillment Satisfaction Distributed Generation (DG) On-time Interconnects
		<ul style="list-style-type: none"> JD Power Customer Satisfaction 	Eight JD Power Metrics <ul style="list-style-type: none"> Electric and Gas Residential Rank and Residential Performance (four metrics) Electric and Gas Business Rank and Residential Performance (four metrics)
Stewardship 	Our communities welcome our partnership and recognize us as a responsible leader	<ul style="list-style-type: none"> Alva Scores [Note 1] 	<ul style="list-style-type: none"> Alva Ranking Alva Performance
		<ul style="list-style-type: none"> JD Power Corporate Citizenship 	Eight JD Power Corporate Citizenship Metrics <ul style="list-style-type: none"> Electric and Gas Residential Rank and Residential Performance (four metrics) Electric and Gas Business Rank and Performance (four metrics)
Cost Competitiveness 	Our customers experience the value of our services as we drive and demonstrate efficiencies	<ul style="list-style-type: none"> International Financial Reporting Standards (IFRS) Controllable Costs 	<ul style="list-style-type: none"> IFRS Controllable Costs

Note 1: Alva is a proprietary daily web-crawling text analysis. The Alva Reputation Index tracks all media stories on National Grid and measures their effect on its corporate reputation.
Source: DR 9 and 98.

In addition to the largely operational metrics represented by Elevate 2015, National Grid also measures financial performance. Operating profit, net margin, Return on Equity (ROE) and capital plan delivery are measured and reported at the operating company level.⁴ While National Grid tracks and reports other performance metrics, the Elevate 2015 and financial measures are used to determine employee incentive compensation. For FY13, all four ambitions of Safety and Reliability, Customer Responsiveness, Stewardship and Cost Competitiveness were weighted equally at 25 percent. In FY14, NGUSA increased the weightings for Safety and Reliability and Cost Competitiveness from 25 percent to 30

⁴ DR 8, DR 9, Attachments 2, 3 and 4, and DR 420



percent each, and reduced the relative weightings of Customer Responsiveness and Stewardship to 20 percent each.⁵

Exhibit XI-4 provides details of the FY14 NG-plc vision, values, and strategy, the US annual priorities, the goals and objectives of NY and the business objectives of KEDLI. KEDLI is shown for illustration purposes. Although the FY14 Operating Company business objectives also align with the US annual priorities and NY goals and objectives, National Grid typically depicts them in the four Elevate 2015 ambitions.

Exhibit XI-4 FY14 Line of Sight Framework – Priorities, Goals and Business Objectives



⁵ DR 9 Attachments 1 and 2



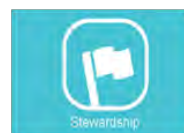
Goals and Objectives - NY	
Safety	<ul style="list-style-type: none"> Visibly demonstrate leadership, commitment and advocacy for safety policies, programs, culture, and continuous improvement across the organization driving us to an incident free work place Support regulatory requirements that are consistent with enabling our desired safety culture
Process/Work Plan	<ul style="list-style-type: none"> Resource support, as requested, will be needed on process work streams Expected that targeted employees will participate in process training and the new National Grid Academy Improve customer order fulfillment/satisfaction Emergency response and storm restoration continuous improvements
USFP	<ul style="list-style-type: none"> Support USFP stabilization with commitment for training completion and data integrity, accurate time entry and approval, accurate PO process, accurate hierarchy
Rate Case Readiness	<ul style="list-style-type: none"> 100% USFP training and compliance that produces timely and reliable financials that support regulatory filings Successful completion of key regulatory proceedings by providing appropriate resources Partner with Regulatory & Legal, Customer, Finance and Strategy to develop KEDNY/KEDLI rate case strategy and plan Manage O&M prudently, tracking transparently any gaps to cost of service Enhance trust in regulatory relationships by anticipating, identifying, communicating and responding to regulatory concerns
Community Volunteerism	<ul style="list-style-type: none"> Quarterly "Signature" Volunteer events Safety Awareness Campaign, Earth Day events, STEM Education ("Grid's Kids") programs, Community Day of Service (United Way), Red Cross, Jefferson Awards Support communities in areas of STEM education, economic development, and energy and the environment through active participation in programs and projects Manage community and large customer relationships and issues to promote strong partnership and economic growth
Growth	<ul style="list-style-type: none"> Contribute to rate case planning to accommodate growth opportunities serving customer or stakeholder needs Address energy efficiency program requirements to achieve regulatory measures Develop solutions in the gas collaborative/generic proceeding that support accelerated gas expansion Develop Long Island business strategy and build National Grid brand awareness Influence and support achievement of State energy priorities (Moreland, SOS) Connect work plans & future asset needs to the 6 priority policies of the business
Business Objectives – NY Operating Companies	
KEDLI	



- Visible, proactive safety leadership
- Emergency response and storm restoration continuous improvements
- Achieve capital investment plan target levels
- Implement project management playbook - achieve regulatory estimation metric
- Implement Article VII process improvement plan
- Achieve gas safety records management compliance regulatory measures



- Prepare for and support Gas PSC Management Audit
- Develop solutions in the gas collaborative that support accelerated gas expansion
- Improve customer order fulfillment/satisfaction
- Meet all service quality standards
- Prepare KEDLI rate case strategy



- Achieve energy efficiency savings/incentives
- Develop and implement down-state infrastructure support stakeholder outreach
- Build LI NG brand awareness
- Progress Newtown Creek project
- Improve Alva awareness and support
- Effectively manage the transition to our future role on Long Island
- Support transmission JV with transmission owners (Energy Highway)



- Achieve cost performance targets
- Achieve gas growth performance objectives
- Develop strategy and process to measure ServCo cost efficiency
- Develop processes designed to meet regulatory expectations of cost transparency; close-out related external audit recommendations
- Manage SIR program

Source: DR 98.



Other Metrics

In addition to the Elevate 2015 and financial metrics, National Grid tracks a number of other metrics; however, these are not as widely reported as Elevate 2015. These include regulatory requirements, operational metrics used by various departments, SLA targets, and metrics under development as a part of a number of process improvement initiatives.

National Grid provides annual reports on service quality measure to the PSC under the Service Quality Assurance Program.⁶

- Reliability goals include annual main replacements, damages (mismarks and company/contractor), leak management, overall damage prevention, replacement of bare steel services (KEDLI only) and gas leak emergency response times.⁷
- Customer service goals are set in consultation with the PSC and vary by utility. They include PSC complaint rate, percent of calls answered in 30 seconds, percent meters read, low income program enrollment, transaction satisfaction indices, and adjusted bills.

B. EVALUATIVE CRITERIA

- Does National Grid make appropriate use of goals, key performance indicators and metrics?
- Is performance reported to appropriate personnel in a meaningful and timely manner?
- Are performance goals and results measurable and verifiable?
- Does National Grid use benchmarking techniques to identify and develop performance targets?
- Does National Grid have effective change management and continuous improvement processes?
- Are there impediments that tend to constrain performance improvements and has National Grid taken appropriate actions to remove impediments to performance improvements?
- Are compensation and performance metrics appropriately linked?
- Does manager and employee performance (e.g., reliability and productivity) feedback to the corporate mission, objectives and goals so National Grid can improve processes, redirect resources, and change priorities?
- Are there additional performance measures or indicators that are needed to facilitate the corporate mission, objectives and goals?

⁶ DR 16

⁷ DR 9, Attachment 5



C. FINDINGS AND CONCLUSIONS

1. The performance management framework developed by NGUSA (Elevate 2015) does not sufficiently align the goals of the NY jurisdiction and Operating Companies with the NG-plc vision and strategy.

- NG-plc’s overall strategy - to be a recognized leader in the development and operation of a safe, reliable and sustainable energy infrastructure to meet the need of our customers and communities and to generate value for our investors - is set at the NG-plc level and includes six elements:
 - Delivering Operational Excellence in the areas of Safety, Reliability, Security and Customer Service
 - Engaging our People
 - Stimulating Innovation
 - Engaging Externally to set Energy Policy
 - Embedding Sustainability
 - Driving Growth.⁸
- On an annual basis, NG-plc establishes priorities for the US and UK. FY14 US priorities were shown in **Exhibit XI-1**. While the US priorities reflect some of its current business challenges, they address only a subset of the NG-plc strategy elements as shown in **Exhibit XI-5** (following) which provides NorthStar’s assessment of the gaps in the performance management program.⁹
 - The NG-plc strategies of “Engage Our People” and “Embed Sustainability” are not addressed by the US priorities, the NY goals and objectives or the Elevate 2015 ambitions or metrics.¹⁰ Some “People” metrics were reported in FY13 as part of other detailed scorecards, but were eliminated in FY14.¹¹
 - The NG-plc strategy of “Stimulate Innovation” is only addressed as it relates to National Grid’ US process improvement activities (described later in this Chapter).
 - The NG-plc strategy of “Engage Externally – Work with external stakeholders to shape UK, EU and US energy policy” is addressed by the US priorities and NY goals/objectives only as it relates to rate cases.
 - The US priorities of Community/Volunteerism and USFP do not directly tie to any of the NG-plc strategies. Rather they reflect current NGUSA challenges of community perception and SAP.
 - The NY safety objectives are focused on employee safety, but not pipeline safety.

⁸ DR 98

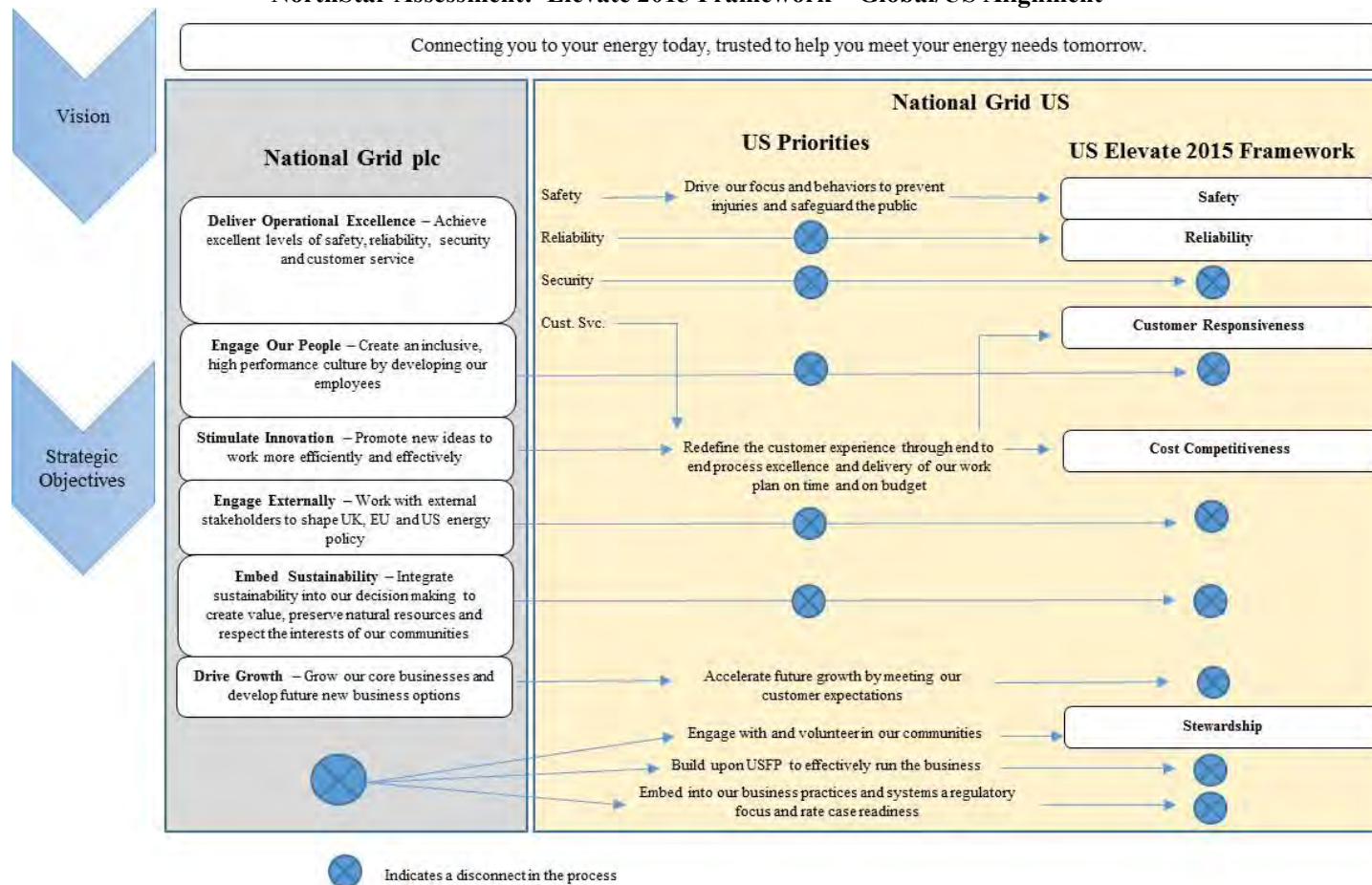
⁹ NorthStar Analysis, DR 98

¹⁰ Some vacancy and absenteeism data was reported at the end of FY13, but no targets existed (DR 99) or were established for FY14 (DR 9)

¹¹ DR 99, Attachment 6 and DR 9



Exhibit XI-5
NorthStar Assessment: Elevate 2015 Framework – Global/US Alignment



Source: NorthStar Assessment (priorities and metrics provided in DR 98).



- The NG-plc strategy of “Deliver Operational Excellence – Achieve excellent levels of safety, reliability, security and customer service are addressed in part. Safety is a US priority, a NY goal/objective, and part of Elevate 2015. Reliability is not a stated US priority or NY goals/objective except as it relates to rate case readiness, but is an element of Elevate 2015. Customer service is part of Elevate 2015 and the customer order fulfillment process improvement exercise. Security is not addressed anywhere within the US framework.
 - NY Jurisdiction priorities are appropriately aligned with the US priorities, but as a result of the prior misalignment, do not directly map to the NG-plc strategy.¹² NY priorities support each of the six US priority categories of safety, process improvement, USFP, rate case readiness, community/volunteerism and growth.¹³
 - Operating Company business objectives are depicted by NGUSA as aligning with the Elevate 2015 ambitions, but more closely tie to the US and jurisdiction goals and objectives.¹⁴
- 2. In addition to the NG-plc, NGUSA and NY jurisdictional strategies, priorities, goals and objectives, for FY14 the NY operating companies developed business objectives, the majority of which are non-specific and do not have associated performance metrics. These serve more as a list of current areas of focus rather than true goals or objectives.**
- Certain of the Operating Company objectives are milestones or deliverables, and as such serve as their own performance measure. Some are tied to the Elevate 2015 framework. Still others are tied to the US annual priorities and NY goals/objective with no specific target or metrics. Examples of the various types include:
 - Milestone/Deliverable-Based: Implement NMPC rate case order, prepare KEDLI rate case strategy.
 - Tied to Elevate 2015: Improve Alva awareness and support, improve customer order fulfillment/satisfaction, visible proactive safety leadership, and achieve cost performance targets. Some of these do not have specific targets.
 - Regulatory Requirements: Meet all service quality standards, achieve energy efficiency savings/incentives.
 - Tied to US Priorities/NY Goals and Objectives: Develop solutions in the gas collaborative that support accelerated gas expansion, develop processes designed to meet regulatory expectations of cost transparency; close-out related external audit recommendations.
 - Most Operating Company objectives are general and lack adequate specific definition, without specific targets or criteria for determining whether the objectives have been met. Some are more specific but lack targets. Examples include:

¹² NorthStar Analysis, DR 98

¹³ DR 98

¹⁴ NorthStar Analysis



- Visible, proactive safety leadership
 - Emergency response and storm restoration continuous improvements (part of Process Improvement initiatives)
 - Global Foundries
 - Upstate NY gas collaborative
 - Progress Newton Creek Project
 - Prepare for and support gas PSC Management Audit (note: this is not a NY goal/objective)
 - Implement project management playbook
 - Develop/advance public policy objectives.
- There are no specific performance metrics tied to the Operating Company business objectives.
- 3. While the NGUSA Elevate 2015 metrics are measurable and verifiable, they are largely perception-based, lagging indicators and do not adequately address the US or NY priorities or the Elevate 2015 ambitions.**
- The Elevate 2015 metrics and US/jurisdiction financial metrics are the most widely-used and reported measures of performance. Typically performance is reported broadly, at the US-level using the four ambitions.
 - The Elevate 2015 ambitions and metrics do not encompass all six NG-plc strategies, or not translate the US and NY jurisdiction priorities into metrics that can be used to assess progress in addressing all priorities. Gaps and disconnects were shown previously in **Exhibit XI-5**. There are no Elevate 2015 metrics tied to rate case readiness, USFP, volunteerism, or growth.
 - The Elevate 2015 metrics do not adequately measure performance against the ambitions it is intended to address: Safety and Reliability, Customer Responsiveness, Stewardship, and Cost Competitiveness.
 - With the exception of pipeline safety, the category of Safety and Reliability is adequately addressed by the Elevate 2015 metrics; however, many of these are required by regulation.¹⁵ Metrics used in this area are typical of the industry.
 - Safety metrics include: LTIs, RTCs and OSHA recordables.
 - For FY13, gas reliability metrics included: gas emergency response times (< 30 minutes, 60 minutes and 90 minutes) and gas leak back log for each operating company.
 - FY14 gas reliability metrics included all of the FY13 metrics, plus annual main replacement, damage prevention, damage due to mismarks, and damage caused by National Grid or its contractors. The addition of these metrics was driven by regulatory requirements.
 - Reliability metrics are reported for each operating company.¹⁶ Safety metrics are reported at the state-level.¹⁷

¹⁵ DR 9 and 98



- The Elevate 2015 Customer Responsiveness metrics do not directly address Customer Responsiveness.
 - Performance is assessed based on customer satisfaction as measured by perception surveys: Residential and Business JD Power Customer Satisfaction Surveys and contactor surveys.¹⁸
 - While the use of JD Power and contactor surveys is typical of the utility industry they are usually paired with other time-based metrics such as percent of appointments kept, average speed of answer (call center), average wait time (customer office), cycle times for certain activities, or activities completed within pre-specified time targets (e.g., percent of appointments kept within the 4-hour window, email inquiries responded to within 24 hours, customer complaints responded to within 48 hours).
 - Despite the fact that National Grid has a business process improvement initiative focused on reducing the time for new gas service orders, this metric is not one of the Elevate 2015 metrics (i.e., percent of gas conversion requests completed in 26 days).¹⁹ It is a metric tracked by the Process Improvement Teams and a factor in employee performance evaluations.
- Stewardship metrics are also perception-based. There are no Elevate 2015 metrics related to numbers of events, volunteer hours, community contact or other related measures.²⁰
 - Stewardship is measured based on JD Power Corporate Citizenship scores and the Alva Performance Index. Alva is a proprietary daily web-crawling text analysis of National Grid sentiment within a peer set. The Alva Reputation Index tracks all media stories on National Grid and measures their effect on its corporate reputation. This includes media stories on the stewardship items, as well as other stories across various media channels regarding National Grid.²¹
 - “Engage with and volunteer in our communities” is a US annual priority. It is supported by numerous NY goals/objectives, including quarterly signature volunteer events, support for a number of community/volunteerism program (e.g., Earth Day and the Red Cross), community support for STEM (Science, Technology, Engineering, Mathematics) education, economic development, and energy and environment programs, and managing community and large customer relationships.

¹⁶ DR 420, Tab 3

¹⁷ DR 420, Tab 3, p. 30

¹⁸ Contactor surveys refer to survey of customers (typically by phone or via the website) following customer contact with the utility.

¹⁹ DR 9

²⁰ Employee performance evaluation goals contain some more tangible targets.

²¹ DR 9 and 98



- Cost Competitiveness is measured based on IFRS controllable costs relative to budget. However, controllable costs represent a small portion of the total cost structure.²²
- 4. The Elevate 2015 metrics and periodic performance reports do not provide sufficient information at an Operating Company level to identify and address potential issues.**
- The majority of the Elevate 2015 metrics are measured at the US level (i.e., stewardship, cost competitiveness and customer service). Only reliability is measured at the Operating Company level.²³ Safety targets are reported at the State level.²⁴
 - Financial metrics are reported at the NY and Operating Company level.
 - With the exception of Operations and Customer Service, very little information on Service Company operations are reported at either the US level or to the jurisdictions.
 - The NY Jurisdictional President receives limited reporting at the jurisdiction or Operating Company level. **Exhibit XI-6** summarizes the information the NY Jurisdictional President typically sees.

²² DR 9 and 98

²³ DR 9 Attachment 2. Safety is measured at the state level and reliability at the operating company level.

²⁴ DR 420, Tab 3, p. 30



Exhibit XI-6
Information Provided to the NY Jurisdiction President

US <ul style="list-style-type: none"> • Safety (RTA, LTI, Recordables) • US Financial Results including Income and Cash Flow Statement • Elevate 2015 Metric Performance • Shared Service KPIs (7 metrics) • Information Service KPIs (15 metrics including call center) • IS Project Performance/Status • Elevate 2015 Metrics <ul style="list-style-type: none"> – Four Elements – Six Financial Metrics (not all defined/quantified) 	
NY <ul style="list-style-type: none"> • NY US Business Headlines – updates on key activities/events (prepared by NYJP staff) • Half Year Progress Report – similar to headlines • NY Financials (US GAAP and IFRS) <ul style="list-style-type: none"> – Operating Profit – Net Margin • Elevate 2015 Metrics <ul style="list-style-type: none"> – Safety (RTA, LTI, Recordables – electric, gas and CMS) – Reliability (Gas, Gas Leak, Electric) – Alva – Some Customer Responsiveness metrics (Contactor Survey and Distributed Gen) • Financial Metrics • KPI Exception Reporting • Other updates as needed (SLAs, USFP, Elevate 2015/Priorities, Pipeline Safety, LIPA Transition) • Credit and Collections KPIs • Capital Update 	Operating Company <ul style="list-style-type: none"> • NY US Business Headlines could include something for one of the operating companies • Specific Issues/Projects – Ad Hoc – e.g., <ul style="list-style-type: none"> – Mohawk Valley Flooding – BQI and Rockaway Lateral – Costs/customer bills • Detailed Op Co Financials <ul style="list-style-type: none"> – Operating Profit – Net Margin – Budgets • Credit and Collections KPIs • Capital Update (Budget vs. Actual and Adjustments) • Elevate 2015 Reliability Metrics (Overall, 30, 60 and 90 minute Response, Damage Prevention (DP), DP Mismarks, DP Contractor, Annual Main Replacements)

Source: DR 420 (binders), DR 8.

5. National Grid uses benchmarking techniques to identify and develop some of its performance targets.

- Financial targets are set based on the fiscal year budget and business plan, and include: GAAP and IRFS operating profit, controllable costs, ROE, actual versus allowed ROE, and capital plan delivery. For controllable costs, operating profit and ROE, the target is set at the budget level. For actual versus allowed ROE, the target is 90 percent of allowed ROE. The capital plan delivery metric is set at the allowed/mandatory capital spend plus required spending to support gas growth.²⁵
- Reliability targets are set based on Operating Company regulatory requirements.²⁶
- Benchmarking surveys are the source for the Elevate 2015 JD Power Customer Satisfaction Survey metric, the JD Power Corporate Citizenship metric and the Alva

²⁵ DR 135

²⁶ DR 9 and 135



Reputation Index metric.²⁷ National Grid's goal is to achieve second quartile performance by 2015; however, its goals to date for these surveys have not been overly aggressive as shown in **Exhibit XI-7**.²⁸

Exhibit XI-7
JD Power and Alva Targets and Prior Year Actuals

Elevate 2015 Metric	FY14 Target	Prior Year Actual Performance
JD Power Gas Utility Customer Satisfaction Survey - East Large Segment		
Residential Ranking	6 th	5 th of 10
Residential Score	613	623 (below segment average of 627)
Business Ranking	5 th	9 th of 11
Business Score	647	634 (below segment average of 644)
JD Power Gas Utility Corporate Citizenship Survey [Note 1]		
Residential Ranking	4 th	5 th
Residential Score	585	579 (below peer set and East Large Segment Average)
Business Ranking	6 th	8 th
Business Score	620	606
Alva		
Ranking	6 th	5 th
Score	6.18	5.79

Note 1: FY13 actual performance based on JD Power CY12 survey.

Source: www.JDPower.com, DR 9 Attachment 1 and 2 and DR 135.

- Post-transaction customer contact surveys are used to assess the performance against other customer satisfaction targets. These do not involve the use of benchmarking.
 - According to NGUSA, the safety targets have been set to achieve a 50 percent performance improvement by 2015 and gain second quartile performance against peer US gas and electricity utilities. The AGA benchmarking survey used to establish the target is a proprietary document and not available for review.²⁹ As a result, NorthStar cannot verify National Grid's statements.
 - In other cases, prior year's performance serves as the threshold for the following year's performance, with higher targets, thus driving performance over time.³⁰
- 6. Although the Elevate 2015 metrics are inadequate, this has not resulted in a lack of focus on the US Annual Priorities in all areas. NGUSA has developed initiatives to address a number of the US Annual Priorities.**
- State objectives support the US Annual Priorities (see **Exhibit XI-4**). For FY14, functional units (i.e., Operations, Customer, Network Strategy, Finance, Shared

²⁷ DR 9, 98 and 135

²⁸ DR 135 and NorthStar Analysis

²⁹ DR 135

³⁰ DR Attachment 1 and 2



Services, Regulatory and Legal, HR, Strategy, and Corporate Affairs) also have business objectives tied to the US Annual Priorities.³¹

- A commitment to safety is embedded in the culture at National Grid. Safety moments are presented at every National Grid meeting and are considered as part of the Process Improvement initiatives.³² Safety is also a factor in employee performance evaluations.
- As discussed in further detail in the next conclusion, National Grid has developed Process Improvement initiatives in the areas of meter-to-cash, supply chain, emergency response and gas operations to redefine the customer experience through end-to-end process excellence and delivery of its work plan on time and on budget.³³
- NGUSA has undertaken significant activities and added resources to address the SAP-related issues resulting in the USFP priority, as discussed in Chapter IV, Capital and O&M Budgeting.³⁴
- Activities to address the Growth and Rate Case Readiness Annual Priorities are not as far along. Activities were delayed as they require an expansion of the current business planning process beyond its current financial focus and the development of 3-5 year operating company plans.³⁵ According to National Grid, as FY14 progressed:

“plans for Regulatory Focus and Customer Growth were combined as both require revising and integrating existing company business processes to create a unified framework to enable continuous rate case readiness and customer growth that anticipates and exceeds consistently increasing customer and regulatory expectations. This includes developing a Business Operating System which aligns planning/performance management processes at the operating company level from long-term planning (e.g., business plan) to short-term performance.”³⁶

- As of September 2013, a plan to address the Volunteerism Annual Priority was still in the planning stage.³⁷

7. National Grid has effective change management and continuous improvement processes.

- National Grid recently initiated three process improvement work streams in the gas operations area (operate, maintain and deliver).³⁸ Previously, National Grid had

³¹ DR 210

³² Review of various meeting presentations and attendance at National Grid meetings.

³³ DR 209, IR 13, 49, 50, 187, 188

³⁴ DR 433

³⁵ NorthStar Assessment and DR 433, Attachment 16

³⁶ DR 433

³⁷ DR 433, Attachment 17

³⁸ There are similar electric process work streams.



implemented process improvement programs in the areas of Meter-to-Cash, Supply Chain and Emergency Response.³⁹

- **Maintain Assets.** Maintain the safety and integrity of National Grid's US facilities, while ensuring compliance with regulatory requirements, meeting customer commitments, and increasing productivity to maximize cost competitiveness.
 - **Deliver Assets.** Deliver new gas assets. Scope includes main replacement work, service replacement, growth mains and services, and deliver complex project work.
 - **Operate Assets.** Continuously improve processes to prudently and efficiently operate National Grid's systems while maintaining the highest standards for safety and reliability.
- Each of the process improvement work streams was assigned an Operations Process Lead, an Executive Sponsor and is supported by a dedicated core process excellence team.⁴⁰ Key operational/business stakeholders are included as part of the broader Process Improvement Team. These teams are chartered with identifying the root cause of performance deficiencies, developing associated detailed performance tracking and driving improvement initiatives from concept through implementation and maturity.
 - The gas process improvement work streams were initiated in late April 2013 with workout sessions designed to define the scope of the processes, identify "pain points", brainstorm ideas, and review and prioritize potential improvement opportunities.⁴¹ An initial series of prioritized initiatives (referred to as "A3s") was developed for each process work stream. Initiatives have been added or removed (as they achieve maturity) since then.
 - Initiatives are prioritized based on a variety of factors including benefits relative to the Elevate 2015 ambitions and US Annual Priorities; the lines of business, functions and regions impacted; the impact on labor and external stakeholders; resource availability; costs; and, dependency on other initiatives.⁴²
 - Initiatives may be state or operating company-specific.⁴³
 - Each initiative is assigned an initiative lead and a business owner. On an ongoing basis, new initiatives (A3s) are introduced for consideration by the team. Each A3 approved by the team goes through a six step analytical process.⁴⁴

³⁹ DR 11 and interviews

⁴⁰ IR 173-175

⁴¹ About 100 people worked for ten days, identifying over 175 pain points for the six process work streams. These pain points led to 28 prioritized portfolios, with over 100 solution options and 23 quick wins, DR 147, Attachments 3 and 14, IR 13

⁴² DR 428

⁴³ DR 416, 428

⁴⁴ PPM presentations (DR 416, 428)



- The Process Improvement Teams and key stakeholders meet on a monthly basis (Process Performance Meeting or PPM). The PPMs provide an excellent forum for addressing operational performance issues.⁴⁵
 - The PPMs are largely working sessions intended to discuss the status of each initiative and improvement efforts, review KPIs, discuss new issues/potential initiatives, approve projects and move initiatives through the process.⁴⁶
 - The meetings are interactive with a positive exchange of ideas.
 - Key decision makers are in attendance allowing for real-time authorization and decision-making.
 - In addition to the process-related team members, applicable business functions and multiple jurisdictions are represented allowing for real-time brainstorming and exchange of potential jurisdictional or operating company best practices. About 30 individuals are invited to each PPM.
- Detailed metrics/KPIs are developed for each initiative to monitor and track performance. Metrics are intended to align with the Elevate 2015 ambitions.
 - Level 1 metrics address the end-to-end process.
 - Level 2 metrics are aligned with the process steps.⁴⁷ Most of these metrics are tracked at the operating company level. In some cases UNY is split into regions.⁴⁸
 - As of December 2013, the teams were still in the process of establishing detailed metrics and gathering baseline data for a number of the initiatives, while other initiatives had specific targets.⁴⁹
 - Each of the gas operations process work streams has a metric watch list at the Operating Company level.⁵⁰
- Overall KPI performance for each gas operations process work stream is reviewed at each PPM using spotlight scorecards (red, yellow, green). Performance indicators are monitored at the functional level, jurisdictional level, or both levels, as appropriate. If performance is “red”, the Process Improvement Team will work with business experts to conduct a performance breakdown analysis to identify the root cause and determine how to address the performance deficiency. If the issue is more systemic, they will develop a new A3 initiative with a dedicated team.⁵¹ If a dedicated team is established, the team will report back monthly to the PPM until a resolution is achieved.⁵²

⁴⁵ Attendance at PPM meetings (IR 187)

⁴⁶ IR 188, DR 431 and attendance at the three Gas Operations PPMs (IR 187)

⁴⁷ DR 426, Attachment 3

⁴⁸ DR 415 and 426

⁴⁹ IR 174

⁵⁰ Maintain PPM Presentation (IR 187) and DR 428

⁵¹ PPMs including Maintain (IR 187)

⁵² IR 187, DR 606



- National Grid has implemented two pilots (one each, gas and electric) to bring the process improvement work methods to the field, to change the manner in which field resources identify and address problems. Although in the early stage, National Grid reports positive feedback from the field and support from bargaining unit leadership.⁵³

8. NGUSA monitors performance against the Elevate 2015 and financial performance targets and the Process Improvement Team KPIs to improve processes, redirect resources, and change priorities.

- On a monthly basis National Grid tracks overall performance against each of the Elevate 2015 targets.⁵⁴ High-level KPIs and business performance are reviewed with the US Executive Committee (of which the NYJP is a member) and the NY Leadership Team monthly.⁵⁵
- Business performance is discussed at weekly NY leadership team meetings and quarterly dashboards provide performance against business objectives; however, most of this information is high-level.⁵⁶
- Process improvement performance metrics are reviewed on monthly basis by the Process Improvement Teams. Adjustments are made as necessary to address performance issues.⁵⁷
- In response to customer satisfaction issues, National Grid implemented the Meter-to-Cash process improvement initiative in 2012.⁵⁸ Initiatives were similarly established to improve process in emergency response, supply chain and gas operations.

9. Achievement of Elevate 2015 targets is an element of the variable compensation for all employees.

- For all employees (union and non-union), cash compensation includes both fixed and variable pay. Variable pay is tied to achievement of individual performance targets and NGUSA achievement of the Elevate 2015 targets. For employees in higher salary bands, achievement of NGUSA financial goals is also an element.⁵⁹
- National Grid's management (non-union) employees are classified in Salary Bands A-F, and are compensated under National Grid's Total Rewards Program. Each management employee has a maximum variable payout level and a target percentage that is set at 45 percent of the maximum. For Salary Bands A-C, variable pay amounts are tied to achievement of individual performance goals, Elevate 2015 metrics and financial objectives. Individual goals are to be specific to the employee's

⁵³ IR 188 and Maintain PPM Presentation (IR 187)

⁵⁴ DR 9, 99

⁵⁵ DR 8, 9 and 101

⁵⁶ DR 8 and 9, Orientation presentation

⁵⁷ DR 147, 174, 415, 426, 428, 605, 605 supplement, 606 and IR 13, 49, 173, 174, 175, 187 and 188

⁵⁸ DR 171 and 174

⁵⁹ DR 75



job function, but aligned with the Elevate 2015 goals. Financial objectives include earnings per share, US operating cash flow, and US operating profit.⁶⁰ **Exhibit XI-8** shows the percentage of variable pay tied to individual goals, NGUSA financial objectives and NGUSA Elevate 2015 targets. **Exhibit XI-8** also provides the potential payouts for each band.

Exhibit XI-8
Variable Pay by Salary Band

Salary Band	Composition	Target	Maximum
Salary Band A	Individual Goals 40% Financial Objectives 40% Elevate 2015 20%	45% of maximum	90%
Salary Band B	Individual Goals 40% Financial Objectives 40% Elevate 2015 20%		70%
Salary Band C	Individual Goals 40% Financial Objectives 40% Elevate 2015 20%		40%
Salary Band D	Individual Goals 50% Elevate 2015 50%		30%
Salary Band E	Individual Goals 50% Elevate 2015 50%		20%
Salary Band F	Individual Goals 50% Elevate 2015 50%		10%

Source: DR 75.

- For management employees, the Elevate 2015 component is linked to all four Elevate 2015 ambitions.
- Union employees are compensated under the terms of the collective bargaining agreements. Union employee compensation is tied to only three elements: Safety and Reliability, Customer Responsiveness and Stewardship. Targets vary by union local.
- Salary Bands A and B, and selected Band C employees are also eligible to participate in National Grid's Long Term Performance Plan (LTPP) which provides stock awards. The LTPP has both an individual element and a discretionary element. The performance criteria are earnings per share (50 percent), total shareholder return (25 percent), and return on equity (25 percent). Earnings per share and total shareholder return are measured over a three year performance period and ROE is measured over a four year performance period.⁶¹ The maximum award potential is 90 percent of base salary for Band A employees, 60 percent for Band B and 30 percent for Band C.⁶²

⁶⁰ DR 75

⁶¹ DR 75

⁶² DR 75



10. Management employee individual goals are generally aligned with the Elevate 2015 goals, US Annual Priorities and the employee's job function; however, it is unclear how the various objectives are considered or weighted, and improvements are possible in the goal setting process.

- Management employee individual performance (40-50% of the variable pay) is evaluated based on leadership qualities and achievement of performance objectives; however, it is unclear how these are weighted.
 - Leadership qualities are evaluated on a scale from one to three. Performance objectives are evaluated on a scale from one to five with one representing “creates exceptional value” and five indicating that “more is expected.”
 - The performance evaluation forms do not specify the relative weighting of leadership qualities versus achievement of performance objectives.⁶³
 - Ratings are intended to achieve a desired distribution ratings curve. Calibration sessions are used to drive consistency of ratings.⁶⁴
- In setting individual goals, management employees are instructed to consider the alignment of the employee's goals to the Line of Sight and KPIs, accountability of the position, SLA metrics and the matrix structure. NY Jurisdictional leadership team members should include measures reflecting satisfactory performance of each of the NY operating companies.⁶⁵
- Generally, management employee individual performance objectives and measures are tied to the Elevate 2015 ambitions and associated metrics or the US Annual Priorities.⁶⁶ However, a number of objectives and measures remain subjective in nature.⁶⁷ Where appropriate, NY objectives/requirements are reflected.
- It is unclear how the various performance objectives are considered or weighted in the final evaluation scoring. NorthStar's selected a sample of 26 employee evaluation forms for review. Only two had any weightings for the performance objectives.⁶⁸
- In some cases, employees have more measures than can be objectively considered.⁶⁹ Based on the sample of performance evaluations reviewed by NorthStar, most employees had between five and nine broad objectives/measures; however, the number of subsidiary objectives or measures was typically over 15 and as high as 50.⁷⁰

⁶³ DR 73 and 609

⁶⁴ DR 73, Attachment 12

⁶⁵ DR 73, Attachment 12

⁶⁶ DR 73, Attachment 7-10, 437

⁶⁷ DR 609

⁶⁸ Review of performance evaluations (DR 609)

⁶⁹ Review of performance evaluations (DR 609)

⁷⁰ Review of performance evaluations (DR 609)



- In other cases employees are held to Elevate 2015 performance metrics that have little to do with their job function.⁷¹
- For employees in Salary Bands A and B, the evaluation methodology was modified for the 2013/2014 plan year. The individual portion of the payout will be based on peer ranking within each band. According to National Grid this “method of evaluating performance ensures leaders are focused on the achievement of objectives and demonstration of leadership skills while also providing stronger differentiation and a rating of overall contributions”.⁷² It is unclear to NorthStar how much this might reduce the focus on measurable goals and objectives.
- Represented employees in DNY are evaluated against job performance/work attributes (e.g., productivity, teamwork, communication), attendance and safety targets which tie to Elevate 2015 (i.e., numbers of safety violations, injuries and motor vehicle accidents). Safety is broadly considered in the UNY represented employee evaluations.⁷³

11. Although the 2013 SLAs represent an improvement from a KPI standpoint, additional work is warranted.

- **Exhibit XI-9** provides a listing of the KPIs under each agreement. Most of the original functional SLAs had no KPIs, and none had any targets. The 2013 SLAs include some KPIs for all areas.

**Exhibit XI-9
SLA KPIs**

Service Provider	Original SLAs		Revised SLAs	
	KPIs	Targets	KPIs	Targets
Audit			• Audit plan delivery	Yes
Corporate Affairs	None provided	NA	• Alva rank • Alva performance • Metrica score	Yes
Customer	• Four gas and three electric energy efficiency measures • Electric residential commodity rate and volatility • Spending on economic development grants • Empire Zone Rider • Customer Transaction Survey Satisfaction		• JD Power performance (4 metrics) • Alva rank • Alva performance • Electric residential commodity volatility • Spending on economic development grants • Gas off system sales • Two gas and two electric energy efficiency measures • Gas conversion process satisfaction	Yes

⁷¹ Review of performance evaluations (DR 609)

⁷² DR 75

⁷³ DR 73, Attachments 1-4



Service Provider	Original SLAs		Revised SLAs	
	KPIs	Targets	KPIs	Targets
Finance	None provided	NA	<ul style="list-style-type: none"> Controllable Cost Suspense and clearing account balance at month end Number of adjustments to pre-tax P&L after close Property damage claims Audit deficiency remediation 	4 of 5
Human Resources	None provided	NA	<ul style="list-style-type: none"> Internal promotions – minority and female Management vacancies Represented employee vacancies Monthly attrition rate for represented employees Performance objective in place – mgmt. employees Annual expert training for operations Employee engagement 	3 of 7
Insurance	None provided	NA		
Information Systems	None provided	NA	<ul style="list-style-type: none"> Customer satisfaction – help desk Resolution time compliance for major incidents Project development – schedule and cost Data loss incidents Operational failure incidents CNI systems availability Operations critical systems availability Business critical systems availability Physical security related incidents reported to regulatory within given time period NERC CIP 6 physical security violations 	7 of 11
Legal	None provided	NA	<ul style="list-style-type: none"> Customer satisfaction with legal Percentage of management employees completing required compliance and ethics training 	Yes
Network Strategy	<ul style="list-style-type: none"> Number of violations resulting from State and Federal Notices of Proposed Violations 	None	<ul style="list-style-type: none"> CAIDI and SAIFI Electric order fulfillment satisfaction – design Leak prone pipe removal Article VII filing non-compliance report occurrences Capital plan spend 	Yes
Operations	<ul style="list-style-type: none"> Eight electric KPIs Three gas leak emergency response Six other gas KPIs Capital plan delivery Appointments made and appointments kept 	4 of 8 Yes None None None	<ul style="list-style-type: none"> Eleven electric KPIs Three gas leak emergency response Leak backlog Three third-party damage KPIs Leak prone pipe removal Gas safety violations Service appointment kept Article VII filing non-compliance report occurrences Capital plan spend Gas conversion process satisfaction 	Yes
Procurement	None	NA	<ul style="list-style-type: none"> Percent NY spend MWBE Percent NY spend small businesses Customer satisfaction survey 	1 of 3



Service Provider	Original SLAs		Revised SLAs	
	KPIs	Targets	KPIs	Targets
Regulation and Pricing	None	NA	<ul style="list-style-type: none"> Customer satisfaction survey with Regulatory and Pricing Timely submission of filings to PSC Billing adjustments 	Yes
Security	None	NA	<ul style="list-style-type: none"> LTI Article VII filing non-compliance report occurrences Site Investigation and Remediation: agency enforcement 	Yes
Shared Services	<ul style="list-style-type: none"> Percent of calls answered in 30 sec Low Income customer assistance program enrollment PSC compliant rate 	None	<ul style="list-style-type: none"> Percent of calls answered in 30 sec Residential and business customer satisfaction PSC complaint rate NY customer service (Elevate/Meter-to-Cash) Real estate transactions client satisfaction survey Bill accuracy Net write-off percent of revenue Paperless billing Electronic payments On time payments of health carrier invoices 	Yes
SHE	<ul style="list-style-type: none"> Article VII filing non-compliance report occurrences Lost time injury rate SIR agency enforcement 	Yes	<ul style="list-style-type: none"> Article VII filing non-compliance report occurrences Lost time injury rate SIR: agency enforcement 	Yes
Strategy, Business Development & Technology			<ul style="list-style-type: none"> None 	NA
Tax	None provided	NA		
Treasury	None provided	NA		

Source: DR 7 and 146 Supplement.

- The 2013 SLAs do not provide adequate budget detail, as discussed in the Capital and O&M budgeting chapter.
- While the number of SLA KPIs has increased, they do not address all functions or provide sufficient coverage of the activities performed. Many of the KPIs are customer-satisfaction based and the same KPI may be used for multiple functional services. None of the KPIs address the efficiency or cost-effectiveness of products and services as delivered.
- Not all KPIs currently have targets. Targets that do exist may not be particularly aggressive in some areas, or may be designed to not exceed regulatory requirements.
- Under the terms of the SLAs, performance information is collected and reported either quarterly, semi-annually or annually, depending on the KPI. For some of the metrics, this update frequency may not be sufficient to identify and correct performance deficiencies.



- There are currently no consequences for failure to meet SLA KPIs, and the SLA KPIs are not meaningfully related to the employee performance review process. According to National Grid:

“[b]ecause the KPIs in the October 2013 SLAs were established after performance objectives were already set for FY 2014, the KPIs will be monitored and reported in FY 2014. Beginning in FY 2015, KPIs will be used to measure satisfactory performance of service company employees providing service to the NY operating companies. It should be noted, however, that satisfactory performance of most of the SLA metrics is already embedded in annual objectives.”⁷⁴

D. RECOMMENDATIONS

1. With the FY 2016 planning cycle (beginning in FY15), modify the performance management process to replace Elevate 2015 and better align NG-plc, NGUSA, NY jurisdiction, and NY Operating Company goals and objectives with a more robust set of performance metrics. The revised performance management program should address/include the following:
 - NG-plc, US, NY and operating company priorities should be aligned but reflect individual priorities.
 - All priorities and strategies should have defined performance measures and targets and be reported monthly, at a minimum.⁷⁵ Ideally metrics would be at the jurisdiction and operating company level in addition to the US level. Gaps such as those illustrated in **Exhibit XI-5** should not exist.
 - Metrics should include leading indicators and should be used to monitor performance and address performance issues.
 - The revised SLAs performance measures should be included in the performance management system.
 - Operating and process improvement team metrics should continue to be robust and not driven to the minimal level of aggregate detail currently represented by Elevate 2015.
 - NY Jurisdictional performance should be routinely reported at an operating company level, and should include SLA performance.
 - Any construct developed to communicate the Line of Sight to employees such as Elevate 2015 should be clearly defined, easy to communicate, tie to the NY/operating

⁷⁴ DR 266

⁷⁵ JD Power surveys are performed either two or four times per year. The Gas Residential Study is fielded in four quarterly waves and the Gas Business Study is fielded in two biannual waves. While the scores do not change monthly, most utilities still report results monthly. At a minimum, NGUSA should report monthly progress on initiatives to improve customer satisfaction and report scores after each wave.



company objectives/priorities and be supported by metrics that actually measure performance against the stated ambition or objective.

- Employee performance evaluation objectives and measures should:
 - Be defined and objective.
 - Involve quantified performance targets, wherever possible, and milestones or specific deliverables.
 - Reflect US goals and objectives, NY, operating company and business unit priorities, along with relevant SLA targets.
 - Consider the employee's job function and include performance objectives related to that job function.
 - Not be artificially tied to broader US ambitions that are not as applicable to the employee's job.
 - Include a manageable set of performance requirements. Too many performance requirements make objective performance measurement difficult and can result in a loss of focus.
 - Provide objective explanations as to how various performance objectives are weighted or used in the rating determination.
- 2. Continue to evolve the SLAs to include additional KPIs addressing each of the major functions performed, include measures of efficiency, cost-effectiveness and unit costs, provide greater budgetary detail, include financial penalties for failure to achieve performance targets, relate the service company employee performance evaluation process to the SLAs, require more frequent reporting, incorporate the results of the benchmarking exercises, and improve performance targets.



Cases 17-E-0238 & 17-G-0239

1 full USFP benefits. These additional programs
2 caused significant overspending beyond the
3 project budget.
4 Q. Did the Northstar Report explain why the USFP
5 implementation had these issues?
6 A. The Northstar Report findings and conclusions
7 are summarized beginning on Page 12 of Chapter
8 IV. The Northstart Report includes seven
9 conclusions for why the USFP implementation
10 experienced overspending and functionality
11 issues that we believe are also relevant to GBE.
12 First, National Grid USA was unprepared for the
13 complexity and magnitude of the USFP and should
14 have had discussions with other utilities to
15 gain industry experience before implementation.
16 Second, National Grid USA's financial processes
17 lacked sufficient internal controls, and while
18 the USFP was expected to solve this issue, the
19 end result was that the SAP program implemented
20 through the USFP did not solve the internal
21 control issue. Third, National Grid USA was
22 unable to quantify the incremental benefits from
23 the USFP, such as improved operational
24 efficiencies, consolidation and cost reductions,

Cases 17-E-0238 & 17-G-0239

1 and therefore it was difficult to measure
2 program success. Fourth, National Grid USA did
3 not focus sufficiently on the individual
4 utilities. Fifth, the staff at these utilities
5 were not able to generate the reports needed for
6 managers to make informed decisions due to lack
7 of training or ability. Sixth, zero-based
8 budgeting was not used to forecast operations
9 and maintenance (O&M) budgets. Seventh, the
10 capital review and planning process for National
11 Grid USA focuses too heavily on spending
12 variances and not enough on the underlying
13 drivers of these variances.

14 Q. How much did the implementation issues and
15 necessary fixes increase the USFP budget?

16 A. According to the Northstar Report, the budget
17 for the USFP was \$392.8 million, whereas actual
18 spending was \$945.1 million. Thus, the
19 implementation issues and necessary fixes
20 resulted in spending more than double what
21 National Grid USA had budgeted.

22 Q. What did the Northstar Report recommend
23 concerning the increased cost?

24 A. It recommended that National Grid USA file a

The National Grid Gas Business Enablement (GBE) team conferred with three peer utility companies to gain insight and lessons learned from their experiences implementing similarly complex IT projects.

These lessons learned have informed the GBE Program's development of strategy, delivery approach and methods as well as governance and management frameworks. Lessons learned and how they validated, or were incorporated into, the GBE plan are shown below.

Company	Key Lessons Learned	Impact
One Gas <ul style="list-style-type: none"> • 2.1M Customers over 3 states • 5 Year Maximo, CGI and Copperleaf Implementation 	<ul style="list-style-type: none"> • Take a phased approach to implementation and use pilots • "Grow your own talent" by hiring new college graduates and letting them learn the solution from the ground up. They bring new and fresh perspectives • When working with legacy data, be careful about its quality. It can unfavorably skew analysis results • Make sure you have thought through, designed and built your initial Day 1 reporting • Don't assume that sending messages to VP's will result in trickle down through the organization. Your change program should directly engage the impacted users • Get your change program established right up front 	<ul style="list-style-type: none"> • The GBE roadmap is built around the concept of phased deployment of functionality and solutions with the first release serving as a pilot. Once that release is stable, functionality is progressively deployed over time • The GBE team is recruiting team members both internally and externally – based on "best fit" for the capabilities required. External hires include qualified new college graduates who are learning the solution at a fundamental level while adding value through personal capabilities, skills and perspectives. • GBE stood up a data management team at the outset of the program to evaluate legacy data quality and provide input to program plans, estimates and scope • GBE has adopted an end to end process approach that captures process and reporting requirements • GBE has developed a governance model and communication approach that engages leadership and users at all levels • Change Management has been established as a core program capability and has been actively engaged throughout
ATMOS Energy <ul style="list-style-type: none"> • 3M Gas Customers across 8 states • 3 Year SAP, Click, Scylo implementation 	<ul style="list-style-type: none"> • CEO set the tone for a culture of change management and employee engagement and common values to insure alignment between business and program • Formed a process council of business leaders that were accountable for key process design decisions to support ownership and buy-in • Addressed data cleansing from the 	<ul style="list-style-type: none"> • US Gas Business Leadership has visibly demonstrated support of the GBE program and have actively participated in a series of events designed to engage employees at all levels and foster alignment between program and business • A Design Authority consisting of the leaders of US gas business units and key supporting functions was formed to directly engage the business in key process

Company	Key Lessons Learned	Impact
	beginning of the program and continuously throughout <ul style="list-style-type: none"> • Focused program scope on key processes rather than trying to fix everything at once 	design decisions and to provide input on program scoping, planning and delivery activities <ul style="list-style-type: none"> • Data cleansing activities occur throughout the program lifecycle. Program governance and management activities insure these activities are appropriately prioritized, monitored and resourced • The GBE Program conducted a Strategic Assessment activity to define scope, business case and roadmap that aligned to business and strategic priorities
DTE Energy <ul style="list-style-type: none"> • 1.1M Gas customers • Implemented Maximo, CGI, and SAP in 2007 	<ul style="list-style-type: none"> • Training needs to include the business process, not just how to operate a screen. Users need to be taught how to do their job in the new solution • At the very beginning of the program, focus on getting data hierarchies correct – they are very expensive to change later • Engaged unions early and regularly, used a quarterly “pulse check” to understand how people are feeling • Developed a strong performance management cadence including daily stand-up/Hub meeting, weekly performance calls etc. 	<ul style="list-style-type: none"> • The GBE Program will incorporate the process / job orientation into training protocols and development standards • The GBE Integrated Program Plan will support alignment of the Data Management Team with Work Streams and Projects within the GBE Program to insure that hierarchies are developed in a timely and complete manner • GBE business engagement plans include union specific activities. An employee engagement evaluation process will be deployed- similar to a “Pulse Check” • The GBE Program participates in the US Gas Business performance cadence to further support business/program alignment. The GBE Program has a regular cadence of “Hub” and performance oriented meetings which will be expended as appropriate during mobilization. Tools and processes are being deployed to support a dynamic approach to program and project management

PUC 5-24

Request:

How will the Company ensure that if there are problems encountered during the rollout of each module in Rhode Island, the work will still be completed on schedule and on budget in Rhode Island during the rollout?

Response:

It is not possible to guarantee that no problems or delays will be encountered during deployment of the Gas Business Enablement Program in Rhode Island. However, National Grid has expended significant effort focused on reducing the likelihood of problems and mitigating the potential impacts should one occur.

National Grid has taken four key actions as a part of this effort:

- 1) Development of a realistic and achievable plan;
- 2) Deployment of a high performing program team leveraging leading practices and methodologies;
- 3) Establishment of supportive commercial arrangements and warranty periods; and
- 4) Provision of independent, third party expertise to provide objective perspectives and insight.

Development of a realistic and achievable plan

In 2016, National Grid retained Accenture, a leading system integrator, to develop a high level design, business case, and deployment road map to deliver the planned Gas Business Enablement scope of work. The roadmap features multiple phased deployments that provide sufficient time between releases to achieve system stability, support user adoption, and allow lessons learned to be incorporated into subsequent releases. This phased deployment approach further reduces the risk of late deployments by dividing the scope of work to be delivered to Rhode Island into more manageable "chunks" and reduces the amount of change at any particular time. Although Accenture leveraged its extensive experience to develop a realistic and supportable plan, it received significant support and input from National Grid leaders and employees supporting the Rhode Island jurisdiction. National Grid also retained PriceWaterhouseCoopers PLC, another leading system integrator, to act independent of Accenture to provide National Grid with assurance that the plan was fit-for-purpose, delivering the Gas Business Enablement Program at a reasonable level of effort and with a supportable deployment plan.

Deployment of a high performing program team leveraging leading practices and methodologies

After studying the lessons learned from past major projects at National Grid, as well as accepted industry best practices, National Grid developed a framework of eight Critical Success Factors to ensure the successful delivery of programs at National Grid. The Gas Business Enablement Program has adhered closely to these Critical Success Factors since the beginning of the program and regularly checks progress against those criteria. The Critical Success Factors are:

Active Sponsors – Performance review for the sponsors is linked to success of the project.

- The Gas Business Enablement Program Steering Group includes senior executives from National Grid and National Grid plc. The Steering Group meets regularly with the Program Sponsor to exercise oversight (including on budget and timing), over the program and to provide guidance and access to resources as required.
- A full time Program Sponsor has been appointed to lead the program and to ensure alignment and focus on strategic business priorities and outcomes.
- The Program Sponsor and Leadership Team's success is tied directly to the achievement of the Gas Business Enablement Program and delivery of the anticipated benefits.

Carefully Managed Scope – Project scope is realistic and achievable.

- High level design workshops with participation from business subject matter experts and leadership were conducted. These served to focus the Gas Business Enablement Program scope on business need and opportunity, tightly aligned with the business case, and supported by the business itself.
- The program manages scope through established governance processes and escalation paths.

Clear Success Criteria – Project outcomes are clear and compelling.

- Clear ambitions have been set for the program to reduce operational risk, improve operational performance, and create a flexible platform for the future.
- The program team has defined the anticipated business benefits.

- The Gas Business Enablement team has developed a value framework to baseline, measure, and track improvements in operational performance metrics as a result of the program.¹

Readied Business – An informed, engaged business is ready to successfully implement the change.

- Change management and business engagement activities will occur continuously throughout the Gas Business Enablement 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 Program team to the business user community.

Rigorous Stage Gating – Tightly defined criteria must be met for projects to move between stages of development.

- Stage-gating is incorporated into the Gas Business Enablement Program plans and management frameworks.
- The program will use a scaled agile development methodology that is performance data driven and includes regular planning workshops with both technical and business personnel to evaluate progress, quality, risk, and outcomes achieved.

Good Governance – Established governance groups, supported to operate effectively.

- A comprehensive Gas Business Enablement Program handbook has been developed, which includes 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 program engages independent reviewers to provide feedback on deliverable quality, process compliance, alignment to business case, and strategic business objectives and priorities.

¹ As described in the Company's response to PUC 5-19, as part of a settlement agreement in Niagara Mohawk Power Corporation's (Niagara Mohawk) rate case (Cases 17-E-0238 and 17-G-0239), Niagara Mohawk has agreed to six value framework key performance indicators that are intended to demonstrate successful delivery of the Gas Business Enablement Program.

Well Managed Partners – The right partners/resources, fit for the Gas Business Enablement Program, and held accountable to deliver.

- A rigorous sourcing process has been completed to retain highly capable consulting partners at competitive rates.
- Service levels and incentives are tied to achievement of the National Grid business benefit case and captured in contracts.
- Contracts with experienced delivery partners have been established on a fixed price basis, supported by rigorous oversight and change control processes.
- The Gas Business Enablement Portfolio Office has established the capability to manage all program consulting and service contracts.

High Performing Teams – One team, the right people, highly motivated.

- The Gas Business Enablement Program has, and will continue to, competitively recruit all team members for the right mix of capabilities, skills and experience, as well as alignment with National Grid and program values and culture.
- Program “ways of working” are designed to foster a “one team” culture between employees and consultants.

In addition, the Gas Business Enablement Program team places great emphasis on upfront and continuous business engagement and alignment and has invested significant effort in ensuring that the scope and road map are aligned and supported by the business. This facilitates efficient and timely engagement of Rhode Island based subject matter experts and shortens time to adoption of new Gas Business Enablement functionality. Further, the program is adopting an agile deployment method based on a Scaled Agile Framework that supports quicker development of initial functionality, continuous engagement of the user community throughout, and provides an approach to prioritizing and delivering enhancements. The program also is leveraging cloud-based industry standard solutions to support faster deployments, provide greater scalability and security, and reduce legacy infrastructure upgrades.

Establishment of supportive commercial arrangements and warranty periods

The Gas Business Enablement Program team has established fixed price contracts with National Grid's primary systems integrators, including performance clauses and warranty periods defined to ensure delivery of stable solutions. A defined framework of milestone payments allows National Grid to hold back payments until issues have been resolved at no further consulting cost to the program.

Prepared by or under the supervision of: Anthony Johnston and Christopher Connolly

Provision of independent, third party expertise to provide objective perspectives and insight

Similar to the Strategic Assessment Phase that resulted in the Gas Business Enablement business case and strategic roadmap, an independent third party consulting company (PA Consulting) has been engaged to advise the National Grid leadership team on the efficacy and quality of program plans, methodologies, processes and solutions developed by the program and its consulting partners. In a competitive procurement process, PA Consulting demonstrated a high level of knowledge, experience and capability in relevant solution design, program management and delivery, the utility industry and agile delivery methodologies. As the Gas Business Enablement Value Assurance Partner, PA Consulting's role is to provide ongoing independent assessment of program delivery to either provide confidence that the program is on track or early warning of any changes needed to secure the desired outcomes. The Value Assurance partner reports directly to the Program Sponsor and the Steering Group on its findings.

PUC 5-25

Request:

Please confirm that the fixed-cost RFPs have resulted in fixed cost contracts.

Response:

Yes, the competitive bidding processes used to engage Gas Business Enablement development partners resulted in fixed price contracts.

PUC 5-26

Request:

Is the Who has accountability against scope creep? What is the Service Company's incentive to manage scope creep? What is the distribution company's leverage to avoid increased costs related to scope creep where the distribution company may believe the addition and associated cost is unnecessary to the Narragansett Gas functionality?

Response:

Anthony H. Johnston, Senior Vice President of Gas Business Enablement, is a witness in this case, and he is accountable for protecting the program against "scope creep."

National Grid USA Service Company, Inc. (the Service Company) has a strong incentive to manage scope creep for the Gas Business Enablement Program because recovery of the costs associated with program implementation is of paramount importance to National Grid. Lessons learned from prior projects have institutionalized the knowledge that "scope creep" adds cost and the corporation will have to absorb costs that are not shown to be reasonably or prudently incurred in the course of implementing this program. In light of past experience, there is zero tolerance internally to jeopardize recovery of the costs associated with Gas Business Enablement Program implementation.

Within this context, the distribution company has considerable leverage to manage scope creep because cost recovery can only occur through the customer rates of the distribution company. The distribution companies are subject to the authority of their respective public utility commissions and rate proceedings will have to be conducted before any costs are fully authorized for recovery from customers. Therefore, the distribution companies are the guardians of the cost-recovery process and are in the position to challenge additions to the program that would increase cost and jeopardize the chances of cost recovery. For this reason, Rhode Island management participates in the project governance for the Gas Business Enablement Program at multiple levels, including review of Gas Business Enablement Program actual costs on a monthly basis.

Importantly, project documentation will serve as the control to assure rigorous adherence to project scope and careful management of associated costs. Specifically, the following will occur: (1) the scope of the Gas Business Enablement Program, as authorized by National Grid to date, is already comprehensively documented; and (2) work streams to implement the systems encompassed in the Gas Business Enablement Program will be documented, including any decisions made during the course of implementation regarding changes to the original work plan or program components. Therefore, any cost increases that occur during project implementation

will be traceable to specific project changes and decision points and will be subject to disallowance if the changes are not warranted or necessary in completing the project.

With respect to the first element of cost control (project design, planning and authorization), there are a number of steps National Grid has already taken to reduce the risk of scope change. For example, there is a clearly defined leadership structure allowing for diversity of input and shared expertise. Project management will occur through the collective work of: (1) the Steering Group;¹ (2) the Design Authority;² and (3) the Senior Executive Sanctioning Committee.³ The Rhode Island Jurisdictional President (Tim Horan) represents Narragansett Gas and Narragansett Electric on the Senior Executive Sanctioning Committee. The Senior Executive Sanctioning Committee sanctions the annual budget for the Gas Business Enablement Program and has the authority to stop, limit, or refocus project expenditures if project additions causing increased costs are planned that are unwarranted or unnecessary for Narragansett Gas. In addition, the Rhode Island Vice President for Customer Meter Services and the Rhode Island Vice President for Gas Field Operations participate on the Design Authority.

With respect to the second element of cost control (work streams that will be conducted to implement the systems encompassed in the Gas Business Enablement Program), the Gas Business Enablement Program team has developed a detailed project plan and implementation roadmap. Using these well-defined scope and work plans, the Service Company was able to achieve fixed-price contracts with its delivery partners to deliver that scope. The Gas Business Enablement Program team also developed a detailed change-control process that requires Steering Group approval for any material changes to the plan. Each year, the Program Team has

¹ The Steering Group has ultimate responsibility for assuring that the Gas Business Enablement Program is completed on a reasonable and prudent basis. The Steering Group consists of the U.S. Chief Executive Officer; Senior Vice President and U.S. Chief Financial Officer; Executive Vice President of Network Operations, Safety, and Capital Development; Senior Vice President of Human Resources and Chief Diversity Officer; Global Chief Procurement Officer; Group Director of Business Excellence; and, the Senior Vice President of Regulatory Affairs. For program delivery, the Steering Group will focus on: (a) strategic oversight; (b) resource requirements; (c) prioritization of the work effort among other operational needs; and (4) emergent issues escalated for review, to the extent necessary.

² The Design Authority functions as the authority on program design, including changes to the work plan. The Design Authority meets at least monthly and is accountable for making key business decisions on items that have the potential to change the scope of the program. The Design Authority consists of the Senior Vice President of Gas Process and Engineering and the vice presidents of work functions within the gas business that are intrinsically related to, and will be affected by, the Gas Business Enablement Program, including management of Narragansett Gas.

³ The Senior Executive Sanctioning Committee is the senior authority in the United States for sanctioning large programs such as the Gas Business Enablement Program. The Senior Executive Sanctioning Committee consists of all senior officers in the United States, representing every jurisdiction and functional area including Rhode Island, and has final authority for approving, modifying, or denying approval for all very large programs. The Gas Business Enablement Program team is required to present its progress to the Senior Executive Sanctioning Committee each year for reauthorization and interim status updates during the year. The Senior Executive Sanctioning Committee has direct line of sight and decision-making authority on planned changes in scope.

to obtain new authorization for the following year's program expenditure from the Senior Executive Sanctioning Committee to give clear visibility of progress and appropriate governance before cost increases are incurred.

Therefore, significant work has been undertaken to make sure that all levels of the National Grid organization are engaged in the GBE Program and to achieve a successful implementation of the new software applications so that it is possible to obtain full recovery of the costs invested on behalf of National Grid's U.S. gas customers, including those served by Narragansett Gas.

PUC 5-27

Request:

Were any independent reviews of the Gas Business Enablement program costs conducted? If so, please provide the results of such reviews.

Response:

Yes. National Grid selected PricewaterhouseCoopers (PwC) as the Business Assurance Partner in the Strategic Assessment phase. Within this role, National Grid tasked PwC to assure that a "fit for purpose" solution was developed; the roadmap was deliverable; and the estimated costs were reasonable and prudent in relation to the solution.

Attachment PUC 5-27 provides PwC's final Stage Gate Report dated February 22, 2017, along with National Grid's response. In that Report, PwC confirmed that National Grid had "developed an appropriate cost estimate for the scope and transformative ambitions of the program."



Johnny Johnston
National Grid USA Service Company, Inc.
40 Sylvan Road
Waltham, MA 02465

February 22, 2017

Re: Stage Gate Report with PwC Advisory findings/observations and high-level recommendations to inform the Stage Gate to move to the next phase of the project.

Stage Gate Report

Dear Johnny,

This report is intended to provide an overview of key findings and high-level recommendations based on review of the deliverables that have been completed by National Grid and Accenture during Phase I of the Gas Business Enablement program. In particular, this report focuses on the Future State Design and Scope and Roadmap for Gas Business Enablement

Stage Gate Recommendation

The GBE Strategic Assessment has been thorough in its approach and provides substantial reference material for the next Phase. It has effectively defined a comprehensive program scope which is well aligned to deliver the program outcomes and developed an appropriate cost estimate for the scope and transformative ambitions of the program.

We believe it would be advantageous to further optimize the roadmap tactics and efficiency of deployment of the current program scope as you progress through the next phase to allow for greater emphasis on user adoption and driving the benefits realization and targeted outcomes. We encourage National Grid to consider the recommendations provide below seriously.

Our assessment is that the program is ready to move into the next stage.

The sections below contain more detail on our findings and recommendations:

Future-State Design

Key Findings

- The solution design is based on industry leading software applications that can support National Grid's GBE Program objectives.
- The design conforms to industry standards to deliver a consistent solution, but can be further tailored to National Grid in specific areas. These areas include contractor management, contractor use of the system, materials handling and clear definition of the Customer Relationship Management solution component.
- There are numerous industry-leading customer experience aspirations that are documented within the requirements matrix that address simplicity and usability, but further definition is required on how CRM will serve as a wrapper for CIS to allow a single application for the CSRs.

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- The design would benefit from a clearer and more systematic linkage of scope to initiatives (e.g. mapping of business processes, data objects, RICEFW/RAWICE Objects, operating model decisions, KDDs, applications to the program initiatives) and the precedence linking of the initiatives; this can be refined during the next phase and will help with governance decisions during delivery
- Impact to the business roles and responsibilities and overall Change Impact is also in early stages of development and is planned to be a focus in the next stages of the project.

Recommendations

- Minimization of customizations is critical to providing the agility to evolve the solution by upgrading with each new product release. This should be a guiding principle for the detailed design teams.
- Establish design governance processes to maintain tight controls on Requirements and Key Design Decisions.
- Conduct an early deep dive to drive out the details in contractor management, contractor use of the system and materials handling to streamline the detailed design effort.
- A similar deep dive concerning the Customer Relationship Management solution component should be conducted early in the detailed design. Particular attention should be devoted to how the Customer Relationship Management solution will serve as a wrapper for CIS allowing a single application for the CSRs.
- The future state for technology is evolving. Emphasis should be placed on the data flow, system of record/entry for key data objects and the overall integration model to ensure that data is synchronized and consistent and supports business processes and analysis for continuous improvement.
- Continue to socialize the solution with the business so they develop a clear vision and build a sense of ownership in decision making within their areas.

Gas Business Enablement Scope and Roadmap

Key Findings

- The proposed GBE roadmap work streams and initiatives provide a program scope well matched to achieve the targeted outcomes and objectives of GBE. The initiative scope goes beyond process and technology to address gaps across the full set of elements of the required core operational business capabilities.
- The 4.5 year deployment duration for the GBE scope elements in the roadmap work streams and initiative listing is achievable.
- When comparing the total costs of this transformation to other industry benchmarks, a business case estimate of >\$500 million is appropriate to cover a transformation of this scale.
- The final version of the SI Work Package provides the level of information necessary for System Integrators to understand the full scope of the Gas Business Enablement program and to enable National Grid to compare equivalent bids.
- National Grid should consider increasing program focus on user adoption of new work practices and tools and resulting benefits realization. This is underserved in the current roadmap where activity typically stops after initial support periods for deployments of new applications and processes.
- We believe the deployment planning of the EAM/WM scope will benefit from further analysis to (a) understand the pros and cons of the proposed “work type” phased approach (which increases



technical complexity) compared to deployment of a core WM solution, and (b) evaluate the initial ramp up of resources and balance between core operational and supporting modules..

Key Recommendations

- While the scope is well structured and the funding is of appropriate magnitude, National Grid should consider optimizing the proposed roadmap planning tactics to focus on more accelerated deployment of the core systems and placing a stronger emphasis on user adoption of new work practices and tools to ensure sustainable business transformation/benefits realization.
- National Grid should consider utilizing a “hybrid agile” deployment during deployment of the EAM/Work Management core. This means that user facing aspects of the solution are developed using a multi-cycle “agile approach” which aligns with the structure/timing of the design-build-test system development life-cycle (SDLC) required for the integration and data management components. Thus the accelerated deployment of core EAM-WM scope will bring forward the viable date for agile ongoing improvement of the core.
- Compliance with the elements of API RP 1173 for a Pipeline Safety Management System has been one of National Grid’s requirements for Gas Business Enablement, however not all elements are as clearly linked to the proposed roadmap as they could be. While it is believed that most requirements are satisfied by the current GBE scope, several areas will need follow-up during implementation – including end-to-end materials traceability process, corrective action program and management of change.

Yours sincerely,

A handwritten signature in blue ink that reads "Chris Fynn".

Chris Fynn, Principal

christopher.c.fynn@pwc.com
T: [1-646-284-6562](tel:1-646-284-6562)

Johnny Johnston
Senior Vice President
Gas Business Enablement



Chris Fynn, Principle
PricewaterhouseCoopers LLP
300 Madison Ave,
New York, NY 10017

March 1, 2017

Re: Stage Gate Report

Dear Chris

Thank you for Stage Gate Report on Gas Business Enablement dated February 22, 2017, and for the support that PWC provided to National Grid through the Strategic Assessment Phase of this important program of work for National Grid and our customers.

As you are aware a lot of work has gone into the first phase and we are pleased to see your overall assessment that the scope is well matched to the desired outcomes, the deployment appears achievable, and the costs are appropriate to cover a transformation of this scale; ultimately that the program is ready to move into the next phase.

I did want to highlight some of the actions that National Grid's is taking to address your findings and recommendations:

1. We have instigated a number of additional interim work items prior to the next phase that specifically will provide clearer and more systematic linkages of scope to initiatives including developing standardized L3 processes. This work has also more clearly defined our requirements around contractors and materials traceability. We are also doing an extended piece of work on data to better inform our thinking in this area.
2. We will be conducting a competitive collaborative/agile procurement process to source our future delivery partners for the next phase. We are planning to leverage this process to better understand potential solutions around the delivery of the customer capabilities that we have said that we need. We have also undertaken a separate customer strategy exercise that is helping better inform the best direction. Our procurement approach will also allow us to assess opportunities that suppliers might have to further optimize the roadmap.
3. Finally, National Grid intends to have overall control of the PMO through the delivery phase. We believe this will help address the various recommendations made around maintaining discipline and strong governance as we go through delivery. We will also be

Johnny Johnston
Senior Vice President
Gas Business Enablement



looking to hire a Value Assurance partner that will provide independent assurance that we are continuing to focus on the right things to support a successful outcome.

I did want to follow up on one area of recommendations where perhaps you didn't have full visibility to all the work we have been doing; that was around Pipeline Safety Management and API 1173. This has been an area of focus for us since the beginning of the program. However we have been leading this work through Dan McNamara with support from a niche consulting firms P-Pic and Mosaic. This has been done in parallel with the Accenture work that PWC has been overseeing and so might be why you believed there were still some gaps. I can confirm materials traceability is part of our requirements and there is a significant piece of work looking at the management of change, particularly related to our policies and procedures. As we move into the next phase we will look to do a better job of articulating how this all comes together into a single roadmap that covers people, process, technology, training and governance to support the implementation of all the elements of API 1173 into National Grid as part of the Gas Enablement program.

Thank you again for the work of your team over the last year, I am excited to see this move into implementation and the difference that this program will make for our employees and customers.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Johnny Johnston", with a long, sweeping horizontal line extending to the right.

Johnny Johnston,
Senior Vice President, Gas Business Enablement

PUC 5-28

Request:

Please explain the difference between Operating Expenses versus Run the Business Expenses.

Response:

Operating expenses relate to costs incurred during the planning through testing phases of the Gas Business Enablement Program, which are not eligible for capitalization under generally accepted accounting principles. These costs include project management, training, data conversion, and software as a service (SaaS) costs. Run the Business expenses relate to ongoing day-to-day maintenance costs of the underlying Gas Business Enablement applications once those systems are deemed in service. Run the Business costs include software and hardware license and support fees, annual ongoing SaaS costs, software upgrades, and annual maintenance and support contracts as well as internal and external labor costs. Run the Business costs requested are in excess of a baseline level of support costs incurred on the legacy applications in use currently.

PUC 5-29

Request:

- (a) For each of the previous five calendar years, 2012 through 2016, identify each safety metric violation and, if applicable, each Information System (IS) program used to manage the task to ensure compliance.
- (b) For each of the IS programs listed in response to the preceding question, identify the converted IS program included in Gas Business Enablement that will either (i) supersede the currently utilized IS program, or (ii) be newly developed to manage the task to ensure compliance.
- (c) When will each converted IS program included in Gas Business Enablement and identified in response to subsection (b) be placed into service?

Response:

Please refer to Attachment PUC 5-29 for the requested information.

NOPV	Date Received	Date of Incident	Location	Description	Current System of Record (a)	Future System of Record (b)	Release Date (c)
12-1	3/20/2012	12/21/2011	Town of Westerly	Alleged outage due to air in gas main	N/A	N/A	N/A
12-2	7/25/2012	4/20/2012	Camp Avenue, N. Kingstown	Alleged accidental ignition from welder's torch due to oxy-acetylene leak	N/A	N/A	N/A
12-3	5/21/2012	5/1/2012	61 Seminole Trail, Cranston	Alleged failure to cut-off services within due date	Paper records / Excel spreadsheets	Maximo	September-20
12-4	10/16/2012	9/19/2012	Audit of Service Abandonment Program	Alleged failure to cut-off services within due date	Paper records / Excel spreadsheets	Maximo	September-20
12-5	11/1/2012	9/19/2012	Audit of Critical Valve Maintenance Program	Alleged failure to perform maintenance within due date	Paper records / Excel spreadsheets	Maximo	September-20
13-1	6/24/2013	4/30/2013	Drug & Alcohol Audit	Alleged contractor failed to perform minimum random drug test requirement of 25%	N/A	N/A	N/A
13-2	9/18/2013	8/27/2013	Audit of Service Abandonment Program	Alleged failure to cut-off services within due date	Paper records / Excel spreadsheets	Maximo	September-20
13-3	10/3/2013	10/2/2013	Audit of Rectifier Program	Alleged failure to inspect and maintain rectifiers in operation	Paper records / Excel spreadsheets	Maximo	October-18
13-4	11/14/2013	10/18/2013	Canal Street, Westerly	Alleged installation of shallow main purge riser	N/A	N/A	N/A
14-1	9/3/2014	5/7/2014	Salve Regina University	Alleged failure to cut-off services within due date	Paper records / Excel spreadsheets	Maximo	September-20
14-2	8/21/2014	7/18/2014	Danielle Ham, Burrillville	Alleged failure to produce OQ's records for contractor performing butt fusions	N/A	N/A	N/A
14-3	10/9/2014	9/25/2014	50-52 Windsor RD, Cranston	Alleged failure to cut-off service within due date	Paper records / Excel spreadsheets	Maximo	September-20
15-1	1/21/2015	12/17/2014	Hartford AV, Providence	Tapping Incident w/ employee injury	N/A	N/A	N/A
15-2	7/2/2015	6/30/2015	Inactive Service Program	Alleged failure to cut-off services within due date	Paper records / Excel spreadsheets	Maximo	September-20
15-3	11/27/2015	11/11/2015	39 Jones ST, Cumberland	Alleged failure to lock off meter	CSS	Salesforce	September-20
15-4	12/22/2015	12/16/2015	Cumberland LNG	Alleged failure to conduct pre-employment drug test for Security Guard	N/A	N/A	N/A
16-1	2/10/2016	9/30/2015	Corrosion	Alleged failure to Inspect bridge piping 2001, 2004, 2007, 2010, 2013	Paper records / Excel spreadsheets	Maximo	October-18
16-2	4/11/2016	3/21/2016	100 Manton AV, Providence	Alleged failure to abandon a gas line as required in 5 years	Paper records / Excel spreadsheets	Maximo	September-20
16-3	7/29/2016	6/21/2016	Dey Street - Control Room MAOP	Alleged failure to maintain Maximum Allowable Operating Pressure	N/A	N/A	N/A
16-5	11/18/2016	11/2/2016	Damage Prevention	Alleged failure to follow O&M Damage Prevention procedures	N/A	N/A	N/A
16-6	11/30/2016	10/13/2016	DIMP	BPA Program – Institute SPECIAL Survey	Paper records / Excel spreadsheets	Salesforce	October-18
16-7	12/20/2016	11/30/2016	Rockland ST @ Morse ST, Woonsocket	Alleged failure to maintain I&R critical valve	Paper records / Excel spreadsheets	Maximo	October-18

PUC 5-30

Request:

Has the RI Gas Infrastructure, Safety and Reliability program resulted in a reduction in pipeline safety violations in Rhode Island?

Response:

Pipeline safety violations have typically occurred due to failure to follow the Company's operation and maintenance policies and procedures, failure to meet target dates on the Company's mandated programs, and some inherited legacy Company assets. The Infrastructure, Safety, and Reliability (ISR) Plan supports safety and reliability goals through capital investments designed to maintain and upgrade the Company's gas delivery system. Over time, the modernization of the Company's infrastructure should mitigate the potential for violations relating to inherited legacy Company assets that cannot be accessed to perform work in accordance with regulatory requirements. For example, replacing cast iron and bare steel mains and relocating meters from inside to outside will eliminate the violations that could occur if required inspections, surveys, and remediation work cannot be performed because of permit restrictions or location access issues. Therefore, although the Company cannot draw a specific correlation between ISR Plan work and the level of pipeline safety violations, the Company is confident that execution of ISR Plan work contributes to the avoidance of violations in the future.

PUC 5-31

Request:

Will Gas Business Enablement program improve gas pipeline safety in Rhode Island? Why or why not?

Response:

Yes. The Gas Business Enablement Program will improve gas pipeline safety in Rhode Island by delivering a solution that provides a holistic view of assets and work. Through the Gas Business Enablement Program, the Company will be able to better prioritize investments and work. The Company will have more robust, standardized 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. This improves operational effectiveness having use of seamlessly integrated systems, a reduced reliance on paper and locally managed spreadsheets, and mobile devices for front-line employees that can be taken from the truck to the point of work with access to procedures, which will help enhance the effectiveness and efficiency of the Company's operation. Further, the Company is investing in enhancements to the technical training program to reinforce skills and operator qualifications of the field workforce to ensure safe and compliant operations.

PUC 5-32

Request:

How will Gas Business Enablement program impact leak detection practices, if at all? Will the implementation of Gas Business Enablement program improve prioritization of leak calls?

Response:

No, the Gas Business Enablement Program will not change current leak detection practices. However, the solution being delivered will enhance the current leak management process (i.e. full lifecycle - odor investigation, grading, surveillance, repair, recheck, and close-out) with deployment of field mobile devices integrated with the work and asset management system including the GIS application.

The leak information will be transmitted electronically, validated, and recorded in the asset management system with visibility of the leak location in the GIS application. The asset management system will be the source of record for all leaks, allowing for the fulfillment of consistent management practices that minimize risk and optimize the useful life of asset investments.

This new functionality improves the leak management process by eliminating the current paper process to record the leak information and location, improving accuracy and demonstrating more consistency in the process. The integration with the GIS application allows the leak location to be identified on a map in near real time providing greater visibility to existing leaks on the gas system. The leak repair order automatically generates a surveillance order in the work management system that can then be dispatched to field personnel to conduct the recurring survey(s) depending on the leak grade. During the surveillance, if the leak readings or migration pattern changes and the grade of the leak needs to be updated, the integrated systems integrated will automatically update the surveillance schedule and the repair schedule in the asset management system and reprioritize the leak repair order as necessary.

PUC 5-33

Request:

Please provide reference to any documentation that supports the National Grid USA's proposed Gas Business Enablement program being identified as a "best practice" to pipeline safety practices.

Response:

Pipeline safety regulations are viewed as minimum requirements for the safe operation of a natural gas system. National Grid is committed to implement a comprehensive Process Safety Management System incorporating elements of the American Petroleum Institute's recommended pipeline safety standards (Recommended Practice 1173) (API RP 1173) to drive continuous improvements in National Grid's safety performance. The API RP 1173 is a holistic approach to pipeline safety that defines the elements needed to identify and address pipeline safety and provides a framework to reveal and manage risk, promote a learning environment, and continuously improve pipeline safety and integrity that can be applied to existing risk control programs. Gas Business Enablement Program initiatives have been mapped to the elements of API RP 1173 for strong alignment to enhance safety and compliance upon implementation.

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 5-33 CONFIDENTIAL. In the report, P-PIC's assessment considered how the Gas Business Enablement Program will support addressing the P-PIC recommendations and conform to API RP 1173 and close the gaps addressing both the intent and letter of API RP 1173. In the findings and recommendations to align activities with the delivery of the Gas Business Enablement Program, the report notes that Gas Business Enablement initiatives are designed to address improvements in being able to ensure and demonstrate compliance and to make data accessible.

Confidential Attachment PUC 5-33 – REDACTED INFORMATION

Confidential Attachment PUC 5-33 is comprised of the final report of Process Performance Improvement Consultants, LLC (P-PIC) issued in March 2017 regarding its assessment of National Grid's Pipeline Safety Compliance Program. The Company has requested protective treatment of the 53-page document in its entirety.