Proposal to Perform a Comprehensive Management and Operations Audit of National Grid USA's New York Electric and Gas Utilities

Case 18-M-0195

Presented to:
Public Service Commission
State of New York

Presented by:
The
Liberty Consulting Group

July 6, 2018

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July 6, 2018

Ms. Kathleen H. Burgess, Secretary
New York State Department of Public Service
3 Empire State Plaza
Albany, New York 12223-1350

Dear Ms. Burgess:

Re: Request for Proposals to Perform Comprehensive Management and Operations Audits of National Grid USA's New York Electric and Gas Utilities - Case 18-M-0195

The Liberty Consulting Group (Liberty) is pleased to present the enclosed *Proposal to Perform Comprehensive Management and Operations Audits of National Grid USA's New York Electric and Gas Utilities.* This proposal responds to the May 17, 2018, Request for Proposals (RFP) issued by the Department of Public Service. We appreciate the Department's continued interest in inviting our responses to RFPs calling for the performance of such important engagements. We believe that Liberty offers a combination of skills, local knowledge, and broad industry experience uniquely suited to performing this engagement effectively:

- Recent completion of the New York utility staffing study - - offering a state-wide knowledge of how utilities structure and staff work on network capital and O&M programs and projects
- Completion of a previous management and operations audit of NYSEG and RG&E
- A previous management and operations audit of CECONY, considered very successful and one that broke new ground
- Current work (to be completed before the National Grid audit commences) on a management and operations audit of an operating utility of Exelon, another very large U.S. holding company
- Prior completion of a comprehensive management and operations audit of Pepco, which serves the Washington, DC metropolitan area, and is now also part of the Exelon family of utilities
- One current and one very recent examination of capital planning, management, and operation of major, long-term gas infrastructure improvement programs in two of the country's largest metropolitan areas (Chicago and the District of Columbia), both of which addressed long-term accelerated high-risk pipe replacement
- Service as technical consultants to the Connecticut utility regulatory staff, addressing readiness, impediments, and challenges associated with a program to increase the state's natural gas consumption by 50 percent.
- Multiple concurrent reviews in 2014 of reliability performance and system "hardness" for North American Atlantic region regulators in the wake of major storm events.
- A review for the California PUC of the use of risk assessment in forming short- and long-term network infrastructure strategies, capital plans, and budgets - - involving PG&E, which provides electricity and gas distribution service across a widely dispersed area.

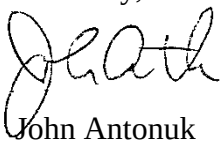
Our experience in just the past few years gives us an unmatched level of knowledge and respect from both regulators and utility management, yet comprises a small part of the track record we have amassed in serving utility regulators for thirty years. We have performed a wide variety of engagements for two- thirds of U.S. utility regulators, four Canadian provincial regulators, and more than 40 utilities. Our work includes more than 20 management audits and dozens of reviews of governance and common service cost assignment/ allocation. We have performed more than 30 examinations of utility holding company affiliate relationships and transactions, concentrating on service companies serving multiple utility operations. We have also performed many engagements at electric and gas utilities addressing reliability and safety, energy procurement, hedging, and management, governance and executive structure, infrastructure replacement and modernization, program, project, and work management, and customer operations.

We are especially pleased to offer a team with strong representation from and long experience with the New York and Mid-Atlantic regions and their utility service providers. Our team includes two engineers, both with many years of utility management experience. They and the remainder of our team have extensive utility planning, budgeting, and management experience in their assigned work areas. The team includes the core members from our audits of CECONY, NYSEG and RG&E, and the New York utility staffing study. The team we offer has worked together on many projects together over a long time, enabling us to offer a cohesive and efficient approach, and further assure the Commission that we can deliver what we promise. We have augmented the team here with a senior, highly experienced information services professional, recognizing the emphasis that the RFP placed on that area and the massive expenditures planned by management.

I hereby certify that the information contained in this proposal is accurate, that Liberty is committed to and has the ability to conduct the work described in this proposal, and that Liberty is in compliance with all RFP requirements. This proposal constitutes a firm offer to provide the services described therein, and that the offer is valid until January 2, 2019. Please feel free to contact us with any questions or information needs. Thank you for considering our proposal to conduct this important engagement.

You may reach us at the address and numbers identified in this letter's header, or contact our office by e-mail at admin@libertyconsultinggroup.com , copying me personally at antonuk@libertyconsultinggroup.com.

Sincerely,



John Antonuk
President

Enclosures

Proposal to Perform a Comprehensive Management and Operations Audit of National Grid USA's New York Electric and Gas Utilities

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I. Introduction and The Liberty Consulting Group's Experience

A. Introduction

The Commission issued, under cover of a May 17, 2018, letter, a Request for Proposals (RFP) in *Case 18-M-0195 – Comprehensive Management and Operations Audit of National Grid USA's New York Electric and Gas Utilities.* This RFP seeks an independent consultant to perform comprehensive management audits of operations of National Grid USA's (NGUSA) New York electric and gas utilities: Niagara Mohawk Power Corporation (NMPC), The Brooklyn Union Gas Company (KEDNY), and KeySpan Gas East Corporation (KEDLI) (collectively the Utilities). This proposal from The Liberty Consulting Group (Liberty) responds to the RFP seeking a consultant to perform these audits.

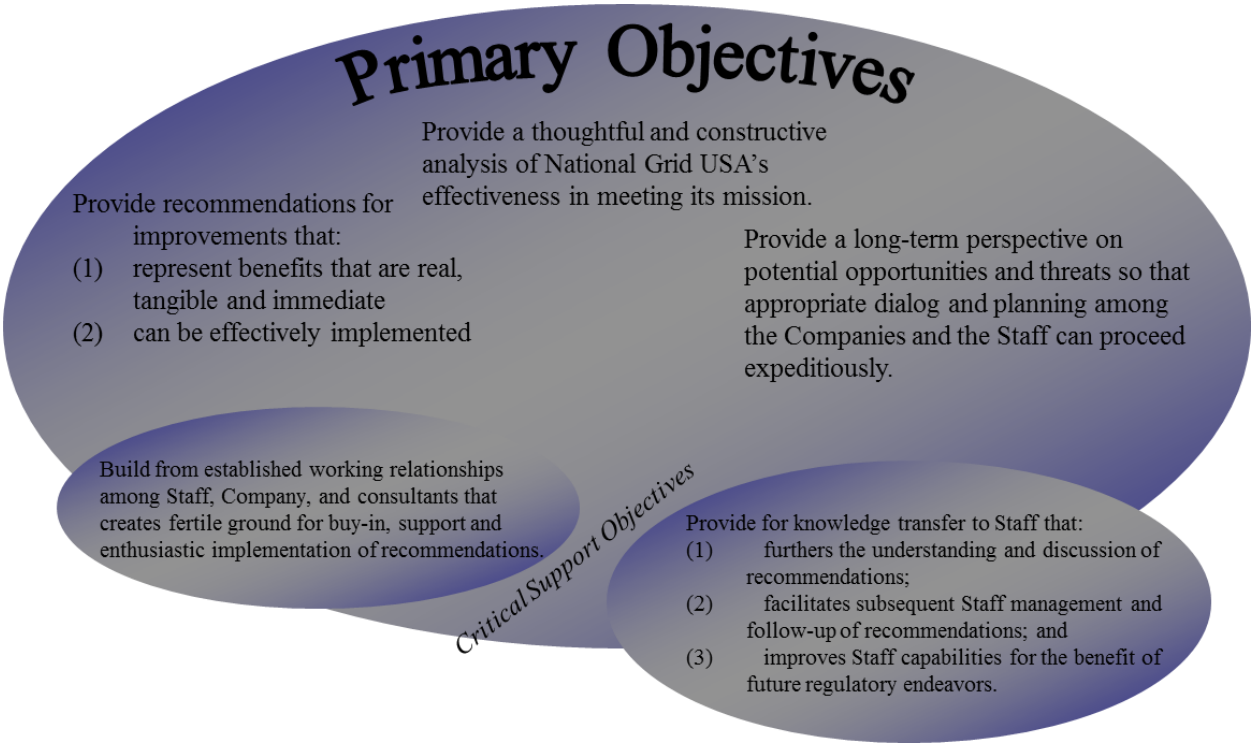
B. Overall Approach

1. The Search for Improvement

As has been true for many years, the New York State Public Service Commission (the Commission) has arranged for the services of an independent firm to conduct comprehensive management and operations audits of New York State utility operations, in accordance with New York State Public Service Law §66(19). The Commission operates one of the country's very first commission-sponsored management and operations audit programs. Liberty has been performing audits under the program for over 25 years. Since that time, the audit approach has continued to focus on prospectively examining utility program planning processes, and evaluating the efficiency of operations for the purpose of identifying opportunities to improve performance.

Driving better performance through improving processes, practices, systems, and organizational structures has been and continues to be an overriding goal of these audits, and Liberty has designed this proposal with that goal in mind.

We have performed more than twenty operations and management audits for public service commissions. We have developed a well-tested and respected set of objectives that help to ensure that our results have benefits beyond providing a "snapshot" of management and operations, but, instead: (a) address changes in the operating environment short- and long-term, (b) contribute to lasting improvements, and (c) increase the depth of knowledge of Commission Staff, which will address the improvement opportunities identified and otherwise continue to work to perform their regulatory responsibilities long after we have left the scene. The next diagram seeks to illustrate the breadth of the objectives we will seek here - - benefits that regulators across the country have found useful.



2. Producing Customer Benefit

The most central objective of this engagement is to produce clear benefits for customers. Those benefits may take the form of reduced costs, enhanced reliability, better service, higher levels of customer satisfaction, or increased transparency or accountability. Whatever form they take, however, it is important that the benefits produced be tangible and timely. Therefore, the audit report should:

- Produce clear and specific recommendations
- Describe all applicable balancing among forms of benefits (*e.g.*, any increased costs required to produce service enhancements)
- Be as precise and comprehensive as possible in quantifying the costs of making changes and the benefits to be obtained.

Liberty's 30-year record of performance for utility regulators in similar projects makes clear that our objective is to seek meaningful improvement, not "change for the sake of change." There often exist different ways to accomplish the same objective. We understand the need to articulate clearly and to support fully how all recommendations proposing changes in strategies, plans, structure, staffing, resource expenditure, programs, policies, methods, procedures, actions, measurement, and feedback will better or more economically serve customers.

3. Long-Term Focus

Consistency and stability were hallmarks of the industry for decades. Change has, however, become a much more important factor, creating significant uncertainties for the future. Moreover, service reliability, which has become a matter of increasing concern across the country, moves much more according to longer-term, as opposed to short-term changes.

On the operations and maintenance side, as Liberty's work at many companies teaches, it can take a long time for service quality metrics to respond to declines in expenditures. Large new investment can, over the long term, drive rates higher without a fully matching level of actual service quality enhancement. Successful performance requires an appropriately long-range view to measure the effectiveness and efficiency of major new investments that will serve the public for many decades to come. The issue of "sustainability" proved to be an especially important one in our CECONY audit, which examined the ability of the company to identify and examine carefully long-term investment needs in connection with the need to keep service affordable.

4. The Staff's Essential Audit Role

Moving from substantive engagement objectives to supporting ones, Liberty has learned from its three decades of work for over 40 North American regulators that audit effectiveness improves significantly in cases where Staff participation is strong, and not just in administrative and project management matters. Liberty has always welcomed Staff participation in all audit activities, including the sessions where Liberty's team members discuss and debate among themselves the nature of current management and operations and the possibilities for improving them.

Knowledge transfer to Staff comprises another support objective for this project. Our team members routinely work with Staff members of the many commissions we serve to answer their specific questions about both management and operations and how to examine them effectively. We have worked with large and small staffs. We have now worked on many occasions with New York Staff. Liberty has consistently demonstrated the openness and candor required to serve effectively in a knowledge-transfer capacity. We often perform that role in the variety of relationships and interactions that take place on our projects.

Liberty will stand ready to assist Staff by allowing it to:

- Develop an understanding of both what we view to be the present circumstances at NMPC, KEDLI, KEDNY, and NGUSA and how and why we consider the particular circumstances on which we focus to be the important ones
- Apply a framework for placing what we do at the Utilities and what we consider important there into contexts that will apply at other utilities in the same industries
- Differentiate what makes circumstances at and affecting NMPC, KEDLI, and KEDNY different from its peers and understanding where they are similar
- See what specific evaluation criteria Liberty applies, how the team applies them to the facts, and why those criteria are considered the proper ones for examining management and operations efficiency and effectiveness
- Gain the benefit of team member experience in understanding how changes in the industry have affected the opportunities, challenges, and needs facing NMPC, KEDLI, and KEDNY utility operations specifically, and its peers generally.

C. Knowledge of New York's Utility and Regulatory Environment

1. Liberty's Long and Varied New York Utility and Regulatory Experience

Changes generally affecting the electric and gas industry, the specific circumstances and environments of National Grid's New York utility operations (which extend across the whole state), utility-related statutes and regulations, and state policy and regulatory initiatives all will provide guideposts, dimensions, and in some cases boundaries for this audit. We begin with a broadly-based understanding of these factors developed in the course of performing many New York engagements, spanning a period exceeding 25 years. Perhaps the most compelling is our recently completed staffing study performed contemporaneously at every major state electric and gas utility. It was preceded by the varied engagements noted below:

- NYNEX procurement and affiliate practices and transactions (early 1990s)
- Management and operations audit of NYSEG (1990-1992)
- Management and operations audit of Central Hudson Gas & Electric (1992-1993)
- Review of Verizon's compliance with the New York PUC's FiOS installation grounding requirements (2010)
- Management and Operations Audit of CECONY (2008-2009)
- Management and Operations Audit of NYSEG and RG&E (2011-2012).

The staffing study we completed in 2017 included consideration of staffing issues related to REV, and to accelerated replacement programs for leak-prone pipe - - two major areas of focus in this engagement. That study also addressed planning, work management, and performance measurement - - all key contributors to effective management of staffing and all Elements of this audit. It also included a detailed examination of broad segments of staffing at National Grid USA's New York electric and gas operations.

Liberty also performed in 2010-2011 an examination of affiliate relationships and transactions for National Grid, addressing operations in New York and New England. Our independence in scoping and performing that examination was a stated company objective, was a necessary element of our agreement to perform it, and was discussed with representatives from multiple commissions to seek their understanding of our independence and how we would go about ensuring it.

The ultimate approach agreed to by the company and Liberty, and explained to regulators, can be defined in a succinct, straightforward way - - we would conduct this audit under conditions, methods, and with the independence similar to what would apply to an audit of this type when conducted for utility regulators. We independently scoped, executed, and reported on an audit conducted substantively as we would have done in a commission-sponsored audit of corresponding scope. Both this approach and the now significant number of years since completing it (during which we have not performed additional work for the company) obviate, in our view, any concern about our independence in performing the management and operations audit this proposal describes.

We have also conducted two separate management and operations audits of the New York Power Authority for the Office of the Controller.

2. Highlights of Recent Developments

The 72 specific focus areas under the RFP's twelve audit Elements correspond closely to matters of significant operations, ratemaking, and planning importance and attention. We have made each of those 72 a specific Task Area in the preliminary work plans described below (and presented in Section II of this proposal). Our first audit efforts will seek to flesh out an understanding of these matters at a level sufficient to ensure that we undertake our work with an appropriate understanding of how management needs to consider them and of the overall framework we will use in forming conclusions and making recommendations. Just some of these matters include:

- New York has used a multi-year approach in rate setting. That approach has considered three-year horizons. The approach makes it important for the Utilities to provide periodic reports that conform structurally and tie data closely to the plans, budgets, and schedules used internally by senior leadership and the boards of directors. If the ways that management reports and manages costs differ from how the Utilities report them to the Commission and to the Department, divergences undermine confidence in the effectiveness of this approach to ratemaking.
- Moreover, in a number of cases, ratemaking incentives (growing out of stakeholder dialogue following items like those originally proposed as "EAMs" or outcome-based Earnings Adjustment Mechanisms in the most recent NMPC rate filing) require specific cost and performance measures, making the ties between internal measures and reported ones all the more important.
- As our recent statewide staffing study addressed, very large gas pipe replacement programs (*e.g.*, a reported 50 mile per year annual pace by NMPC) imposes great and continuing program management and resource marshalling and application needs, in an environment where public policy supports acceleration of efforts to remove the safety risks associated with leak-prone mains and services (a program also supported by ratemaking incentives and requiring accurate costs and performance measurement).
- A National Grid-wide Gas Business Enablement project (GBE), recently begun, and seeking, as management describes it, to "transform National Grid's U.S. gas operations" through process and technology investments cutting through many of the 12 Elements the RFP for this audit has defined. The roughly ½ billion dollars committed to GBE underscore its breadth, importance, and need for careful oversight and control from the board to the project management levels.
- Acknowledgement by management of the need for material safety performance improvement, underscoring the importance of the RFP's focus on areas that include performance metrics and targets, training, violations, and performance incentives, all representing areas where management has proffered changes.
- The steady advance of REV efforts, early and not very "energetic" a few years ago when we began looking at them, but "on the ground" with four NMPC demonstration projects, one recently begun in the Buffalo area, and addressing VaDER (not altogether an unfortunate acronym, given its connotation of the "power" of the "force" that state policy continues to seek to release).
- NMPC has projected annual capital spending that would reach a billion dollars per year by 2021, underscoring the emphasis that the RFP for this engagement places on capital program planning, prioritization, budgeting, and controls.

- Street lighting, a classic electric industry "stepchild" is in for significant change at NMPC as well, with provisions for transferring systems to willing municipalities and available opt-ins and incentives for upgrading to LED technology.
- Risk rankings for prioritizing pipe replacement, a focus area for this audit, have been addressed in National Grid utility rate proceedings, making the decisions reached an important factor to consider in our work.

3. Specific Regulatory and Policy "Touchstones"

A range of specific proceedings, orders, statutes, regulations, and other forms of documented guidance and control underlie matters like those listed in the preceding list. The RFP refers directly to some and implicitly addresses many other recent changes, orders, proceedings, and other contributors to circumstances that National Grid's management faces in management and operations going forward. Some address issues on a statewide basis, and some apply specifically to National Grid's New York electric and gas companies.

We always treat efforts to understand the particular regulatory policies, requirements, and expectations applicable to the utilities we are examining as a critical focus of early audit work. Here, as the RFP demonstrates, many regulatory touch points directly and substantially address subjects embodied in the 72 focus areas the RFP specifies. We therefore plan to begin work with an even more focused effort to ensure that we do not wander too far down the many roads and side paths that fact-finding inevitably requires before ensuring a full and common understanding by all team members of regulatory factors that should be influencing management attention, and therefore will have importance for us as well.

Our first audit steps will seek to develop the understanding of these regulatory touch points at the level necessary to ask management informed questions at interviews and secure meaningful documents through written requests. We will work with Department Staff at audit outset to ensure we have a full list and that we develop a robust understanding of them. Among such change contributors and environment determinants whose details and key documents we will explore early include, but will not be limited to:

- The *Reforming the Energy Vision* (REV) proceeding (Case 14-M-0101) launched in 2014
- Proceeding to develop accurate pricing for distributed energy resources (DER) and the Value of Distributed Energy Resources (VDER) compensation system
- NMPC's June 30, 2016, Distribution System Implementation Plans (DSIPs) and any modifications that may occur during the audit road-mapping planning, operation, and management of a modern electric grid
- The February 2015 Order Adopting Regulatory Policy Framework and Implementation Plan and NMPC filings for demonstration projects directed by that order
- Internal assessments addressing *Energy Efficiency Program Data filed in response to the* March 2018 Order in Case 15-M-0252; the EE Data Governance Assessment Report due in September 2018
- Details of NMPC's investment of an expected $2.5 billion over three years to reinforce and modernize its electric transmission and distribution system
- Efforts to meet the Commission's directive that NMPC seek cost-effective, non-wires alternatives

- Use of and measurements under required updates to performance metrics for leak-prone pipe removal, leak management, damage prevention, emergency response, and gas safety
- Progress in implementing required gas safety programs
- Information System upgrades and enhancements (Call Center and Gas Business Enablement Program) and incentives for reducing costs of IS project implementation
- Street Lighting upgrading
- Changes resulting from the statewide staffing audit (Case 13-M-0449)
- Changes resulting from the performance metrics review (Case 13-M-0314)
- Home Energy Fair Practices Act (HEFPA)
- Low Income Program proceeding (Case 14-M-0565).

The Task Area descriptions that follow later in this proposal make clear that many of these contributors will form primary focuses of examination. We list them here as objects of our first audit inquiries to highlight the importance of beginning our work with a clear understanding of the knowledge they impart about circumstances affecting National Grid's New York utility operations, the direction and guidance they provide for management and operations, and the perspective they offer on the views of management, the Commission, Staff, and other stakeholders about what management attention and leadership should focus.

Liberty's management and operations audits of CECONY and NYSEG and RG&E took a forward-looking view of major, long-term challenges. Examples include very long-range (multi-decade) network planning and the use of risk management to drive capital and O&M planning. Both areas were at the time leading edge in the business. Our team has since completed a staffing study of all the state's energy utilities, including efforts to incorporate REV into organization and staffing planning. This audit of offers an opportunity to engage very deeply in that area, driving the review to strategic, programmatic, and tactical thinking into the areas implicated by the move to a new vision of the marketplace and utility roles in it.

In addition, other issues, like expanding gas service in fundamentally changed markets and tackling the problems of aging infrastructure, whether electric or, more particularly, natural gas, have greater visibility. New York's gas distribution utilities operate thousands of miles of leak-prone, high-risk pipe. How to prioritize, accelerate, and pay for its replacement have become major issues. Across the country, utilities, pressured significantly by their regulators, have been facing aging infrastructure, service expansion, new markets, and other issues that have become increasingly visible. In the past two years alone, Liberty's work for commissions on such emerging issues has included utilities across a broad stretch of the country, including, for example, Chicago and Washington, DC.

4. Customer Benefit Analysis

Careful consideration of expected benefits and anticipated costs has formed a fundamental component of management audits in New York for some time. The means for doing so has changed somewhat, moving from the earlier concept of Cost/Benefit Analysis to the current Customer Benefit Analysis model. We utilized Cost/Benefit Analysis in previous management and operations audits (*e.g.*, CECONY), giving us familiarity with the process, templates, and expected results. Those efforts have given us an understanding of the aspects central to executing the Customer Benefit Analysis successfully:

- Understanding and finding ways to deal with innate management concerns about agreeing to "numbers" that may have eventual rate case consequence
- Taking into account the potential benefits and risks, one-time and ongoing costs, and potential savings
- Dealing with the uncertainties associated with each of those factors
- Finding ways to share information early enough in the process to allow for careful construction of required, quantitative cost and benefit information
- Working jointly with management in seeking an agreed-to identification and use of needed cost and savings information
- Maintaining, at the same time, the "arms'-length" relationship necessary to produce a final, documented analysis that, while informed by management's information and participation, remains one behind which Liberty is willing to stand independently.

We appreciate fully how important a part demonstrating that recommendation implementation will provide benefits plays in this engagement and the analytical rigor that such demonstration requires. We dedicate a later section of this proposal to explaining our approach and providing starting templates for guiding the Customer Benefit Analysis process. The required analyses include defined components: potential benefits, potential risks, one-time costs, ongoing costs, potential savings, potential efficiency gain, and not easily quantified benefits like greater management visibility on performance drivers, reduced reliability, or safety risk.

Our project hours assignments also include substantial hours dedicated to the Customer Benefit Analysis process, and our schedules incorporate the work activities needed to perform them effectively. We also propose to dedicate a senior, Albany-area-based employee, Dr. James Letzelter to guide the interactions, data assembly, and analysis required. He has long and very strong experience in analytical and data-driven industry analyses of various kinds. His Albany location will support regular and on-demand access to Department Staff, which will serve to expedite work and seek to resolve differences in individual analyses as project work proceeds.

We also understand the risk of short-changing Customer Benefit Analysis by deferring it for too long. Recommendation development and definition enable the process to begin, and the process must be performed generally at the individual recommendation level (likely with some opportunities for consolidating related recommendations for the analysis). As we have done before, we will seek to produce recommendations in a stream that begins as early as possible. This varies from the more common approach - - first exposing recommendations in a usable form in a final draft that puts them all on the table contemporaneously, late in the engagement, and with limited budget remaining. Streaming rather than batching them enhances the ability for full attention on the details of each in formulating robust Customer Benefit Analyses. Done this way, the analyses benefit from the contribution of all three parties and the airing of differences, whether fully reconciled (as hoped) or not (as needs to be considered a substantial possibility).

The Final Report will provide our final Customer Benefit Analyses for each recommendation.

D. Audit Work Structure

1. The RFP's 12 Elements

The RFP for this engagement sets forth a list of 72 areas of focus (each defined and described as a "Task Area") organized into the following 12 overall Elements set forth in the RFP:

1. Corporate Governance
2. Information Systems
3. Electric Planning and Grid Modernization
4. Electric Load Forecasting and Supply Procurement
5. Gas Planning
6. Gas Safety
7. Budgeting and Finance
8. Project Management
9. Program Management
10. Work Management
11. Performance Management
12. Customer Operations.

The RFP and question/answer session with potential bidders lead us to understand that the RFP did not intend the 72 listed focus areas as a limiter of the scope of review under each of the 12 generally-identified audit Elements. In some cases, the focus areas listed under the 12 areas combine to provide a scope typical in examining the Elements in a management and operations audit. In those cases, we have designed task area work using the exact structure of the RFP, seeking to show specifically how we propose to provide what each numbered RFP focus area seeks.

For a few other Elements, we have defined, scoped, and explained some additional task areas, added at the end, following descriptions of task area work aligned exactly with the RFP. The small number of tasks that we have added address what we consider useful in: (a) providing the context in which activities related to the numbered focus areas are planned and executed and (b) producing findings, conclusions, and recommendations that are mindful of that context and appropriate in ensuring overall effectiveness and efficiency in the functional area (*e.g.*, Corporate Governance or Gas Planning) or in the more specific subjects identified (*e.g.*, Grid Modernization).

2. Audit Task Ares

We have divided audit work into 12 Elements, which correspond directly and sequentially to those identified in the RFP. Moreover, under each of those 12 Elements, we have designed and structured task areas, each one again corresponding directly and sequentially to the RFP's numbered list of 72 focus areas aligned under the 12 Elements. For each of the resulting task areas, Section II of this proposal:

- Defines the scope of the work involved
- Explains the importance of the subject to effective and efficient management and operations
- Describes the dimensions of the review we will undertake.

We noted above that, for some of the 12 Elements, we have identified task areas that provide important overall context for addressing how management and operations under the identified focus areas can affect management and operations effectiveness and efficiency more broadly. In all such cases, we have created certain specific task areas and provided for the same definition, examination objectives and dimensions as for the RFPs numbered focus area.

We will produce for each of the RFP's 12 Elements and for the Task Areas under them a thorough and careful analysis of the Utilities' current structure, resources, methods, and performance as they concern New York electricity and gas operations. Meeting this objective requires recognition of the major changes that have taken place in the industry generally, and in New York specifically, since the last comprehensive management audit. REV and distributed energy resources provide primary examples of such change in the state generally. The continuation of low gas prices, sustained by massive additions to natural gas supply reflect another. The existence of major information system and leak-prone pipe replacement activities of National Grid's New York operations highlight the kinds of specific circumstances that require consideration.

E. Final Report Structure and Guiding Principles

The final audit report will comprise the principle and overridingly important deliverable from this engagement. The RFP emphasizes a need that we believe our reports related to work in New York have always provided, and which we consider to be outstanding features of our work products. Specifically, we:

- Provide narrative and quantitative descriptions (Findings) that give broad and reasonable detailed context for understanding the key factors driving the aspects of management and operations examined in each Task Area
- Establish clear and comprehensive standards for evaluating management and operations (Evaluation Criteria) in definitive work plans, and continually re-validate their completeness as developing Findings bring forth new issues or areas meriting examination
- Provide clear judgments about performance (Conclusions) versus each of the established Evaluation Criteria
- Make a clear connection between Conclusions and the Findings and the Evaluation Criteria, through narrative explanations of the Conclusion and through ensuring completeness of the Findings
- Include for each Conclusion an explanation of where, why, and to what extent performance does and does not match those criteria
- Provide a clear, concisely-worded statement of the improvement opportunity (Recommendation) presented by each Conclusion that expresses gaps between performance and the applicable Evaluation Criterion
- Provide a narrative explanation of how the Recommendation address all gaps expressed in the Conclusion explain, what change implementation will produce, and what steps and time should be required to achieve implementation
- Complete and document the required Customer Benefit Analysis for each Recommendation for inclusion in an appendix to the final report

- Include references to all underlying source documents (Endnotes) used in forming Findings, Conclusions, and Recommendations.

F. The Driving Role of Clear Evaluation Criteria

As has been true in all of our work in New York and as is emblematic of the approach we have used generally for three decades, definitive work plans will provide the first major output of our audit efforts. A draft of those work plans will detail explicitly the criteria under which we will conduct our examination. Those criteria will seek to establish the key questions that need to be answered in addressing management and operations under each task area. We will report separate conclusions, succinctly stated, explained, and supported that respond to each evaluation criterion.

Starting from an extensive list of criteria used in our extremely-broad range of such work, we will produce final criteria tailored specifically to the circumstances our early audit field work discloses, promising areas of examination and analysis identified from those circumstances, and regulatory and other public policy requirements and expectations specifically applicable here. Section VIII of this proposal provides a link to a sample of the way we structure detailed work plans and the specificity we include following initial fact-finding on engagements like this one.

We will use each of those criteria to drive a list of work activities appropriate to reaching conclusions on the satisfaction of those criteria at the end of audit work. Again, we will begin with an extensive roster of activities we have found useful in the past but will tailor it to the final criteria, circumstances, promising opportunities, and regulatory requirements and expectations specifically applicable here. For each conclusion that expresses a gap from expectations embodied in the criteria, we will, as described above, form concise recommendations for improvement, explain and justify them, and provide a Customer Benefit Analysis demonstrating the value in implementing them.

G. Liberty's Nationwide, Multi-Decade Service to Utility Regulators

For some 30 years Liberty has performed a broad array of comprehensive and focused engagements, including reviews of power and energy purchases and sales, fuel and energy supply and management audits, reviews of corporate governance in utility holding company structures, reviews of affiliate transactions and cost allocations, focused reviews of construction program expenditures and results, reliability assessments, and other consulting engagements for over two-thirds of the country's state public service commissions, which the table below lists. These other projects include evaluating restructuring proposals and impacts, assessments of utility financial separation and integrity, merger and acquisition reviews, and revenue requirements analysis, among others. Liberty has performed or is performing many projects for U.S. regulators, and has conducted management, operations, and affiliate reviews for utility authorities in Canada and in Central America.

Liberty's North American Utility Regulatory Clients

Alberta	Idaho	New Hampshire	Oregon
Arizona	Illinois	New Jersey	Pennsylvania
Arkansas	Indiana	New Mexico	South Dakota
California	Iowa	New York	Tennessee
Colorado	Kentucky	Newfoundland	Texas
Connecticut	Maine	North Carolina	Utah
Delaware	Maryland	North Dakota	Vermont
District of Columbia	Minnesota	Nova Scotia	Virginia
Florida	Mississippi	Ohio	Washington
Georgia	Montana	Oklahoma	West Virginia
Hawaii	Nebraska	Ontario	Wyoming

A testament to the strength of Liberty's performance is the number of commissions that have asked the firm back to perform repeat engagements, sometimes in circumstances or on subject areas far different and more challenging than those under which Liberty first served them. The unifying attribute of Liberty's work for commissions in its long service to them is the ability to help them to deal with the especially difficult regulatory challenges that take place when regulatory policy intersects with complicated operations requirements. Liberty does its best work in managing the "traffic" that flows through these crossroads. Dealing with highly technical or controversial management or operations issues that fall out from important changes in regulatory policy or major unforeseen events has characterized Liberty's work for commissions.

H. Management and Operations Audits

1. Liberty's Management and Operations Audit Experience

Liberty is a national leader in the performance of management and operations audits of public utilities, predominantly in the electricity and natural gas industries. Liberty has performed 24 such reviews at energy utilities across a period of over 20 years. Liberty has performed management and operations audits of electricity utilities, including investor-owned, cooperative, municipal, and statewide authority entities. The following table lists many of Liberty's prior management audits.

Alabama Electric Coop. (G&T)	Dayton Power & Light	Pepco
Atlantic City Electric/PHI/Exelon	East KY Coop. (G&T)	So. Connecticut Gas
AGLR/Elizabethtown Gas	NJR/New Jersey Natural Gas	SJI/South Jersey Gas
Arkansas Western Gas	NYSEG	United Cities Gas
Alliant/IPL	NY Power Authority	West Penn Power
Central Hudson G&E	NU/Public Service NH	Yankee Gas
Connecticut Natural Gas	NorthWestern Energy	Bell Atlantic
Consolidated Edison of NY	NUI/Elizabethtown Gas	A major municipal electric utility

2. NY Staffing Study

Liberty completed in 2017 a comprehensive, detailed study of staffing by all of New York's electric and gas utilities. This study examined how the state's energy utilities define, organize, structure, and staff the functions associated with network planning, design, construction, maintenance, and operation. The work included detailed examinations of the processes that the utilities use to determine staffing needs, apply resources, and measure performance. Liberty compared these staffing design and execution elements, identified best practices, and made recommendations designed to enhance staffing efficiency and effectiveness.

3. Management and Operations Audits

The following list shows that we continue, following our performance of our last management and operations audit for the Commission, to remain the country's leader in performing management and operations audits for utility regulators.

a. Atlantic City Electric Management and Operations Audit

Liberty is currently performing a management and operations audit of Atlantic City Electric for the New Jersey Board of Public Utilities. This utility, like the others under PHI, recently became part of the large and extensive Exelon family of companies. We expect to complete it prior to the work inception on this proposed engagement. This two-phased, broadly-scoped audit comprises the fourth such review we have performed for New Jersey utility regulators. In addition to the scope elements traditionally included in New Jersey's audits, this one adds two key focus areas of particular emphasis. The first of these is a 10-year review of Financial Performance, designed to identify the root causes of a long period of utility underearnings. Liberty's team developed an innovative approach designed to identify causation factors over the course of this period, and to identify reasons for their occurrence and continuation. The audit also includes a detailed review to determine the condition of and status and financial data related to ACE's distribution system and operations as they pertain to a number of state initiatives and spending programs aimed at addressing Reliability Programs, Electric System Resiliency, Restoration Abilities, and Distribution Planning Criteria and Forecasts. These tasks are in addition to a tradition review of electric transmission and distribution system planning, reliability, and operations. The audit includes the following tasks:

Phase One

- Evaluation of Financial Performance
- Procurement and Purchasing
- Affiliate Relationships
- Internal Controls
- Market Conditions
- Previous Audit Recommendations
- Cost Allocations
- Capital Allocation
- Cost Recovery Mechanisms
- Non-Rate Related Revenues

Phase Two

- Executive Management/Governance
- Organization Structure
- Human Resources
- Strategic Planning
- Finance
- Cash Management
- Accounting & Property Records
- Customer Service
- External Relations
- Distribution & Operation Management

- Operations Review
- EDECA
- Merger Conditions
- Clean Energy
- Support Services
- Contractor Performance

As with NMPC, KEDLI, and KEDNY, Atlantic City Electric operates as part of a large holding company structure. The recent acquisition (completed in March 2016) of ACE's parent Pepco Holdings by Exelon Corporation in 2016 places the utility in a position of being served by multiple holding company levels and more than one service company that provides critical services.

Liberty's final report is slated for issuance in advance of the project start time stated in the RFP to which this proposal responds.

b. Pepco Management and Operations Audit

Prior to the PHI/Exelon merger, Liberty performed for the D.C. Public Service Commission a broad management and operations audit of Pepco, PHI's largest utility operating subsidiary. Our review included the following task areas:

- Corporate Governance
- Executive Management
- Affiliate Transactions
- System Operations
- System Planning
- Power Supply (for SOS)
- Underground Utilities
- Finance
- Human Resources
- Customer Operations
- External Relations
- Information Systems
- Support Services

The final report for this project was released June 12, 2014.

c. Connecticut's Statewide Natural Gas Infrastructure and Availability Expansion Initiative

In 2013 Liberty served as an extension of the Staff of the Connecticut Public Utility Regulatory Authority (PURA) which is reviewing proposals for a massive expansion of the gas distribution system and gas use in the state. Connecticut's gas distribution systems share the problems of older systems in the Northeast U. S., including cast-iron mains and corrosion problems. The state has established a major initiative to produce a massive expansion of the natural gas availability for economic and environmental reasons. This initiative will require very large capital expenditure programs by all three of the state's major LDCs across an extended time period.

d. Interstate Power and Light Management and Operations Audit

Liberty completed a comprehensive management and operations audit of IPL and its parent, Alliant Energy, for the Iowa Utilities Board. This first ever management audit for the IUB addresses the full scope of management and operations as they affect the provision of electric and gas utility service offered by IPL. Construction programs, planning and execution, electric and gas operations, and customer service formed major areas of focus in this engagement. The audit also addressed emergency planning and response as a special area of focus. The audit followed major flooding across much of IPL's serving area. The audit also examined planning, governance, executive management, finance, budgeting, affiliate relations and transactions, and energy supply, among other areas.

A key part of this audit focused on IPL's natural gas operations. Liberty surveyed the key elements of gas design, construction, operations, and maintenance, including personnel planning and resource management, construction program management, engineering, and use of contractors. Liberty reviewed the overall effectiveness and efficiency of the maintenance programs as well as how the company established maintenance goals, objectives, and programs. Liberty also reviewed inspection and maintenance programs, including performance in monitoring performance parameters and characteristics for the purpose of maintaining reliability. Additionally, Liberty examined the procedural and process issues related to purchasing and managing outside services.

The final report for this project was released September 27, 2012.

e. Iberdrola SA/IUSA/NYSEG & RG&E Management and Operations Audit

In 2012 Liberty completed for the New York Public Service Commission a management and operations audit of Iberdrola SA/Iberdrola USA/NYSEG and RG&E. Iberdrola operated five major U.S. utility operations: electric and gas service in New York by NYSEG, electric and gas service in New York by RG&E, and electric service in Maine by Central Maine Power. Iberdrola USA also operated small natural gas utility operations in Maine and New Hampshire. It also provided natural gas delivery through larger utilities -- two in Connecticut and one in Vermont. Iberdrola USA also operated a variety of New York and New England subsidiaries in a number of different business areas. A separate U.S. subsidiary of the Spanish based parent operated the second largest wind generation business in this country. The scope of this audit included how New York's two electric and two natural gas utilities manage and conduct and were affected by: (a) governance at the holding company and utility level, (b) structure, operations, costs, efficiency, and allocations of the service company serving U.S. utility and non-utility operations, (c) construction program planning, (d) system management and operations programs, (e) workforce management, (f) performance measurement and management, (g) supply planning and operations, and (h) wholesale markets (ISO issues).

The final report for this project was released June 4, 2012.

f. NorthWestern Energy

Through 2013, Liberty assisted NorthWestern Energy in the ongoing development of a major, long-term infrastructure improvement plan. That work included participation in a broadly-based stakeholder group, which engaged with NorthWestern in a many-month process of sharing ideas about service objectives, capital and O&M programs, Smart Grid development, costs of alternative future programs, and future ratemaking alternatives. Liberty's work included assistance in identifying, prioritizing, planning, budgeting, and subjecting to project management and performance measurement systems major infrastructure improvement needs affecting both electricity and natural gas delivery networks. The engagement included an overall assessment of U.S. infrastructure (energy and non-energy) declines, major governmental support initiatives for infrastructure improvement, Smart Grid opportunities and risks, novel utility/regulator plans for participatory infrastructure planning and cost recovery methods, the merging of urban and rural service expectations, the particular difficulties in maintaining rural reliability in normal and transient conditions, and other issues surrounding the full integration of capital and O&M planning across both short and very long horizons.

Liberty issued a report on October 21, 2011 and was involved with NorthWestern management in report implementation through early 2013.

I. Customer Service

1. Liberty's Customer Service Reviews

Liberty has examined customer service in virtually all of its two-dozen management and operations audits, in addition to several other focused examinations of utility customer service organizations, systems, and operations. Liberty's customer service expert, Christine Kozlosky, has conducted significant research into customer care best practices, process improvement, and performance benchmarking, and maintains an extensive database of customer service metrics from companies in all industries. She has also led best-practice surveys addressing customer services for multi-company groups, has published newsletters addressing utility customer service practices, and is a recognized national expert in this field. Christine also has extensive experience in competitive, functional, and process-based benchmarking, both inter-company and multi-company performance comparisons. The following table lists Liberty's customer service reviews by client and by utility examined.

Client	Utility	Client	Utility
Colorado Springs	Municipal Utility	New Hampshire PUC	NU/Public Service NH
Connecticut DPUC	Connecticut Light & Power	New York PSC	NYSEG
Connecticut DPUC	Connecticut Natural Gas	Nova Scotia UARB	Nova Scotia Power
Connecticut DPUC	So. Connecticut Gas	New Jersey BPU	Atlantic City Electric
Connecticut DPUC	Yankee Gas	New Jersey BPU	Elizabethtown Gas (twice)
Dayton Power & Light	Dayton Power & Light	New Jersey BPU	South Jersey Gas
District of Columbia	Pepco	New Jersey BPU	New Jersey Natural Gas
Illinois CC	Commonwealth Edison	New York PSC	Central Hudson G&E
Kentucky PSC	East Ky. Coop. (G&T)	Ohio PUC	SBC/Ameritech
Kentucky PSC	KU and LG&E	Pennsylvania PUC	West Penn Power
Maine PUC	Central Maine Power	Pennsylvania PUC	Bell Atlantic
Maine PUC	Emera Maine	Stillwater, Oklahoma	Municipal Elect. Utility
New Hampshire PUC	Liberty Utilities (three)	Tennessee RA	United Cities Gas

2. Selected Liberty's Customer Service Reviews

a. Central Maine Power

Liberty is in the process of performing for the Maine Public Utility Commission a forensic audit seeking to identify the root causes of a major wave of customer billing complaints following conversion of its customer information system to a new platform. This process includes each step

in the billing process from meter reading accuracy through bill prints as provided to customers. We are examining each system that receives and transmits data used to calculate and process bills. We are also examining each path used to transfer information from the meter through each "stop" on the way to bill print, in order to verify accuracy from start to finish.

We are also examining the management of completion, turn-over, and transition to the new customer information system, in order to determine whether and, if so, how it may have contributed to billing errors or to the ability of customer service representatives to respond timely and appropriately to customer inquiries and complaints.

b. Liberty Utilities New Hampshire

In 2016, Liberty performed a focused management audit of the Customer Service function of Liberty Utilities New Hampshire. This review included an extensive focus of all elements of this function, in addition to examinations of Information Technology and Corporate Support Services, Vendor Relationships, Accounting, Business Planning, and Capital and O&M Budgeting. Subsequent to the completion of this audit, Liberty performed follow-up assessments of Customer Service performance and Planning and Budgeting to assess the effectiveness of corrective actions implemented by the company in response to Liberty's audit recommendations.

c. Emera Maine

In 2016, Liberty performed a focused management audit of the Customer Service, implementation of a new CIS System, and Electric Transmission and Distribution and System Operations of Emera Maine for the Maine Public Utilities Commission.

d. Newfoundland Power and Newfoundland Hydro

Starting in 2014, Liberty has performed for the Newfoundland and Labrador Public Utilities Board extensive reviews of electricity reliability and outages, customer service operations and communications, generation, and transmission issues associated with Newfoundland Power and Newfoundland Hydro.

e. Connecticut Light & Power

Liberty's CL&P Storm Review, performed as an Extension of PURA Staff in 2012, included reviews of call center and telephony capacities and performance, web and IVR self-service response, social media and proactive customer communications, public relations and communications, Outage Management System performance, and Estimated Restoration Times effectiveness.

f. Kentucky Utilities and LG&E

In 2010, Liberty performed a management and operations audit of the customer service function of KU/LG&E for the KY PSC. This audit included the following focus areas:

Customer Service *Operation and Maintenance Expenditures*
Capital Budgeting and Spending *Strategic Planning*
Customer Information Systems Support

f. Ameritech-Ohio

Liberty performed a comprehensive investigation of Ameritech-Ohio's service delivery quality. This engagement included an assessment of Ameritech-Ohio's installation and repair operations and processes, and an in-depth review of performance measures and service quality benchmarks. As part of this review, Liberty conducted a management review of Ameritech-Ohio's customer service and call center operations that examined the management and operations of the company's sales, service and repair organizations. A large sample of calls were monitored from each of the business offices to determine if the company's employees were adequately disclosing required information to customers and complying with commission regulations. The processes and systems supporting service and repair representatives were also reviewed to identify opportunities for improvement. Recommendations were made for improvement and follow-up.

J. Electric Utility Infrastructure Reviews

Liberty has performed over twenty focused reviews of electric system infrastructure. They demonstrate our ability to combine the knowledge of and experience with effective program and program management as carried out on a large scale. Both commissions and utilities have taken advantage of Liberty's expertise in examining system planning, design, dispatch, construction, maintenance, and operations in an effort to improve service reliability and to identify the causes of persistent problems or major outages. In addition to these more focused reviews, we have performed a dozen management and operations audits that have included reviews of the planning, design, construction, and project management of electric utility infrastructure. Multiple listings mean that Liberty performed a number of distinct engagements involving the same utility.

Alabama Power	Commonwealth Edison	Maine Public Service Co.
Ameren Illinois	Commonwealth Edison	NorthWestern Energy
Atlantic City Electric	Connecticut Light & Power	NorthWestern Energy
Bangor Hydro	Consolidated Edison	Nova Scotia Power
Central Maine Power	Central Maine Power	Pepco
Commonwealth Edison	Georgia Power	Public Service NH
Commonwealth Edison	Eastern Maine Elec. Coop.	United Illuminating

1. Atlantic City Electric

As noted above, our current management and operations audit of Atlantic City Electric for the New Jersey Board of Public Utilities includes a detailed review to determine the condition of and status and financial data related to ACE's distribution system and operations as they pertain to a number of state initiatives and spending programs aimed at addressing Reliability Programs, Electric System Resiliency, Restoration Abilities, and Distribution Planning Criteria and Forecasts. These tasks are in addition to a tradition review of electric transmission and distribution system planning, reliability, and operations.

2. Newfoundland Power and Newfoundland Hydro

Liberty has completed for the Newfoundland and Labrador Public Utilities Board extensive reviews of electricity reliability and outages, generation, and transmission issues associated with Newfoundland Power and Newfoundland Hydro. We also performed a prudence review of a large

series of capital projects and O&M programs undertaken following a series of widespread electric outages. We have also been regularly monitoring a variety of areas for some time, including near-term adequacy of supply resources for coming winter seasons, and progress in completing major, undersea ac/dc lines linking the island of Newfoundland to Labrador (the site of a major hydro generating facility in Labrador) and to Nova Scotia (providing a major path for electricity flow into and from Newfoundland).

3. Emera Maine

In 2016, Liberty performed a focused management audit of the Customer Service, implementation of a new CIS System, and Electric Transmission and Distribution and System Operations of Emera Maine for the Maine Public Utilities Commission. The T&D Systems Operations and Maintenance review included:

- Systems Operations and Dispatch
- System Maintenance
- Reliability
- Budgeting
- Field Work Management.

Liberty's work in this area was supported by an extensive review of field work by company personnel.

4. Nova Scotia Power

In 2014 and 2015, Liberty completed for the Nova Scotia Utility and Review Board an examination of the utility's response to a major weather event and of practices contributing to the ability of its network to withstand adverse conditions. Follow-up verification work continued into 2017.

5. Pacific Gas & Electric

In 2012 and 2013 Liberty completed for the California Public Utilities Commission Staff an assessment of PG&E's use of risk assessment in forming capital and O&M expenditure requests in a major rate filing. Liberty examined risk assessments and safety expenditures related to generation and electricity delivery assets and systems. Liberty's work assessed how PG&E examined the probability and consequences of potential failures of physical assets and systems, and the impacts of those failures on public safety. Liberty reviewed the processes and activities for assessing public and employee safety risks, identifying options for addressing those risks, and analyzing the costs and benefits of proposed prevention, mitigation, and response measures.

6. Connecticut Electric Utilities Response to 2011 Storms

In 2012, Liberty performed (as extension of the Connecticut Public Utilities Regulatory Authority Staff) an investigation of the Service Response and Communications of Connecticut's electric utilities to two separate 2011 storms that caused significant outages. Liberty's work included reviews of pre-filed testimony, an audit of storm response and procedures, appearance at and cross-examination of witnesses in public hearings, and preparation of a report used in the drafting of the PURA's decision.

7. Commonwealth Edison Transmission and Distribution Systems

Liberty was engaged from 2000 through 2008 in a very extensive program of work for the Illinois Commerce Commission, for which Liberty has performed a variety of comprehensive investigative, monitoring, and ratemaking assignments associated with the company's transmission and distribution reliability. This work began with a 2000 comprehensive examination of events surrounding and responses to a major series of outages experienced in Chicago. Liberty undertook as part of this examination a review of transmission and distribution management, operations, and supporting systems and a review of the reliability of Commonwealth Edison's transmission and distribution systems. These projects have included:

- 2000 Investigation: Comprehensive examination of T&D and supporting management systems and review of the reliability of Commonwealth Edison's transmission and distribution systems following major outages.
- 2002-2004 Reliability Monitoring: On-site, quarterly monitoring of corrective actions to address T&D management and operations improvement needs, and on-call consulting services to investigate any significant outages.
- 2004 Review: Detailed review of the performance capabilities of Commonwealth Edison's transmission system adequacy to prevent system blackouts in the wake of the major 2003 blackout.
- 2005 Investigation: Root cause analysis of a major substation fire.

8. Ameren Illinois Transmission and Distribution Systems

Liberty performed an assessment of whether three different Ameren Illinois utilities:

- Appropriately planned, designed, constructed, inspected, and maintained their electric delivery systems.
- Adequately planned, prepared, and executed storm-service restoration efforts following a July 2006 windstorm and a November 2006 ice storm that affected hundreds of thousands of customers.

The windstorm caused service interruptions to almost one million customers in St. Louis and parts of southern and central Illinois. Over 300,000 electric customers lost service in Illinois. Restoring service completely took over a week. The winter storm caused nearly 235,000 Ameren Illinois customers to lose electric service and caused extensive tree damage, broken poles, downed lines, and the loss of nearly 100 distribution feeder circuits.

Liberty's review of Ameren was also extremely comprehensive. Liberty provided a comprehensive written report providing separate findings and recommendations for each of the three utilities. The report included the investigations' conclusions, an evaluation against each of the two major criteria noted above, and detailed recommendations for improvement that each utility can implement. Liberty was subsequently engaged in providing quarterly verifications (for a period of up to three years), against specific implementation plans and schedules, that each utility has implemented the recommendations and any initiatives each utility may plan to undertake.

Liberty's comprehensive written report addressed the following requirements that the Commission established for the engagement:

- One: Storm Description and Analysis
  - Complete and factual description of the July and November/December storms
  - The provision of data and information related to the amount of ice/snow on lines and structures, wind velocities, broken poles, other equipment damage, and company information on the effects of the storm
  - An evaluation of the accuracy of the companies' service interruption information
- Two: T&D Planning, Design, Protection, and Construction
  - Reports on: (1) the companies' planning, design, and construction of transmission, distribution, and substation facilities in general, and (2) any aspect of T&D planning, design, or construction that contributed to the ill effects of the 2006 storms
  - Evaluation of T&D lightning and animal protection systems and practices
  - Evaluation of T&D line and substation fault protection designs
  - Review of engineering resources available to perform planning, design, and construction tasks; a determination of the degree of engineering centralization and differences in engineering practices among the utilities
  - Assessment of the design criteria for physical loading on structures and overhead lines, including a determination of whether: (1) the loadings created by the 2006 storms exceeded the design criteria, and (2) the storm damage was caused by physical loadings in excess of design criteria
  - Review of T&D equipment ratings
- Three: Maintenance, Inspection, and System Conditions
  - Evaluation of the companies' T&D line, pole, substation, and relay maintenance and replacement programs, practices, and results
  - Evaluation of the companies' T&D line, pole, and substation inspection programs, practices, and results
  - Appraisal of the vegetation management program and practices
  - Root causes of T&D line and substation outages
  - Assessment of T&D and substation system conditions
  - Review of the companies' work forces
  - Assessment of the degree to which maintenance and inspection practices and system conditions contributed to the effects of the 2006 storms
- Four: Emergency Planning
  - Assessment of the companies' emergency plans and storm preparations, including the companies' training and drill procedures for emergency response
  - Review of the companies' practices related to weather and load monitoring and pre-event mobilization and communications
  - Examination of the following topics:

General Information	Administration/Resources	Recovery
Planning Process	Testing the Dry Run	Protection
Employee Services	Hazard Analysis	Disposal
Restoration Activities	Authority	Transportation
Inventory Control	Organizational Structure	Personnel Support
External Services	Communications	Equipment Maintenance

Customer Services	Emergency Plan	Procurement
Customer Types	Discharge Control	Documentation
Auditing & Accounting	Assessment	Capability Assessment
Environmental Response	Containment	Facilities
Pre-Event Activities	Post-Event Activities	Training and Drills

- Five: Restoration Performance
  - Evaluation of the companies' weather and load monitoring activities, event prediction activities, pre-event alert process, mobilization of the emergency response organization, performance of the emergency response centers, performance of field command centers, and the use of outside resources
  - Evaluation of the companies' outage management systems, restoration status monitoring and reporting, and damage assessment
  - Evaluation of the companies' event communications and performance of call centers
  - Evaluation of the performance of the companies' support organizations such as safety, security, logistics, materials, and transportation
  - Evaluation of the companies' field restoration organization, processes, and performance
  - Evaluation of the companies' post-event processes and performance such as ramp-down, clean-up, and post-event critiques.

9. Maine's System Reliability

For the Maine Public Utilities Commission, Liberty examined the reliability of the four largest electric T&D companies in the state of Maine. The areas that Liberty examined generally fell into the following categories:

Budgeting and Expenditures	System Reliability	System Planning	System Design
Equipment Ratings	Inspections	Maintenance	Vegetation Management

10. Southern Services Company

Liberty performed assessments of T&D standards and practices in two separate engagements conducted on behalf of Alabama Power Company and Georgia Power Company. The areas examined included:

System Protection	System Operations	Underground Network
Maintenance	Inspections	Distribution Mapping

11. Montana T&D Reliability

NorthWestern Corporation, which purchased the utility system of Montana Power, provides electricity and natural gas to over 600,000 customers in Montana, South Dakota and Nebraska. The electric system has more than 29,000 miles of transmission and distribution lines and associated facilities serving 299 communities and surrounding rural areas covering two-thirds of Montana, eastern South Dakota, and Yellowstone National Park in Wyoming. The Montana Public Service Commission became concerned about the maintenance of NorthWestern Energy's transmission and distribution system reliability resulting from financial problems experienced in

non-utility operations. The Company selected Liberty because it was a firm recognized to be experienced in the field and having substantial credibility with regulators for candor and objectivity to perform an evaluation of the utility's overall transmission and distribution systems. Liberty's review addressed the following subjects:

- Inspection, maintenance, replacement, and upgrading of equipment and overall transmission and distribution system
- System performance compared to other similarly situated utilities
- Collection, analysis, use, and adequacy of system reliability data and indices to evaluate system reliability
- Work priority guidelines and the sufficiency of the resulting expenditures
- Comparison of existing T&D standards and practices with good-utility standards and practices.

Liberty's examination addressed and produced recommendations in the following specific areas:

Interruption Frequency	Equipment Failures	Vegetation Management
Relays	Substation Maintenance	Pole Maintenance
Inspection Program	Distribution Planning	Cable Failures
Animal Induced Failures	Inspection Schedules	Financial Forecasts
	Staffing	

12. Nova Scotia Power

Liberty performed for the Nova Scotia Utility and Review Board an examination of the transmission system of Nova Scotia Power. The assignment came in the wake of a 100,000-customer, fall 2004 outage that produced pole, tower, and conductor failures that left many without electricity for days. The outage also overwhelmed the utility's call center. Liberty's review examined: (1) system maintenance, inspection, structural design, materials, staffing, and related matters, (2) system planning, operations, system design, lessons learned, and other matters, and (3) utility communications, call center operations, staffing, outage management system, lessons learned, and related matters.

Liberty's examination included the following subjects:

- System Maintenance and Design
- Field examination of structures to determine general condition, failure causes, and prevalence of dangerous conditions
- Utility assessments of failure causes
- Pole, tower, hardware, and conductor inspection, maintenance and testing programs
- Inspection records to assess adequacy of dangerous condition identification and response
- Inspection frequency, documentation, quality, and conformity with company procedures and good-utility practice
- Prioritization of corrective maintenance tasks identified by its inspection program and tracking and monitoring of corrective maintenance tasks to completion

- Vegetation management program compared to programs employed by other North American utilities
- Protective relay scheme designs, relay scheme maintenance programs, actual maintenance practices
- Outage event review process
- Process for identifying incoming major storms, precautionary actions, and operator training for major storm events
- Controls for assuring operation of the system according to planning and ratings criteria
- Dispatching of line technicians and materials, construction methods, and the level of staffing of line technicians
- Inventorying of replacement poles, towers, hardware, and conductors
- Emergency supply agreements with suppliers and other utilities
- Pole and tower design criteria, including material and construction specifications
- Process for incorporating lessons learned from prior events
- Transmission System Planning and System Design
- Single-line diagrams, load flow and other data and analysis concerning constraints to electricity flow in the system
- Adequacy of the system to meet contingencies in accordance with applicable system design criteria
- Monitoring program ability to isolate and minimize outage areas
- Adequacy of fault indication devices
- Adequacy of system design criteria and conformance with, coordinating council design and operations criteria
- Load forecasting techniques
- Ratings applied to system components to ensure they are not overstressed
- System models employed and suitability for prediction of system study results
- Operator procedures and capability at the Energy Control Centre during incidents
- Communications and Outage Response
- Call center ability to handle normal and emergency call volumes
- Staffing levels of call center during normal and emergency operation, benchmarked against other North American utilities
- Outage management system capabilities and performance
- Basis for outage notification.

K. Gas Operation, Systems, and Safety Practices

Liberty has performed over a dozen reviews of natural gas system infrastructure and operations including focused reviews and as part of management and operations audits of gas utilities.

1. Management Audit of Washington Gas Light PROJECT*pipes*

The District of Columbia Public Service Commission requires annual audits of a massive safety improvement program by Washington Gas Light Company. We are currently performing a management audit of the program which focuses on (a) program and executive management oversight and direction, (b) construction integrity, including the quality of installation and construction, (c) cost estimates, overruns, and actual cost reasonableness, and (d) prudence of project work in management and completion. Liberty's project team for this engagement includes each of the four team members we propose for this engagement.

2. Peoples Gas AMRP

From 2014 through 2017, Liberty performed for the Illinois Commerce Commission an investigation of Peoples Gas planning and implementation of an accelerated program for replacing a very large number of high-risk gas mains (AMRP). The goal of this examination was to: (a) improve AMRP planning and execution in order to ensure that Peoples completes the program in the shortest reasonable time and at the lowest reasonable cost, and (b) provide the ICC with a demonstrable, measurable basis for monitoring cost, schedule, and quality moving forward to completion. A comprehensive report of this examination set forth:

- The processes we used for evaluating performance in the many areas critical to effective and efficient AMRP planning and execution
- The criteria under which we performed that evaluation clearly and simply stated, and explained factual findings (cross referenced to supporting information) addressing performance under those criteria
- Conclusions succinctly stated and clearly supported addressing how:
    - People's performed against the criteria
    - Based on current plans and expectations how one might expect it to perform into the future
    - Where and how changes in performance could improve cost, schedule, and quality.
- Specific recommendations for improving cost, schedule, and quality, supported by explanations of where and how such improvements could occur.

The year-long Phase One addressed in detail the key determinants in judging AMRP program design and execution, including but not limited to:

- Foundation basis
- Experience to date
- Reasons for variances between expectations and results
- Realism of initial cost and schedule estimates
- Reasonable projections of cost and schedule going forward
- Planning and budgeting support from the parent/corporate financial planning processes
- Program and project management processes and effectiveness
- Comparison to best practices in similar programs

- Measures for assessing risk and prioritizing by zone, equipment type and condition, operating characteristics, and other factors
- Effectiveness in identifying and addressing technical design, engineering, and construction issues
- Cost, schedule, and quality metrics used to measure progress and performance
- Levels and capabilities of and division of work between internal and external resources
- Identification and timely and economical acquisition of materials and equipment.

Liberty completed in June of 2017 a two-year follow-up recommendation verification phase.

3. WGL Gas Pipe Leaks

Through 2013, Liberty served as technical consultant to the District of Columbia PSC as it examined the usage and cost recovery of a hexane injection strategy used by Washington Gas Light (WGL) to reduce leaks in old-vintage couplings, following the introduction of large amounts of LNG into the system. Liberty prepared a report and assisted in the preparation of testimony relating to the:

- Prudence of the hexane injection strategy of WGL to respond to the effects of massive injections of liquefied natural gas into its distribution system
- Recovery of hexane injection costs
- Planning and recovery of costs associated with a significantly accelerated program for correcting increased leaks associated with the facilities affected by the introduction of LNG
- Safety and cost impacts on the District and its customers.

The initial case in this matter was settled between the District of Columbia Office of the People's Counsel and WGL. The settlement provided for a Vintage Coupling Replacement and Encapsulation Program, to address the problem of leaking mechanical couplings, and a Plant Recovery Adjustment, to recover the costs of the Program. After the Commission approved the settlement, Liberty assisted the Commission in: (a) examining the computation of the Plant Recovery Adjustment, and (b) monitoring the progress of the Vintage Coupling Program.

4. Peoples Gas of Chicago

For the Illinois Commerce Commission Liberty performed a review and evaluation of Peoples Gas' overall operations and maintenance activities and its pipeline safety program to determine:

- Compliance with federal and state regulations
- Conformance of those activities and program with industry best practices and best practices determined by the ICC Staff in consultation with Peoples Gas.

Upon the completion of this baseline assessment, Liberty monitored the efforts of Peoples Gas to implement recommendations from our audit. Specific focus areas of the audit included:

- Excavation Damage Prevention
- Corrosion Control
- Management and Maintenance of System Assets

- Operator Qualification
- Construction System Support, Programs, and Records.

The final report Liberty issued in the matter is dated December 23, 2010.

5. NYSEG and RG&E

Liberty's management and operations audit of NYSEG and RG&E, performed for the NY PSC, included a detailed examination of Gas System Planning at both companies. Included in this review were examinations of:

- Organization and Staffing
- Key System Planning Parameters
- Planning Process
- Distribution System Modeling
- The Gas Capital Spending Plan
- Replacement of Leak-Prone Pipe.

6. Management and Operations Audits

In addition to the projects described above, Liberty has reviewed Gas Operations, Gas System Operations, and Safety practices in management and operations audits of:

Arkansas Western Gas	IPL/Alliant	So. Connecticut Gas
Central Hudson G&E	NJR/New Jersey Natural Gas	SJI/South Jersey Gas
Connecticut Natural Gas	NUI/Elizabethtown Gas	United Cities Gas
Consolidated Edison of NY	NYSEG	Yankee Gas
	NorthWestern Energy	

7. NiSource Maine (Northern Utilities Gas Company)

For the Maine Public Service Commission Liberty conducted a management audit of the company's safety operations and practices, which will produce a report setting forth findings on the adequacy of gas safety management and operations, and making any recommendations appropriate to improving them. This audit came in response to a growing series of problems with gas safety operations and practices, driven by a series of commission examinations of potential violations of state and federal regulations.

L. Energy Procurement – Electric Companies

These examinations generally address the effectiveness and efficiency with which vertically integrated utilities procure and manage fuel and energy. While that function is not pertinent here, the reviews have generally examined forecasting and how it is used by those responsible for supply resources.

1. Mississippi Power Company

For the Mississippi Public Service Commission, Liberty performed three separate annual audits of fuel and energy procurement by Mississippi Power Company. The principal focuses of Liberty's audit were to:

- Verify that fuel and purchased energy and their costs were properly identified
- Assess practices for economical purchase and use of fuel and energy
- Assess contract terms and conditions and any variations from them
- Examine the prudence of power purchases, including transactions with affiliates
- Examine a sample of individual fuel and energy purchases.

Liberty's structure for this review encompassed the following principal areas:

Organization/Staffing/Controls *Coal Procurement* *Coal Supply Management*
Modeling & Analytics *Natural Gas and Oil* *Purchased Power/Sales for Resale*

The last report was released in December 2016.

2. Arizona Electric Power Cooperative

Liberty examined for the Arizona Corporation Commission electric power generation by Arizona Electric Power Cooperative, in two separate audits (2010 and 2013).

The final report for the first audit was released on July 30, 2010, and for the second audit on April 29, 2013.

3. Nova Scotia Power

Liberty has for many years regularly reviewed for the Nova Scotia Utility Regulatory Authority (the Utility and Review Board) power supply management by the province's electric utility, Nova Scotia Power. These reviews have included the performance of three audits of the utility's fuel clause, as well as several reviews associated with annual rate case filings. The reviews have included examinations of electric power purchases and sales, the procurement of coal, natural gas, and fuel oil used for generation, and management and operation of the Company's generating fleet.

Liberty's most recent report was issued in August of 2016.

2. Other Reviews of Electric Utility Solid-Fuel Management

Liberty has also performed for other public utility regulators focused examinations of fuel and energy procurement and sale by electric utilities:

- Kentucky PSC: Focused management audit of all operational and managerial aspects of the fuel procurement functions of Kentucky Utilities, including an examination of the organizational structure and the operational interrelationship of fuel procurement management among affiliates. Fuels involved included coal, natural gas, and fuel oil.
- Kentucky PSC: Focused management audit of all operational and managerial aspects of the fuel procurement functions of Louisville Gas & Electric, including an examination of

the organizational structure and the operational interrelationship of fuel procurement management among affiliates. Fuels involved included coal, natural gas, and fuel oil.

- Nova Scotia UARB: Review, evaluation, and ratemaking adjustments of Nova Scotia's 2005 fuel and energy costs based on an examination of fuel and energy procurement and management, and a review of the reasonableness of major fuel procurement transactions.
- Nova Scotia UARB: Review, evaluation, and ratemaking adjustments of Nova Scotia's 2006 fuel and energy costs based on an examination of fuel and energy procurement and management, and a review of the reasonableness of major fuel procurement transactions.
- Nova Scotia UARB: Review, evaluation, and ratemaking adjustments of Nova Scotia's 2007 fuel and energy costs based on an examination of fuel and energy procurement and management, and a review of the reasonableness of major fuel procurement transactions.

In addition to the preceding focused examinations of fuel and energy, Liberty has performed for public service commissions a number of general management and operations audits whose scope included an examination of fuel and energy management by electric utilities. These engagements include:

- New York PSC: Consolidated Edison of New York
- Kentucky PSC: East Kentucky Power Cooperative (Generation and Transmission Cooperative)
- New Hampshire PUC: Northeast Utilities/Public Service Company of New Hampshire
- New York OSC: New York Power Authority
- New York PSC: Central Hudson Gas & Electric
- New York PSC: New York State Electric & Gas (Two Separate Engagements)
- Pennsylvania PUC: West Penn Power Company
- Iowa Utilities Board: Interstate Power and Light.

Liberty has also performed a number of fuel and energy purchasing and management engagements for electric public utilities. They include:

- Central Illinois Public Service Company
- East Kentucky Power
- Potomac Electric Power
- Public Service of Colorado
- Alabama Electric Cooperative.

M. Supply Planning and Energy Procurement – Natural Gas Companies

These examinations generally address the effectiveness and efficiency with which natural gas distribution companies manage the capacity and commodity aspects of natural gas supply. The reviews have generally examined forecasting and how it is used by those responsible for supply resources.

1. Liberty's Natural Gas Supply Planning Experience

Liberty has reviewed the procurement of natural gas supply on 45 occasions. Energy procurement and portfolio management have been primary focus areas in the general management and operations audits of natural gas LDCs that we have performed for public service commissions. We

have also performed management/performance audits of Ohio LDCs. These audits routinely included supply planning, organization, staffing and control, gas acquisition strategy and transactions, transportation, affiliate transactions, balancing, regulatory management, and response to changes in regulation. Additional review areas have included the roles of affiliates and wholesale marketers with respect to an LDCs natural gas procurement function, asset management agreement evaluations, and the procurement of natural gas supply for the purpose of electric power generation.

Client	Utility	Client	Utility
Arizona Corp. Comm.	AEPCO	New York PSC	ConEdison
Arizona Corp. Comm.	AEPCO	New York PSC	RG&E
Arizona Corp. Comm.	Arizona Public Service	New York PSC	RG&E
Atmos	Atmos	New York PSC	NYSEG
CT DPUC	Connecticut Nat. Gas	New York PSC	NYSEG
CT DPUC	So. CT Gas	NH PUC	KeySpan
CT DPUC	Yankee Gas	NM PRC	SPS
Dayton Power & Light	Dayton Power & Light	NS UARB	NSPI
Illinois Commerce Comm.	Peoples Energy	NS UARB	NSPI
Iowa Utilities Board	Interstate Power & Light	NS UARB	NSPI
KY PSC	Columbia Gas	NS UARB	NSPI
KY PSC	Delta Natural Gas	PA PUC	Peoples Natural Gas
KY PSC	LG&E	PUCO	CG&E
KY PSC	Union Light, Heat, & Power	PUCO	Columbia Gas of Ohio
KY PSC	Western KY Gas	PUCO	Duke Energy Ohio
MS PSC	Entergy Mississippi	PUCO	East Ohio Gas
MS PSC	Entergy Mississippi	PUCO	Eastern Natural Gas
National Fuel Gas	National Fuel Gas	PUCO	Pike Natural Gas
New Jersey BPU	ETG	PUCO	Vectren
New Jersey BPU	ETG	PUCO	Duke Energy Ohio
New Jersey BPU	NJNG	United Cities Gas	United Cities Gas
New Jersey BPU	SJG	VA CC	Sequent
Wyoming PSC	KN Energy		

2. Liberty Utilities New Hampshire

In 2017, for the Staff of the New Hampshire Public Utilities Commission, Liberty examined (among other issues) the prudence with which senior management directed and oversaw the planning, budgeting and execution of major gas capital programs. In 2018 we began an evaluation of the Companies Integrated Resource Plan to determine the reasonableness of planning processes and analyses, addressing factors including load growth, system planning, and supply planning, and their use to justify significant capital expenditures for a new pipeline and a very large LNG facility designed to increase the availability of capacity and supply.

3. Mississippi Power Gas Procurement and Management

For the Mississippi Public Service Commission, Liberty performed three separate annual audits of fuel and energy procurement by Mississippi Power Company. The audit included a review of the

Company's management of the large gas requirements of Southern Company's fleet. The most recent final report was released in December of 2016.

4. Nova Scotia Power Gas Procurement and Management

Liberty has for many years regularly reviewed for the Nova Scotia Utility Regulatory Authority (the Utility and Review Board) gas supply management by the province's electric utility, Nova Scotia Power. Liberty's most recent report was issued in August of 2016.

5. NYSEG and RG&E

Liberty's management and operations audit of NYSEG and RG&E, performed for the NY PSC, included a detailed examination of Gas Supply Procurement at both companies. Included in this review were examinations of:

- Organization and Staffing
- Controls
- Commodity Procurement
- Capacity and Storage Contracts
- Gas System Control
- Forecasting and Peak Load Forecasting
- Competitive Markets and Retail Access
- Metering and Measurement
- Lost and Unaccounted for Gas.

6. Entergy Texas Gas Fired Generation Costs and Values

Liberty completed in 2017 a project for the Texas Public Utility Commission (PUCT). The Entergy system utilities operating across the Deep South, from Mississippi to Texas, have performed common system planning, operation and maintenance, dispatch and other services, largely through a service company and under a so-called System Agreement. The Entergy operating companies are also in the process of moving to MISO. Consideration of that move by the PUCT raised the issue of the departure of the Texas Entergy operating utility (ETI) from the System Agreement, which would make ETI responsible for the management of the services formerly provided under the direction of the service company. Liberty evaluated the operating and economic consequences of ETI's exit from the System Agreement. Our work included consideration of current and future costs and values of market and ETI-owned supply resources, including gas-fired units.

Liberty's report was released in August of 2013, and our work monitoring ETI's readiness for system agreement exit ended in 2016.

7. Competitiveness of New Hampshire Fossil Generation

Liberty examined in 2013 for the New Hampshire Public Utilities Commission the threats to the competitiveness of the fossil fleet of the state's dominant utility, Public Service Company of New Hampshire (owned by Northeast Utilities). The principal threat to the fleet comes from the emergence of natural gas fired generation as a comparatively very low cost competitor in New England generation markets. Liberty looked at current and forecasted fuel economics and plant

efficiencies, among other factors, in seeking to determine whether natural gas has a long-term advantage and the degree to which price volatility (such as experienced during winter "basis blowouts") for natural gas might permit coal units to serve a hedging function. Liberty has performed over a long period a number of engagements for the Commission and involving PSNH/NU. They include past management, operations, and fuel audits, assistance in crafting a major settlement of federal-court stymied industry restructuring, and oversight of divestiture planning and the competitive sale of the Seabrook nuclear generation station.

The final report for this project was released on June 7, 2013. We later worked for the Governor's energy office in crafting and negotiating a settlement agreement (supported by a large range of business and environmental interests) calling for divestiture of the remaining utility generating units, and supporting it in hearings before the New Hampshire Public Utilities Commission.

8. Arizona Electric Power Cooperative Gas Procurement and Management

Liberty examined for the Arizona Corporation Commission the procurement of natural gas for electric power generation by Arizona Electric Power Cooperative, in two separate audits (2010 and 2013).

9. Entergy Mississippi Gas Procurement and Management

For the Mississippi Public Service Commission, Liberty performed two separate audits of fuel and energy procurement by Entergy Mississippi. Both audits focused specifically on managing the large gas requirements of Entergy's fleet, which a service company managed in common across the Entergy footprint. The final report for the first audit was released December 20, 2011. The final report for the second audit was released March 14, 2012.

N. Utility Finance, Holding Company, and Ring-Fencing

Liberty has particularly broad experience in examining utility financial separation and insulation and governance for public service commissions. Liberty's examinations of board structure, membership, governing documents, and operation now extend to about 25 engagements for public service commissions. Our most recent engagement examined for the Staff of the Public Utility Commission of Texas the financial and operating benefits and risks associated with the more than $18 billion acquisition of Texas's largest electric utility (Oncor) by NextEra Energy, which operates a major Florida utility (Florida Power & Light) and an extensive portfolio of non-utility generation resources.

We also conducted two studies for the Delaware Public Service Commission Staff. Liberty this year testified in Delmarva Power & Light proceedings about the need for and the existing gaps in utility ring-fencing measures. Shortly before that, Liberty completed a study of the non-utility factors influencing the issuance of Delmarva debt during the U.S. financial crisis, when the utility's trading affiliates were experiencing severe liquidity problems.

Liberty has already examined Sarbanes Oxley Section 404 compliance at many utility companies operating as part of a holding company structure.

Liberty began a decade ago to examine utility governance and the implications of poor non-utility financial performance on utility subsidiaries. Liberty examined the reasons for a widely-publicized dispute between the directors and executive management of Virginia Power (the state's largest electricity provider) and their counterparts at the holding company, Dominion Resources (DRI). Faced with the need for a real-time response to a significant and very public governance crisis, the Virginia commission asked Liberty to examine governance in detail.

In a groundbreaking study for the New Jersey Board of Public Utilities, Liberty conducted a detailed examination of how and how well the governing structure adopted by PSEG served its major subsidiary, PSE&G, which was one of the country's largest electricity utilities. That study came in the wake of poor performance by non-utility ventures, and included a focused examination of the impacts of historical non-utility performance on utility financial condition and a similar assessment of likely future harm to the utility.

Liberty's pre-eminence in this field has continued to the present. Liberty examined and eventually prepared testimony for commission staff in an electric and gas utility acquisition proceeding, addressing a variety of governance and utility financial protection issues. Liberty's observations, conclusions and recommendations proved to be material factors in eventual public service commission rejection of the acquisitions. In that engagement, Liberty analyzed for the Staff of the Arizona commission the proposed acquisition of UniSource by a group of private investors, whose purchase would end UniSource's history as a publicly traded company. UniSource owns three Arizona utilities: two electric and one natural gas.

Liberty has performed a review of affiliate transactions of the Nova Scotia Power Company for the regulatory Board in that province. Within the past four years, Liberty has also conducted focused examinations of governance and utility financial insulation at six holding company/utility subsidiary situations for the New Jersey Board of Public Utilities. At all four New Jersey electric companies, Liberty's governance review addressed the separation requirements imposed by comprehensive standards applicable to holding companies operating non-utility businesses in parallel with utility operations.

Among these reviews for the New Jersey Board, Liberty completed a focused audit of NUI and its affiliates. This engagement came in the wake of significant downgrades of holding company and utility debt by rating agencies and an emerging threat of bankruptcy. Liberty examined in detail governance, organization structure, relationships, and transactions among utility and non-utility affiliates. This examination led or contributed ultimately to major changes in management at the holding company and utility, strong action by the Board of Public Utilities to strengthen utility financial ring-fencing to protect it from problems at the holding company level, and the eventual sale of the holding company/utility to resolve the financial crisis.

Liberty's prior engagements include examining the financial and operating conditions at a utility holding company that was failing even while its utility was exhibiting strong financial and operational performance on a stand-alone basis. Liberty performed for the New Jersey Board of Public Utilities a focused audit of NUI/Elizabethtown Gas. Liberty's work was instrumental in:

- Helping the regulators to understand the full extent of the financial failings at the holding company and affiliates

- Preventing the issuance of new, "rescue" debt at the holding company level under terms that would have severely jeopardized continued utility access to capital
- Identifying board and senior executive changes that needed to be made to assure that utility needs and conditions received priority attention as non-utility operations continued to drag the holding company into further and severe financial distress
- Halting the authority that the holding company sought to give to a "turnaround" firm to make substantial reductions in utility staffing, capital expenditures, and O&M activities
- Developing a plan for sale of the holding company/utility under conditions that would preserve utility financial strength and separation and maintain sufficiently independent utility management and operation.

Liberty's work was widely recognized as promoting an orderly operations and ownership transition under circumstances that, without timely intervention by state utility regulators, would likely have caused the total financial collapse of the holding company and the utility. Liberty was selected by the Board of Public Utilities to perform the first management audit of operations of Elizabethtown Gas under its new owner, AGLR, one of the country's largest gas utility holding companies. The work of this audit is described above. The following table lists Liberty's prior work in this area.

Client	Utility	Client	Utility
Arizona CC	UniSource/Tucson Electric	New Jersey BPU	PEPCO/Atl. City Elec.
Connecticut DPUC	Connecticut Natural Gas	New Jersey BPU	ConEd/O&R
Connecticut DPUC	So. Connecticut Gas	New Jersey BPU	AGLR/Elizabethtown Gas
Connecticut DPUC	Yankee Gas	New Jersey BPU	NUI/Elizabethtown Gas
Delaware PSC	Delmarva Power & Light	New Jersey BPU	SJI/South Jersey Gas
Kentucky PSC	GTE South	New York PSC	NYSEG
Kentucky PSC	EKPC	New York PSC	Central Hudson G&E
New Hampshire PUC	NU/Public Service NH	Nova Scotia UARB	Nova Scotia Power
New Hampshire PUC	NU/PSNH	Pennsylvania PUC	Verizon/BA-PA
New Hampshire PUC	Verizon - NH	Pennsylvania PUC	APS/West Penn
NH Governor	ConEd/NU	Tennessee RA	United Cities Gas
New Jersey BPU	PSE&G	PUC of Texas	Oncor
New Jersey BPU	First Energy/JCP&L	Virginia SCC	DRI/Virginia Power

O. Information Systems

1. Management and Operations Audits

Liberty has examined Information Technology as part of many of the two-dozen management and operations audits we have performed, including at large U.S. holding company structures such as PHI and Exelon Corporation.

2. Focused Audits of Utility Information Technology and Systems

a. Liberty Utilities New Hampshire

Liberty performed a focused management audit of customer service at Liberty Utilities New Hampshire. This review included an extensive focus of all elements of this function, in addition to examinations of information technology and corporate support services, vendor relationships,

accounting, business planning, and capital and O&M budgeting. Our Information Technology review focused on the Company's overall IT approach and strategy, staffing and management of the IT organization, the systems, software, and vendors utilized, and support for IT processes provided to the utility by the service company and parent. The utility operates as part of a Canadian-owned parent, whose Toronto-based service company had responsibility for system-wide IT planning and project management. Our work included an evaluation of the responsiveness of the organization to individual New Hampshire utility needs and to those of its family of dispersed utility operations (all U.S. based) generally.

b. Kentucky Utilities

Liberty performed a management and operations audit of the customer service function of KU/LG&E for the KY PSC. Customer Information Systems Support comprised a key component of this audit. Liberty evaluated whether the company planned and executed the proper development, testing, deployment, and maintenance of customer information systems, focusing on system development and testing and system support and maintenance.

3. Experience of Michael James

Information systems, particularly transitions to new platforms, have been problematic at National Grid. Moreover, management has begun a new series of initiatives, including the multi-year development and implementation of a transformational, very high-cost Gas Business Enablement Program. Addressing these initiatives underscores National Grid's need for a highly-effective Information Services organization overall and, even more crucially, strong project management. We have therefore decided to add high-level expertise to address the Information Systems Element of the RFP. We are pleased to include Michael James as part of our proposed team for this engagement. Section V and Appendix A: Resumes of this proposal detail his background and experience. Michael, an Information Systems specialist with over 35 years of business and consulting experience, has directed the transformation of large and complex information systems organizations. He has also overseen and served in project leadership for a wide range of Information Systems assignments over his career. He has performed Strategic IT and business planning, IT Transformation, Quality Assurance and Project Management, and Application Systems Delivery for more than 20 utility operating companies, listed in Section VII of this proposal.

P. Affiliates Audits

1. Liberty's Affiliate Relationships Experience

Liberty has been examining affiliate transactions and relationships nearly continuously since beginning in this field well over a decade ago. Liberty has examined affiliate relations and transactions in more than 30 different engagements, performed for 13 different regulators. Liberty is especially well versed in examining for public service commissions the affiliate transactions and relationships of multi-state holding companies. Liberty's experience in such audits includes some of the country's largest holding companies and utilities. They include Duke Energy, First Energy, APS, Pepco, Consolidated Edison, and Public Service Enterprise Group. Liberty has also performed examinations of Northeast Utilities and Dominion Resources Inc. (DRI) in the

electricity business and Atlanta Gas Light (AGL) in the natural gas industry, all of whom were major players in the U.S. energy business.

Liberty's extensive experience in auditing service company and other affiliate relationships and transactions extends as well to America's largest telecommunications enterprises. By contrast, the country's major telecommunications companies have very large affiliate operations, widely dispersed utility operations, and affiliate structures, procedures, and operations, all of which historically have been far more complex than those of their energy counterparts. Finally, as is true for its management and operations work, Liberty has examined service company and other affiliate relationships and transactions for a number of utilities.

2. Examples of Affiliates Audits Performed

a. Central Maine Power

From 2014 to 2016, Liberty performed for the Maine Public Utilities Commission an assessment of Central Maine Power's study of the competitiveness of service company functions as part of CMP's request for approval of an alternative rate plan. This filing was intended to fulfill the Maine Commission's requirement for a market study of service company functions. CMP filed a third-party study that compared costs of its service company (Iberdrola USA Service Company) with those of a small panel of utilities. Liberty reviewed and critiqued this study, analyzing the comparability of the panel utilities, the sufficiency of the sample size, the methods used to compare the costs among the utilities, and the extent to which the analysis met the requirements for a market study, among other issues. Liberty also independently reviewed trends in the Iberdrola USA Service Company costs and the amounts allocated to CMP. Liberty's report on this analysis was filed in the Maine Commission proceeding. Liberty also provided testimony in the proceeding.

b. Management and Operations Audits

The following Liberty management and operations audits performed within the past four years have included reviews of affiliate relations, transactions, and costs:

- For the District of Columbia Public Service Commission: Pepco (2014).
- For the New York Public Service Commission: Iberdrola USA (2012).
- For the Iowa Utilities Board: Interstate Power and Light (2012).

c. National Grid

Liberty performed for National Grid U.S. a comprehensive review and evaluation of the comparatively very extensive service company relationships and transactions that arose from the nature of its organization and operations, which included a British holding company and a large number of electric and gas utility operations in Europe and in four U.S. states (New York, Massachusetts, Rhode Island, and New Hampshire). Liberty's work included examination of transactions involving the British holding company (and any other potential off-shore source of charges to U.S. utility affiliates), four separate service companies, all U.S. utility and gas operations in the four U.S. states served, non-utility affiliates, and extensive operations and power services provided to the Long Island Power Authority in its provision of retail electricity services.

Liberty undertook the National Grid U.S. engagement on a basis like that under which it would perform a similar scope of services for the state commissions that regulate rates and service. The basis for judging such comparability was Liberty's performance of more than thirty affiliate reviews for utility regulatory commissions. The essential work characteristics that Liberty required to be in existence were independence in determining the required work activities, transparency of conclusions and recommendations and their support, and sufficient schedule time to assure full addressing of audit issues. The scope of Liberty's review was extremely broad, encompassing:

- Business Unit Structure and Interactions: National Grid operated on a transatlantic basis under a line-of-business, rather than a utility operating company defined basis.
- Examination of agreements and operating methods guiding service types and levels provided commonly to support electricity distribution, electricity transmission, and natural gas distribution services.
- Cost Allocation Manuals, Policies, Procedures, and Guidelines.
- Nature and extent of Affiliate Transaction Data Collected and Retrievable.
- Methods for Collecting, Allocating, and Reporting Affiliate Costs.
- Systems Used to Collect and Distribute Costs.
- Time and Cost Reporting by Common Service Employees and Contractors.
- Rationale for Assignment and Allocation Factors Used.
- Testing of Sample Transactions.

The final report for this project was released on April 7, 2011.

d. Nova Scotia Utility and Review Board: Nova Scotia Power

Following up on a baseline affiliate relationships and transactions audit performed a number of years ago, Liberty has been providing periodic reviews of annual affiliate transaction reports, and reviewing the sufficiency of and analyzing proposed amendments to the underlying Code of Conduct and the more detailed guidelines used to implement the code

II. Scope and Objectives

This RFP establishes an audit scope consisting of 12 Element and 72 Focus Areas. This proposal section describes Liberty's understanding of each of those twelve Elements (outlined in Section 3 of the RFP), and specifically addresses each of the 72 RFP-derived Task Areas, divided among those 12 Elements. As we explain and detail in this proposal section, we have added several tasks areas among a few of those Elements, to provide what we view as important context for examining and assessing management and operations under the RFP's 72. The description of each of the Task Areas will guide first audit efforts, designed to produce a detailed work plan on the timeline contemplated by the RFP. That plan will set forth for each of the Task Areas a description of the guidelines, evaluation criteria, and work activities that will apply to the examination of each of those Task Areas. The detailed work plan for each will also show a schedule for its activities and the team members and time requirements assigned to it.

The information set forth in this section reflects the perspectives, questions, and needs that Liberty will apply to work plan development. We use very detailed work plans for engagements like this one and we propose to do so here. Section VIII this proposal provides a hyperlink to the approved detailed work plans for our management and operations audit of NYSEG and RG&E. These plans provide a template for those that we propose here, which we will draft as informed by initial inquiries addressing the issues, questions, and factors described in this proposal section.

A. Element 1: Corporate Governance

Corporate Governance Scope

This first audit Element that the RFP details, Corporate Governance, includes eight focus areas, a number of them having multiple dimensions:

1. Governance Structure and Executive Management Approach
   - Support for New York Operations
   - Commitment to REV and Grid Modernization
   - Focus on Regulatory Objectives
2. NGUSA and Utility Changes Since Last Management Audit
3. Grid Modernization-Related Change Management Processes
4. Best Practice, Resource, and Expertise Sharing
5. Financial and Non-Financial Risks
   - Enterprise Risk Management
   - Internal Controls Focus on Customer Interests
6. Affiliate Transactions Processes and Controls
   - Processes and Controls
   - Service Level Agreements
7. Handling Employee and Contractor Tips
8. Strategic Planning
   - Planning Processes
   - Program Linkage to Strategic Goals
   - Roles of Parent Organizations
   - Integration with Other Planning and with Performance Management.

We have established eight task areas that address each of these focus areas in the context of an examination that will address how and how well governance and executive management structure

and activities focus on the needs of New York utility customers and on meeting state regulatory requirements, objectives, and expectations.

Governance Structure and Executive Management Approach

Corporate Governance Task Area 1

The first RFP focus area under Corporate Governance asks that this audit:

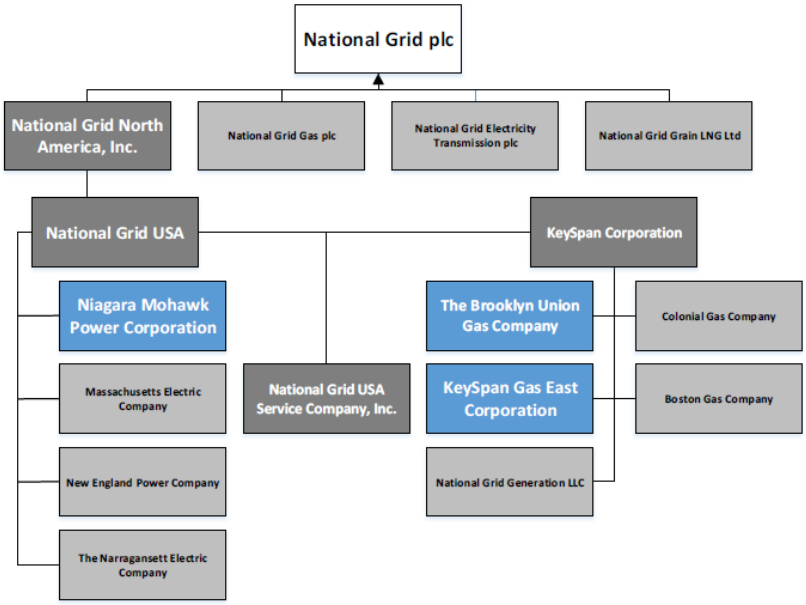
> *Determine if the Utilities' corporate governance structure and executive management approach appropriately support New York operations and demonstrate commitment to REV, grid modernization, and other regulatory objectives.*

The National Grid business organization chart shown in the RFP (repeated below) highlights the importance of ensuring an adequate focus on New York under everyday circumstances. Initiatives like REC and grid modernization add emphasis to the need for planning, organizing, staffing, and spending decisions that support routine utility operating needs as well as "game changing" ones. Geographies, densities, customer make-up, demographics, state legislative and regulatory policies differ among the three U.S. states in which National Grid operates nine utilities. In fact, they differ even among the three New York utility businesses, which operate in all three corners of the state triangle - - from the far west to the far north to Long Island.

This "horizontal" or geographical and jurisdictional dimension comprises only one of the sources of potential diffusion of board and senior management attention. National Grid exhibits significant vertical layering as well, with the organization consolidating U.S. utility operations (National Grid North America, Inc.) operating under a parent that also houses three other major international businesses. There is also a U.S. common services company (National Grid USA Service Company, Inc.) that has an executive organization and large numbers of employees operating under its direction.

How National Grid governs these various entities, how it provides them with executive direction, how it provides for the apportionment of attention and resources among them, and how it ensures effective measurement of performance by them can all have implications for New York utility customer costs and service quality, customer, worker, and public safety, and for ensuring confidence that routine regulatory matters and important initiatives have the eyes and ears of directors and of senior executive management.

National Grid Business Structure



New York's nearly four million meters make the state's operations one of the country's largest utilities in its own right. Also representing a very substantial portion of U.S. operations overall, one should expect highly focused attention in board and senior executive structure, organization, planning, budgeting, and performance monitoring. Note that Element 7 below addresses planning and budgeting directly. The results of that review will be integrated into the work under this task area in addressing the nature and suitability of board and executive structure and operation.

Boards of Directors

Key aspects of governance that we will examine include, at each of the parent companies (National Grid USA and KeySpan Corporation), National Grid USA Service Company, Inc., and the New York utilities, whether the utility boards exercise substantial oversight and direction, as opposed to merely administrative roles. Even as governance ascends to the parent level, we would expect to see clear visibility of and attention to New York utility matters and needs. We will use an examination of the following matters to identify whether there is reason to pursue any particular concerns about a lack of New York focus and attention:

- Board and committee structures, committee roles, charters, and activities at all principal entities
- Board and committee membership
- Board member selection criteria and recruitment
- Board process for assessing its and senior executive management's performance
- Focuses of boards' attention and discussion (from agendas, minutes, interviews with members)
- Regular and special reports, emphasizing New York utility matters
- Board awareness of New York regulatory requirements, and progress and gaps in meeting them
- Activities in support of REV and grid modernization in New York
    - Regular reports and discussions held

- Clarity of information to boards about plans, budgets, staffing, schedules, gaps
- Engagement level of boards in addressing barriers, changes in focus, progress constraints.

Executive Management Structure and Operation

We will examine the following aspects of the executive management structure at the parent levels (offshore and U.S.), service company, and New York Utility levels:

- Parent-level processes, procedures and controls that direct and guide utility operations
- Executive positions and roles
- Relationship to executives at entities up and down the hierarchy
- Existence and nature of any dual-executive positions or dotted-line reporting relationships
- Participation of executives of lower-level entities (*e.g.*, operating utility) in discussions and deliberations at higher-level entities
- Procedural and operating guidelines (*e.g.*, delegations of dollar-level decision-making authority)
- Regular cost, operating and other reports from lower entity levels up the hierarchy
- Limitations on authority of lower-level executives to manage their resources
- Regular and special reports, emphasizing New York utility matters
- Offshore and U.S. executive team awareness of New York regulatory requirements and progress and gaps in meeting them
- REV and grid modernization in New York
    - Regular reports to offshore and U.S. parent executives addressing plans and status
    - Clarity of information provided to offshore and U.S. executives about plans, budgets, staffing, schedules, gaps
    - Engagement level of boards in addressing barriers, changes in focus, progress constraints.

Communications and Performance Reporting

Regular communication among executives is necessary for effective and coordinated performance. A multi-layered executive structure complicates the process of ensuring common understanding, based on current, detailed information. We will examine the following matters to identify the existence of any gaps that may warrant detailed review:

- Key metrics reported regularly by all New York operating utilities and by all National Grid U.S. utilities
- Use of metrics to stay abreast of performance gaps and issues
- Reports regularly distributed to the executive team at each entity (offshore and U.S. parents, service company, and operating utility)
- Reports regularly prepared by each entity for distribution to and review by higher entity executives
- Regular executive level meetings, agendas, topics, reports addressed at each level
- Regular meetings among lateral (*e.g.*, each operating utility) entities
- Regular meetings bringing together executives from lower- and higher-level entities.

Organizational Changes Since the Last Audit

Corporate Governance Task Area 2

The second RFP focus area under Corporate Governance asks that this audit:

> *Assess changes to the organizational structures of NGUSA and the Utilities since the most recent management audit.*

While the preceding audit is now somewhat dated, to the extent it made material recommendations about organization structure, it will say much about where and why National Grid has changed or evolved to reach its present state. It may also have meaning in terms of assessing management's flexibility and agility in an era of significant change - - some of it driven by major state regulatory and policy initiatives. In examining the preceding task area, we will use the understanding we develop about responses and responsiveness to the preceding management audit to provide perspective on current conditions, any remaining needs and gaps, and the possibility that barriers preventing change may warrant consideration.

Grid Modernization-Related Change Management Processes

Corporate Governance Task Area 3

The third RFP focus area under Corporate Governance asks that this audit:

> *Assess change management processes as they relate to grid modernization efforts.*

The first two task areas will expressly consider the fit between current governance and organization structure and the ability to support and manage grid modernization expeditiously yet efficiently. We will examine openness to and acceptance of the need for considering both fundamental and less-major changes to support modernization. We will examine whether, how, and how candidly management has examined barriers to change. We spent considerable time and attention to cultural barriers to change at senior levels in our management audit of CECONY, producing what we think was an eye-opening by executive management about just how resistant management was to change. We will seek to identify whether any similar barriers exist with respect to grid modernization, work to explain to leadership any that we may find, and seek to identify ways that management can chart an effective change-management process.

Best Practice, Resource, and Expertise Sharing

Corporate Governance Task Area 4

The fourth RFP focus area under Corporate Governance asks that this audit:

> *Determine the extent to which best practices, resources, and expertise of the affiliated utilities, NGUSA, and National Grid plc are shared with the Utilities.*

National Grid operates in an environment rich in identifying ways to use comparisons of performance among its many units and locations to make performance improvements. Our work at other large, dispersed holding companies demonstrates that one best practice involves regular, formal, robust, quantified comparisons of performance against objective metrics to identify best and lagging internal performers. Another involves regular assembly of experts from across those units to "projectize" the identification, planning, and execution of processes for improving performance at lagging units (which of course may also be the leading units in other areas).

We will examine how National Grid uses the broad base of information that its dispersed operations produce, and the body of experts embedded across its footprint, to identify change opportunities. We will focus on performance data collection, analysis of that data, and the process for using collective expertise to form and execute clear, well-defined improvement plans. One problem we have witnessed in this regard has arisen from the "distant ownership" phenomenon, in which parent resources operating from another continent over-relied on performance data collected there to proffer solutions not effective in the U.S. environment involved. Therefore, we would expect to see broadly-based teams involved in such efforts. We will also look at specific initiatives undertaken and their results.

The broad base of resources that a large and diverse set of operations produces also gives National Grid leverage in succession planning. One of the industry's particular challenges in the era of "graying workforces" has been in positions that do not produce a large body of workers. In those areas, a company can find itself dependent on a very few numbers of indispensable resources. Operating many different utilities increases the ability to find at least emergency replacements. We will examine whether planning for the filling of vacancies short- and long-term, and for the development of a pool of candidates for critical and leadership positions, takes full advantage of the leverage that National Grid's multiplicity of operations produces.

At the same time as this advantage exists, it may cause problems. We have observed cases where rotation among operating entities has produced gaps and problems for some. We will look at rotation through positions critical to the New York utilities, to ensure that, on a net basis, they gain more than they lose through any rotational programs. The existence of a European source of expertise can also be an asset, providing fresh and possibly positively innovative ways of addressing New York needs. However, many may recall the "expat" issue that raised significant regulatory concern some years ago. We will examine whether placement of European transfers temporarily into U.S. positions affecting New York on the whole benefits the utilities here.

Recent years have brought to the eastern U.S. a number of major weather events requiring major resource lending among utilities. Continuing in the best tradition of the industry, electric utilities continue to do their utmost in assisting neighboring companies and their customers in critical times. The dispersion of the National Grid U.S. utilities is significant enough to present opportunities for one or more to help others. That ability presents an opportunity for closer planning and coordination and, as some have found, even some cost-effective cross training and methods/practice integration that can increase restoration-activity productivity. We will also examine the degree to which National Grid has considered and exploited opportunities to prepare resources across its U.S. utility footprint in a manner that can optimize performance in emergency conditions.

On the gas side, as we addressed in our recent staffing report, expanding programs for replacing leak-prone natural gas facilities have had and continue to be expected to add substantially to demands on limited personnel resources. We will identify and assess efforts undertaken by National Grid to leverage its program size to optimize resource availability.

Enterprise Risk Management and Controls Focus on Customer Interests

The fifth RFP focus area under Corporate Governance asks that this audit:

> *Determine the extent to which Enterprise Risk Management programs and internal controls regarding financial and non-financial risk areas provide adequate ratepayer protection at the Utility and state level.*

Corporate Governance Task Area 5

Our work will provide an examination and assessment of a suite of controls, including but not limited to what the industry generally terms "Enterprise Risk Management." This review will examine how management identifies, prioritizes, plans to mitigate, executes mitigation plans, and monitors mitigation effectiveness of risks. It will not limit itself to financial risks, but will address operational utility risks at each of National Grid's individual New York utility businesses. We will assess how local, service-company, senior executive leadership and the board controls risks.

We will look carefully at how risk identification and mitigation inform capital and O&M planning and budgeting, recognizing that there should be a strong and clear connection between operating risk and where scarce financial resources get applied. The leading edge in risk management focuses on connecting risk (far more broadly defined than what was true only a few short years ago in the science of risk management) to such planning and budgeting.

The first component of this Task Area, Enterprise Risk Management, addresses a management focus that has become reasonably well structured, and guided by formal and analytical approaches and reasonably-typical documented outputs. It therefore represents an area of this audit that lends itself to a readily designable approach.

A properly designed enterprise risk management program provides the foundation for controlling risks material to New York utility operations. The language of this portion of the RFP corresponds to two concerns that our extensive work in examining risk management has often uncovered: (a) an imbalance toward financial versus operational risk, and (b) a lack of closely focused analysis of risk at the utility operating company level. This historical imbalance reflects the origins of the industry's use of structured risk management, which lie in efforts to address risks exposed by well-known utility-affiliated trading operations failures some years ago. Accordingly, while the overall scope, criteria, and work activities in addressing Enterprise Risk Management are straightforward, we understand the need to structure them to recognize the importance of ensuring sufficient operational focus, and in ensuring that structured risk-management activities extend to the New York operating utility level - - both in terms of the kinds of risks addressed, and the location and responsibilities of the members of management who carry out risk identification, assessment, mitigation, and measurement of mitigation effectiveness.

The second group of components of this Task Area - - Internal Controls - - engages a broader spectrum of organizations, activities, and methods. The activities involve the following, each of which we will examine:

- SOX controls
- Internal and external auditing
- Compliance management
- Management of regulatory affairs

- Management reporting - - regular, continuing reporting of performance against defined financial and operations measures.

Some aspects of activities in these areas do not directly concern New York customer interests. For example, very broad areas of SOX compliance concern the protection of investor interests. Therefore, our first audit efforts in this second component of this Task Area will be to identify those risks and activities relevant to New York customer interests. This identification process will include those that relate to state regulatory requirements (expected to be particularly significant in examining compliance management). We will follow with a review of how management identifies and prioritizes those risks and identifies activities for controlling them, how it ensures the effectiveness of controls, and how it engages persons having direct responsibility for and knowledge of New York activities, conditions, and circumstances associated with them in risk identification, mitigation, and monitoring.

Enterprise Risk Management Programs

Best practice among utility holding companies calls for the use of comprehensive, focused Enterprise Risk Management ("ERM") programs to include both financial and operational risks. The non-operational risks include safety, reliability, regulatory compliance, and reputational risk. All but the reputational risk explicitly concern matters within the scope of regulated utility operations. Even reputational risk can have significant bearing on that scope, however, in that it encompasses threats that result from stakeholder and public concerns arising from failures to meet not just requirements, but expectations as well. We will address enterprise risk management comprehensively, but with a focus on utility-affecting threats. We will examine how management of New York risks are affected by programs that we would expect based on experience to be carried out at higher levels in the corporate structure.

Some ERM programs were initially carried over from a risk-management program focused on commodities related to non-utility electric generation, and the credit risk of trading counterparties. Such origins for enterprise risk management typify industry experience. Many utility holding companies have expanded their commodity-focused approach into a more broadly-based ERM program over more recent years. ERM has moved toward consideration of all threats within the spheres of holding company and all subsidiary operations.

Executive-level risk management committees may oversee ERM programs. Corporate risk management "working groups" perform most of the risk measurement and analysis work required to implement the ERM program. The working group works with subject matter experts in the areas of operation where risks arise. Risk owners use a bottom-up approach to identify risks. The risk management working group discusses and analyzes the risks identified by the risk owners. The working group determines whether each has a material enough potential impact to qualify it for inclusion on the corporate risk lists.

Key components of effective risk management at the enterprise and at the operational level include:

- A formal process for identifying and categorizing risks
- An analytical approach to quantifying risk exposure using two factors - - risk of occurrence and magnitude of consequence (to ensure that low occurrence, high consequence risks get sufficient attention)

- A clear identification of existing mitigation measures
- The residual amount of risk remaining after consideration of existing mitigation measures
- Potential means for further mitigation
- Costs and benefits of further mitigation measures
- Execution of such further measures as prove cost-effective.

The changes in risk structures have followed some departures from commodity-related businesses, as well as advancements in the ERM program. Generally, the highest-ranked risks have transitioned from commodity-related to financial, reliability, regulatory and reputational risks. The overall ERM program should be structured to address New York utility operations comprehensively and analytically, and there should be locally organized and executed risk identification and mitigation measures sufficient to give focused attention to the regional and local circumstances of each National Grid New York utility business. Particular elements of effective risk management include:

- Existence of a strategic approach to risk management, in the form of a high-priority Enterprise Risk Management program
- Well documented ERM and other operational risk-management processes, activities, and responsibilities
- Program management by senior executives, with regular oversight by the boards of directors
- Global program scope considering all risks in addition to financial ones; *e.g.*, operational, employee and public safety, reputational risks
- Existence and use of effective risk-management committees, with substantial New York representation, using regular meetings, agendas and follow-up processes
- Risk identification inclusive of all parts of the enterprise in developing primary "risk lists"
- Processes and personnel necessary to analyze individual risks, identify potential consequences, and identify mitigation measures
- Risk ranking using an organized and effective format to provide focus on most important risks
- Approved risk-mitigation action plans for highest-rated risks, with regular status monitoring and reporting
- Regular identification and evaluation of risk-control mitigation and performance measures
- Clear, direct, comprehensive linkage between identified risks and mitigation plans and capital and O&M budgeting, to ensure that resources are going to highest priorities.

Our audit work will include:

- Determining and assessing approach to and priorities on risk management
- Assessing the nature and degree of focus on New York utility needs and circumstances
- Determining the location of oversight and direction for risk management
- Examining engagement of senior executives and boards of directors
- Identifying the scope of risks "managed" formally for all types of risks: financial, operational, employee and public safety, reputational, etc.
- Evaluating structure and operation of risk-management committees and other sources of focused management of risks at highest levels and within each operating utility

- Verifying that all parts of the organization, including operating utility sources, are solicited for identification of primary risks
- Examining processes and personnel in place to analyze individual risks, identify potential consequences and plan mitigation measures
- Determining how risk ranking is organized and effective
- Identifying where risk-mitigation action plans get formally approved and how progress against them is monitored
- Assessing ERM process and procedure documentation
- Determining how internal auditing considers ERM results in its audit planning
- Determining how capital and O&M planning and budgeting are integrated with risk management.

Internal Controls

Our examination of Internal Controls, the second group of components of this task area, will include similar evaluation criteria and activities, focusing on goals and objectives, organizations, resources, programs, risk or compliance rosters, control methods and activities, mitigation efforts, and measurement of success in ensuring controls implementation, risk mitigation, and regulatory compliance. The next subsections, therefore, focus on the unique aspects of the contribution of each of this second group of risk-management concepts that will drive our detailed work plans as first work steps progress.

Internal and External Auditing

Independent auditing comprises a critical element in creating and maintaining an effective controls environment. That environment depends greatly on independent, robust, well-staffed and trained auditing organizations (internal and external), operating on the basis of sound and comprehensive risk assessment, plans for examinations to address material risks, completion of those examinations on a timely basis, clear and candid reporting, and access to the board of directors audit committee. These aspects of auditing lie among those on which our work will focus.

The most common gap we have found in our prior work concerns the level of focus on utility operations issues and on certain types of financial issues. Such financial issues include those that may not necessarily affect the bottom line, but nevertheless are material to utility revenue requirements. Affiliate transactions offer one example - - whether a dollar is charged to one versus another affiliate may produce no net balance-sheet or income-statement impact, but can do so for the two affiliates involved, whether one is regulated and one not, or where both are regulated but subject to different revenue-requirements determinations. We will therefore also examine the degree to which auditing plans and activities focus on customer-affecting utility operations issues and on ensuring that accounting for costs gets them to the "right entity."

SOX Controls

We do not propose to replicate the extensive SOX examination required of companies like National Grid. We will focus on the creation of an effective controls environment by New York leadership, on the focus that exists on New York utility-related risks, and on the engagement of New York resources in ensuring the effectiveness of controls associated with those risks.

We will identify the SOX controls that address utility financial and operating risk involving the New York utilities. We will assess that list for completeness based on what our audit efforts tell us about New York-related risks. We will examine the SOX documentation of them and of their assessment to ensure sufficiently robust and formalized engagement of "local" management. To the extent that any gaps exist in controls effectiveness as assessed by management or by auditors, we will identify their significance from a customer perspective and ensure that gap-closure plans and methods are effective.

Standards and industry practice call for strong senior (boards and top executives) action to communicate commitment to and accountability for creating and sustaining a sound controls environment. Attitudinal support must complement even the best procedures, tools, and risk heat maps, and mitigation plans to ensure maximum controls effectiveness. We will examine the environment that top leadership (from operating utility through holding company) seeks to create, and that it communicates explicitly the centrality of customer interests among those considered to be "at stake."

Compliance Management

A structured, formalized approach and program for compliance management forms one of the newer elements of an effective approach to ensuring a sound controls environment. It has become common to see explicit treatment of utility regulatory requirements, policies, and expectations. Structured compliance-management programs, accompanied by clear responsibility for planning, execution, and monitoring, have emerged as a common means for organizations, particularly large and dispersed ones like National Grid, to apply formal means for ensuring full identification of, and for controlling response to, requirements across multiple jurisdictions, addressing all levels (local, state, national), and covering a wide variety of business areas and activities. We would expect to see a formal, programmatic approach at National Grid, and a particular focus on New York utility management, operations, accounting, filings, reports, and all other documents, activities, and results required to demonstrate compliance.

We will look for key determinants of successful compliance management. Those determinants include:

- Placing such programs under senior leadership
- Dedicating empowered resources to them
- Providing for systems (very commonly supported by automated information and web-based access) assigning lead responsibility for execution, activity scheduling, confirmation of required activities, filings and documents
- Triggering of alerts when key dates come into jeopardy
- Regular reporting to executive management and directors
- Prompt reports of failures to comply, assessment of root causes, and firm plans for remedial actions to prevent recurrence.

This review will focus particularly on New York utility regulatory requirements and policies.

Management of Regulatory Affairs

We see a clear and important connection between regulatory affairs management and controls - - particularly from a compliance perspective. Effective regulatory affairs management consists of much more than seeking successful outcomes to rate cases and other proceedings. In addition to our many reviews of utility management and operations and generally in connection with them, we have examined regulatory affairs management often. Our experience, confirmed by the employment experience of our team members with regulatory agencies and in utility regulatory management positions, has taught that effective approaches, organization, staffing, and culture for regulatory affairs makes a particularly strong contribution to controls that ensure meeting regulatory requirements and expectations. Likewise, the absence of these features contributes to failures to consider those requirements and expectations when planning and executing utility activities that have cost, reliability, safety, and customer-satisfaction implications.

Putting it simply, the best regulatory affairs organizations do not simply champion company positions before regulators and stakeholders; they also ensure that management decisions and activities are informed by a robust knowledge of not just regulatory requirements, but of regulator and stakeholder expectations.

Particularly in an organization that has multiple and dispersed operations, a lack of centralized focus on managing regulatory affairs can sow confusion, inconsistency, and concern about management's dedication to ensuring regulatory compliance. As importantly, the lack of such focus can flaw the type of regulatory relationship needed to promote common understandings of requirements, full knowledge of expectations, transparency in providing information, and a failure to appreciate sufficiently the needs of and burdens on regulatory bodies and their personnel. Conflicts cannot be eternally avoided by large utilities operating in multiple and complex environments, but minimizing them to those that matter and that are not based on misunderstanding should be important to an enterprise operating the extensive New York utility operations that National Grid does.

We will therefore examine the approaches, organizations, resources, methods, and activities undertaken to ensure effective management of regulatory affairs. We will review any problems and difficulties that have occurred and, should we find any that have current or future implications, we will seek to identify their sources and ways to address them.

Performance Reporting

Reporting of performance against objective measures (and more importantly how management uses that reporting to identify and address problems and improvement opportunities) will form a focus of a number of other task areas in our audit (for example, under Elements 2, 3, 8, and 11, addressed below). The work in this task area will not repeat those efforts. However, recognizing that ongoing reporting comprises an important source of risk identification, we will here examine the extent to which reporting fills needs for identifying on a timely basis where gaps from targets, expectations, and goals, at the detailed level (key performance indicator or KPI, for example) introduce material risk

A Note on Controlling Non-Financial New York Risk

A principle that will guide our examination of risk management and controls holds simply that what matters to us is what matters to New York utility service costs, reliability, safety, and continuity. This principle leads to a number of guideposts that we will use to keep our work on track.

We have found in prior work that some enterprise risk management programs operated at the holding-company level prioritize risks in a manner that can reduce the transparency of utility operational risks. To some degree this loss of visibility is an aid to top executive management and the boards of directors - - directing their attention to the highest risks imposed by all operations. This form of summarization can have particularly great impact for entities like National Grid's New York utility operations, which operate as parts of a world-wide, economically vast enterprise. Thus, it becomes necessary to ensure that risk management applies focused and structured risk-control structures, processes, activities, and risk-mitigation measures similar to those planned and executed at the parent level. The key element applicable here is that risks that may not be comparatively large to National Grid overall, may be very material to its New York utilities and to their stakeholders. We will thus, using criteria and work activities like those set out under the general topic of Enterprise Risk Management, determine who at the New York utility level assesses and responds to risk, how they do so, the breadth and nature of risks identified, the structuring of measures to mitigate them, and the effectiveness of those measures. Most importantly, we will look for clear connections between their risks and the financial resources (capital and O&M) targeted at mitigating them.

Wherever New York utility operations risks land on overall National Grid "heat maps," New York management should be carefully identifying and responding to their material risks. Some companies have adopted what we consider to be best practice for ensuring that visibility of and focus on utility non-financial risk is strong. That practice consists of operating their Enterprise Risk Management programs in tandem with (under similar approaches and methods) an operational risk-ranking program for their discrete utility operating segments (*e.g.* electric versus gas; power production versus delivery).

Affiliate Transactions Processes and Controls

The sixth RFP focus area under Corporate Governance asks that this audit:

> *Evaluate the effectiveness of the current processes and internal control procedures governing affiliate transactions, including Service Level Agreements, to ensure accountability and proper cost allocation.*

Corporate Governance Task Area 6

Controlling affiliate transactions has historically been an area of concern at National Grid. Exacerbated by extreme difficulties in transitioning to a new suite of systems (SAP) for enterprise resource management, ensuring that costs were reported accurately and free of cross-subsidization became very problematic for an extended period of time. National Grid had used two different accounting systems and multiple service companies - - legacies of the history of its acquisition of the New York utilities it operates. The Utilities have undergone many changes (systems, methods, service agreements, and even senior personnel) in the years during and following these difficulties.

That history needs to be considered in determining how to ensure that management applies processes and controls in both an efficient and in a fully-effective way.

The large and dispersed nature of National Grid's U.S. utility operations also makes the structuring and governance of service-company support to the New York utilities important in ensuring that commonly provided services are: (a) those required, (b) well-defined and planned, (c) subject to quality and cost monitoring against objective definitions, descriptions, and costing bases, (e) regularly monitored and reported at a detailed level, and (f) regularly discussed, with variances highlighted, root causes discussed, and responsive actions identified and executed. Baseline documentation (such as service-level) agreements or the equivalent provide the basis for planning, executing, and monitoring commonly provided services. Their nature and use will thus form a primary focus of this part of Liberty's examination. We will also examine what performance information management (at the provider and at the recipient-utility levels) reports as the year progresses, and how they use it to control the quality and cost of services and goods provided.

National Grid's multiple operating locations and utility service types call for a review of controls to prevent a number of types of potential cross-subsidization:

- Of utility operations in one jurisdiction by utility operations in another jurisdiction
- Through allocation of service company costs among the operating utilities
- Through direct bilateral arrangements between the operating companies; *e.g.*, loans of employees or providing storm-response resources
- Of one utility operation (*e.g.*, electric service) in a single jurisdiction by another type of utility operation (*e.g.*, natural gas distribution) in the same jurisdiction
- Of non-utility operations by utility operations - - not as great a threat as for other holding companies having large non-utility (*e.g.*, market generation or competitive retail supply) affiliates, and further diminished by the end of certain services provided to LIPA.

The presence of non-utility operations has been considered the biggest cross-subsidization threat in many jurisdictions, but different approaches to or timing of rate increases or differences in competitive threats can serve to incent inter-utility cross-subsidization as well.

There is a nexus (often very strong in large, diverse, complex organizations) between organizational structure and the ability to manage costs that flow back and forth among units in that structure. It is therefore appropriate to consider how structure helps or hinders control of cost allocation and management, and whether it includes the information necessary for, and provides for sufficiently comprehensive and frequent analysis of, competitiveness with other alternatives for providing services.

We have performed some 30 examinations of utility affiliate relationships and transactions. Providing effective controls requires satisfaction of many critical needs:

- Documenting and applying clear, comprehensive charging, assignment, and allocation principles, procedures, methods, and factors
- Documenting and communicating allocation policies and procedures; providing clear direction, guiding objectives and criteria, and appropriate allocation methods and factors
- Performing regular internal testing of compliance
- Regularly applying and updating allocation factors

- Conforming cost assignment and allocation methods to regulatory requirements
- Using methods that align cost causation and responsibility as closely as possible
- Maximizing use of direct accounting for and charging of costs
- Using allocation only where required; applying cost-causative factors where feasible; minimizing use of general allocation factors
- Ensuring complete, comprehensive methods for all cost types, providers, and recipients
- Regularly informing employees about cost allocation policies, procedures, and changes
- Regularly providing current training for employees on proper cost allocation procedures
- Applying review processes providing effective monitoring of cost assignment and allocation
- Particularly for operations on a vast international scale, ensuring that expatriate transfer and relocation policies and charging methods do not disadvantage U.S. host utilities, such as NMPC, KEDLI, and KEDNY, when compared to their internal options for filling positions.

Our detailed work plan will employ activities appropriate to those risks; among them:

- Reviewing Cost Allocation Manuals (CAMs) and other governing and guiding documents
- Reviewing the process for validating the general effectiveness of services provided commonly to the operating utilities
- Determining how quality and cost-effectiveness of commonly-provided services to the New York utilities is measured
- Reviewing the processes for negotiating the scope of commonly-provided services and their costs (*e.g.*, Service Level Agreements, or SLAs)
- Reviewing the processes and reports for monitoring common service quality and costs, and governing services cost assignment and allocation
- Reviewing mutual assistance agreements
- Determining how costs and revenues are assigned or allocated to the utilities
- Determining means for ensuring effective methods for cost and revenue assignment and allocation among New York utilities and affiliates
- Determining how costs and revenues are assigned or allocated between offshore and operations in the U.S. generally and New York specifically
- Reviewing approval documentation for cost assignment and allocation
- Reviewing processes for validating calculation of allocation factors and frequency of updating
- Measuring the fraction of costs directly assigned, allocated based on cost-causative factors, and allocated using general allocators
- Reviewing expat policies.

Handling Employee and Contractor Tips

The seventh RFP focus area under Corporate Governance asks that this audit:

Evaluate how the Utilities assess, review, and respond to tips, anonymous or otherwise, from employees and contractors.

Corporate Governance Task Area 7

Section 302 of the Sarbanes Oxley Act requires publicly-held companies to create a means for handling reports made by anonymous whistle-blowers. The section also requires board audit committees to provide procedures for reporting questionable practices anonymously. We will review how National Grid has provided for the required capabilities and methods. These requirements focus on investor-related fraudulent activity. Other considerations in the case of public utilities, such as their operation under broad sets of public requirements and the employee and public-safety implications of their operations, give reasons beyond investor harm for ensuring avenues for reporting of concerns, issues, and problems.

Corporations generally acknowledge the need to provide their people with safe places for reporting workplace issues and for creating trust that they will be dealt with objectively. Confidentiality forms an essential aspect of creating that environment. Anonymity where desired, while technically different, forms a fairly common element of the processes for addressing tips, problems, complaints, and inquiries. Publications from the Society of Corporate Compliance and Ethics (SCCE) tout whistleblower hotlines as effective component of successful ethics and compliance programs.

Whatever the methods and communications channels used, certain important principles, which we will examine, apply in evaluating the effectiveness of handling employee and contractor tips. Specific areas we will examine include:

- First establishing trustworthiness and employee buy-in through communicating a commitment to ethical work practices and activities
- Communicating clearly how communications will be handled, and setting clear expectations about confidentiality, feedback to the initiating employee or contractor, and lack of consequences for good-faith reports
- Providing multiple ways to report concerns (web, text, and other electronic reporting options)
- Employing a clear plan for timely escalation
- Finding the whole story - - avoiding knee-jerk reaction on the one hand, versus delay in effective, objective, convincing response
- Key personnel to contact, and how to reach them for matters requiring fast response
- Disseminating provided information to a second source to ensure proper handling
- Avoiding multiple, potentially-confusing channels for different types of issues
- Ensuring confidentiality (third-party sourcing or trained, dedicated internal staff).

Strategic Planning

The eighth RFP focus area under the Corporate Governance element asks that this audit:

> *Assess the strategic planning processes, including the linkage of programs to strategic goals, the roles of NGUSA and National Grid plc, and the extent to which the strategic planning function is incorporated with other planning activities and performance management processes.*

Corporate Governance Task Area 8

The development of strategic or long-range plans to affect enterprise mission, vision, goals and objectives sets a critical baseline for promoting and measuring an organization's performance.

Planning clearly embodies the adage the "tone gets set at the top." Successfully implementing strategic plans and driving operations according to them strongly drives management effectiveness for good or for bad. The challenge is not simply to define management's priorities in a comprehensive and specific way, but to bring them to fruition in a large organization. A first focus here will lie on assessing board of directors (including NGUSA and National Grid plc) and senior executive leadership guidance, emphasis, and activities in:

- Establishing mission clearly
- Articulating a consistent vision that duly reflects public service responsibilities and stakeholder expectations
- Defining objectives and goals comprehensively and in forms capable of objective measurement
- Setting priorities and strategic initiatives clearly and in a way meaningful to all those who contribute to meeting them
- Building strategic plans and actively steering their implementation
- Monitoring performance against these plans regularly.

Goals and objectives should balance the needs of all stakeholders, including customers, shareholders, employees, and regulators.

Boards and executive management, through the strategic planning process, should address long-term infrastructure issues, ensure that plans and capital investment programs address them, and promote a culture and environment responsive and welcome to major initiatives (such as REV). The quality of information in strategic plans and initiatives provided to the boards by management should be of the highest order and suitable for critical and objective decision-making. This element of the audit also captures the most direct and detailed examinations Liberty will undertake to assure that New York utility capital and operating needs have sufficient priority (and that priorities lead to corresponding commitments).

A major part of our review will address how attitudes, messaging, and accountability reinforcement at the top, strategic levels of NGUSA and National Grid affect matters of consequence to the New York utilities. With respect to capital and operating commitments, we will test the engagement of parent and service company leadership and management in terms of knowledge of New York needs, the ability to parse them in a manner that serves short-term needs, while advancing longer term initiatives to meet electricity and gas service requirements, control customer costs, and serve stakeholder expectations.

It has been our experience that strategic planning processes provide the forum for linking visions, long-term goals, objectives and priorities, and key strategic initiatives into long-term plans that serve as a roadmap for boards and senior management. We will specifically assess the roles of management at all levels and at all locations (NGUSA, National Grid plc, the New York utilities) in the development, approval, monitoring and performance management of strategic plans and their most important goals and strategic programs and initiatives.

One area of "holding company" strategic goals can have an important influence on the strategy, planning, and operations of each of the Utilities. Long-term earnings goals such as percentage annual increases in earnings per share of the holding company may require the utility subsidiary

companies to adjust their own planning to meet the holding company earnings goals. This holding company influence can push utility capital expenditure/rate base investment in either an upward or downward direction. For instance, when a holding company views increased rate base investment in one of its electric and gas utility operations as a promising "growth engine" for meeting the earnings growth requirements of its shareowners, undue emphasis may be placed on increasing utility rate base investments. The emphasis to decrease utility rate base investments is also a potential result of such earnings targeting, if the holding company believes that other affiliates provide a more promising avenue for capital allocation. We will focus on the important area of assuring that the Utilities receive the strategic planning attention and capital allocations/resources necessary to meet public service responsibilities and stakeholder expectations effectively in both the short and long runs.

We will also address the roles of the utility boards of directors, senior executives, and key managers in developing, reviewing, and approving strategic plans and capital allocations. A failure to engage them all in a holistic fashion can produce significant disconnects in plans at lower levels, a sense of where priorities lie, and an understanding of how performance will be assessed and incented.

The strategic planning processes of the Utilities should be incorporated into and linked with that of NGUSA and National Grid. Utility five and ten-year plans, budgets and shorter-term plans should be linked to, and their progress measured against, the holding company long-term objectives and strategic plans and progress toward them. The Utilities should also take advantage of the knowledge and expertise of the other National Grid utilities and the holding companies. An appropriate level of involvement by boards of directors in strategic planning formation and measurement should be evident.

Boards of directors and senior leadership should monitor actual spending and variances in total and on strategic initiatives during the year. Performance versus the strategic plans and individual initiatives and major projects should be regularly measured with corrective action, course corrections or plan revisions taken as appropriate. We will also assess board involvement in monitoring the capital spending and variances on key infrastructure initiatives and other strategic initiatives important to the New York utilities.

We will examine the planning and reporting information the boards receive from management, and verify its usefulness in deliberations and decision making. We will assess financial considerations (earnings, ratios, financing requirements) and rates for their impact on the decision process at the board level. Performance gaps and variances on key strategic initiatives should undergo thoughtful analysis, documented explanation and reasonable justification in summarized reports to boards. We will determine how such gaps and variances are analyzed and reported to the boards, as well as corrective measures that have been taken.

B. Element 2: Information Systems

This second audit Element that the RFP details, Information Services, includes seven focus areas, a number of them having multiple dimensions:

1. Support for New York Operations
2. Short- and Long-Term Plans

Information Systems Scope

- Support for REV
- Synergies

3. Project Selection and Implementation
    - Consideration of Alternatives
    - Prioritization
    - Scoping
    - Implementation
4. IS Project Information Provided to DPS
5. Benefit/Cost Estimating Framework
6. Gas Business Enablement Project Implementation
7. Customer Information System Conversion
    - Billing Errors

Change and advancement in Information Technology (IT) in the last 30 years has been perhaps the swiftest and most dramatic of any economic sector. The widespread deployment of IT systems and their importance to so many facets of utility operations have radically transformed the conduct of business. Utilities have used computers and data communications for decades to improve their efficiency and service. There is good reason to believe that IT, fundamentally interwoven into all utility operations, will continue to make greater improvements possible.

These changes have created alternatives for performing data-intensive functions using distributed architectures and expansive networks. Hardware no longer represents the largest cost element of information systems. Software development, implementation, and maintenance costs now comprise the largest components of the IS budget and ongoing costs.

The growth in data communications activity and applications has also produced a new set of IT security concerns. These concerns relate to the security of information contained in, and transported by, information systems, as well as telecommunications-network access. Customer confidentiality is also an issue of concern. Utilities' industrial and commercial customers do not want competitors to have access to their consumption information. In some industries, such records provide competitive information critical to rivals, and are regarded as closely-held trade secrets.

National Grid has recently undertaken major initiatives to upgrade information systems. The IS technology modernization program provides important context for our examination. This program seeks to: (a) upgrade the information system infrastructure to address reliability and ensure business continuity and (b) modernize critical applications to deliver new capabilities. The program is intended to support current and future business needs. The program will improve network capabilities, enable cloud and mobile technologies, improve cyber-security, and enhance the Utilities' ability adopt future upgrades and new applications.

In 2012 National Grid implemented a new IS delivery model that utilizes external partners to perform various IS functions. This approach continues to evolve and incorporates lessons learned through the experiences of working with the vendors. National Grid will continue to rely on external vendors which they believe is appropriate in this fast paced and evolving world of IT.

Support for New York Operations

Information Systems Task Area 1

The first RFP focus area under Information Systems asks that this audit:

> *Determine if the Utilities' information systems effectively support current utility operations.*

We will begin with an assessment of the overall Information Systems organization. Support for New York utility operations is unlikely to be effective or efficient in the absence of an integrated overall approach and organization to systems development, operation, and maintenance. We will examine those broadly, and then seek to determine how it addresses, assigns accountability for, manages, and monitors performance associated with organizations and functions (whether service-company or utility located) that directly engage or support New York utility operations. An assessment of IS organization structure, resources (internal and external), training, and development will form part of this assessment.

The complex role of Information Technology involves of thousands of individual components, major design and implementation, substantial daily operations issues and major project management issues (*e.g.*, business scope, technology). The number and magnitude of these matters requires an organizational and analytical framework to bring them together in a way that optimizes effectiveness and efficiency - - not only of tools and systems but of the processes for installing, using, and maintaining them.

We will examine enterprise-wide IS governance. A first goal will be to determine how executive guidance, ownership/sponsorship of initiatives and allocation of technology resources operate on a corporate basis. We will look at how governance applies in a number of areas where governance and planning require effective integration:

- Utility needs across all National Grid U.S. jurisdictions
- Off-shore locations if IS governance and planning for them has material connections to U.S. operations
- The needs of organizations and functions serving New York at the service-company level
- The needs of organizations and people resident in the New York Utility operations
- The differing needs of New York's gas versus electric management and operations
- The differing needs among functions (*e.g.*, customer information versus accounting).

This review will not alone definitively answer the question of the effectiveness of support for New York operations. That answer requires a holistic approach considering findings and conclusions, some of which will engage other members of our audit team:

- Remaining task areas under this Information Systems audit element, which bear on effectiveness directly
- Corporate Governance, which will address top management and board roles in functions (which include information systems) where we will be seeking to determine the adequacy of New York utility focus
- Work management and customer operations, which will necessarily consider the implications of CIS conversion and the Gas Business Enablement Project

- All other areas to the extent they determine that information system existence/absence, functionality, operability, availability or other factors promote or constrain effectiveness of the performance of the functions addressed in those areas.

Therefore, the team will periodically assess information systems issues jointly as our work progresses and as our knowledge base expands. Then, as the process of forming conclusions advances, the team jointly will contribute to overall and to function- or activity-specific conclusions tied to how well information systems support New York utility operations.

The specific contribution of this task area will be to ensure that the overall information system governance process provides an environment, and organization, a set of approaches, and means of integration that ensures a sufficient focus on New York utility operations, and safeguards to ensure that enterprise-wide, cross-utility, and utility specific system development and implementation, operation, maintenance, and support are effective in supporting state operations. Part of this review will include the nature and materiality of involvement of New York utility personnel in the governance process. We will determine whether Enterprise-wide Technology Governance is well defined and includes:

- Executive guidance
- Sponsorship and ownership of technology initiatives
- Investment analysis and funding approval
- Business unit review
- Allocation of technology resources on a corporate basis.

Short- and Long-Term Plans

The second RFP focus area under Information Systems asks that this audit:

Information Systems Task Area 2

Determine the adequacy of the Utilities' short- and long-term information systems plans, and if these plans support REV-related requirements, and if they will provide synergies across NGUSA which will benefit New York ratepayers.

Operating from within a sound governance structure, long-term effectiveness of information systems requires sound Technology Strategy and Planning. We will determine the processes, methods, templates, and practices for performing longer term technical and financial plans for IS resources and technology deployment. We will also examine the resulting plans for responsiveness to utility operations needs, and care in considering incremental versus step changes (*e.g.*, moving from updating older systems to installing new ones. How the planning process addresses trade-offs in cases like these will form an important area of focus. We will also look at the thinking and analysis that sequences work over the longer term. The next task will look specifically at project selection and prioritization. The work here will focus more on how overall considerations of resource and capital budgeting limitations guide the placement of overall dimensions on IS-related matters.

Even short-term plans need to consider the long-term. Short-term needs, however, can produce IS needs that require uncontemplated action. We will examine the processes and controls that apply when functional or IS management identify a potential need either unplanned or scheduled far out in overall plans.

With respect to areas like REV (as well as others where reference to planning, management, and operations needs have a bearing) the lead here will coordinate with leads in the areas involved to ensure that potential or existing IS-based contributions and barriers are examined.

A sound governance process will support an approach that seeks to identify and implement systems and practices that will provide synergies when applied on a multi-unit basis. The first task area under Information Systems will consider that aspect of governance. Here we will look specifically, using test cases if available in recent National Grid history, to examine specifically how the planning process considers the potential for combining needs or "customers" in the search for systems and practices that jointly optimize functionality, cost, and timeliness.

Our examination will include whether Technology Strategy and Planning is well defined and includes:

- Existing Application and Services provided
- Business Systems and Services strategy
- Business Systems and Services plan
- Business/Business Systems strategy alignment
- Technology architecture
- Cost management
- Business requirements definition.

We will examine business systems management processes to verify that they are well defined and include:

- Prioritization
- Master schedule of work and resource assignment
- Risk management
- Quality assurance
- Performance metrics
- Training plan and skill development
- Organization structure and staffing.

We will also examine plans for ensuring addressing IT security and customer confidentiality.

Project Selection and Implementation

Information Systems Task Area 3

The third RFP focus area under Information Systems asks that this audit:

> *Evaluate how the Utilities select, consider alternatives, prioritize, determine the scope of, and implement information systems projects.*

We will look specifically at the criteria, processes, and weightings used to evaluate alternatives, and select from among them. We will also examine the use or prioritization, first to select projects for inclusion in approved plans, and then to adjust project sequencing as other needs emerge or unexpected conditions and circumstances arise. We will not just look at how such activities occur, but at who performs them, in order to ensure that New York utility needs get proper consideration.

Major IS projects (particularly those involving large new systems or conversions) require a strong and effective management process to control scope, costs, and schedule. The governance process (addressed in Task Area 1 under Information Systems) plays a role in providing effective controls. It needs to be properly structured to provide both technical and user input, but very clear in authority to approve changes, progress reporting information and details required, and decisive in acting where progress deviates. We will examine how IS manages the work, measures performance, identifies needed corrections and adjustments, and follow corrective measures through to prompt completion.

For solutions delivery we will examine how IS performs the work, provides for consistency in delivery and interacts with the users on projects. With respect to technology infrastructure and support we will examine how IS operates computing resources and networks and provides user support.

The solutions delivery process, in addition to operating under clearly defined project management approaches, practices, and resources should clearly define:

- Project management
- Systems development methods and practices
- Deliverable definition
- Service capabilities
- Customer satisfaction and acceptance.

Technology infrastructure and support should operate under appropriately organized and staffed personnel employing clear methods and processes for:

- Maintenance
- Support
- Help Desk
- Network Management
- Security, including Cyber Security
- Release Procedures
- Capacity planning
- Third party services.

IS Project Information Provided to the DPS

The fourth RFP focus area under Information Systems asks that this audit:

> *Assess the adequacy and transparency of information provided to the Department related to information systems project selection, prioritization, and schedule, budget, and rate plan adherence.*

Information Systems Task Area 4

Information system capital projects and operating expenses comprise a growing component of the utility cost structure. Information systems tend to be planned for as a specialized component of planning processes, often developed as part of joint information systems used by several of the utilities under a holding company structure, in this case NGUSA Service Company. NMPC's electric and gas rates provide for Information Services (IS) capital investments owned by National

Grid USA Service Company, Inc. to be allocated to NMPC in the form of rent expense. The rent expense includes the return on, and the depreciation of current IS capital, as well as incremental forecast investments. As such, information systems are usually planned by the CIOs and their staff at the service company, with expenditures charged to each utility in the form of rent expense. Liberty will assess information systems information provided to the NYPSC to determine the adequacy and transparency of the related capital and operating expense programs.

Information services central planning groups have responsibility for identifying capital projects and programs required by each utility system and in total for all joint systems. The identification of information systems capital projects starts with corporate IT staff estimating each utility's local information and system capacity requirements and specific customer service metrics that must be met. IT staff will then identify the specific projects and IT systems needed to meet these requirements. In its recent rate case, funding was approved to allow NMPC to invest in modernizing its information technology, including Call Center Upgrades, which would allow more effective management of customer calls to its multiple in-state call centers, and the Gas Business Enablement (GBE) Program, which would enhance the Utilities' gas operations in areas including customer information and appointment scheduling, workforce management, gas safety compliance, and system planning.

Management should assign priorities to individual projects that have been proposed by its central planning groups following the identification, selection, analysis and preparation of Capital Requests. Liberty will examine the methods, processes and variables used to assign priorities to various IT projects. There should be a clear and timely process for expenditure prioritization with as much objectivity as can be incorporated into that process. Liberty will evaluate the quality of service analysis and other system metrics included in the process, including setting the priorities for the competing plans and projects. Another prioritization process that may be in place is a benefit/cost ratio scoring that evaluates quantifiable cost benefits of the project as compared to the capital and expense costs of project execution.

Controls should be in place to ensure that increases or decreases to the project scope, schedule or cost are justified and appropriately approved. Procedures to control and manage total company, program and project capital costs should also be in place and effective. Reporting on variances to IT projects should also be provided to senior management for their review and regular monitoring.

The Commission has employed three-year forecasted rate plans, key components of which are associated IT capital plans and forecasted O&M expenses. An NMPC rate Order in March 2018 provided for a three-year rate period beginning on April 1, 2018. The rate Order approved specific IT programs and expenditures in the Order. The IT capital and O&M plans filed by each utility for its rate case should contain the same components as the company's most recent five-year capital plans and O&M forecasts approved by the company's senior executives and presented to the Board of Directors. The contents of the rate filing should be completely consistent and adhere to the company's approved IT capital and O&M plans.

Liberty will compare the rate case capital and O&M plans to the authorized and approved plans of the Utilities, identify any barriers to reliance on the latter to provide timely, meaningful, accurate

information regarding the former, and identify means for maximizing consistency and ease of producing information enabling comparisons of the two.

Benefit/Cost Estimating Framework

Information Systems Task Area 5

The fifth RFP focus area under Information Systems asks that this audit:

> *Assess the effectiveness of the benefit/cost framework and accuracy of the process(es) employed by the Utilities to estimate costs and savings for decision-making regarding information systems.*

NMPC's electric and gas rates provide for Information Services (IS) capital investments owned by the National Grid USA Service Company, Inc. to be allocated to NMPC in the form of rent expense. As a result, benefit/cost framework and processes used to estimate costs and savings for information systems would occur at NGUSA Service Company, who plans for and makes investments in information systems for the Utilities.

Following the origination of an information systems project at the service company, each should be subjected to an analysis of alternatives, as well as a benefit/cost analysis. The benefit/cost analysis should compare the capital and operating costs of each major information systems investment against the demonstrable and quantifiable benefits that will entail. The benefits and costs should be compared on a forecasted, annual basis, as well as comparing the present value of costs and benefits over the life of the investment. Liberty will examine the methods, processes and variables used to analyze the benefits and costs related to the various IT projects at the service company.

NGUSA Service Company IT management should also assign priorities to individual projects that have been proposed by its central planning groups following the identification, selection, analysis and preparation of Capital Requests. One type of prioritization process can come in the form of benefit/cost ratio scoring evaluating quantifiable cost benefits of the project as compared to the capital and expense costs of project execution. We will examine the methods, processes and variables used to assign priorities to various IT projects at the service company and other involved sources of planning and budgeting.

The service company charges "rents" on information systems to the Utilities, making a fraction of the benefits and costs of such investments chargeable to individual utilities. We will review the calculation of rents to the Utilities regarding the information systems investments to ensure that the net benefits of such projects flow to the Utilities in the rent payments.

Gas Business Enablement Project

Information Systems Task Area 6

The sixth RFP focus area under Information Systems asks that this audit:

> *Review the Gas Business Enablement project, including an assessment of how the Utilities plan to implement the project, and a determination if the project will achieve the intended goals in a cost-effective manner.*

We first note that the leads for Audit Element 5: Gas Planning and for Audit Element 10: Work Management will have responsibility for addressing the business needs to be met by the project.

Working with them to ensure that the management of the project appropriately considers and incorporates those needs, the lead for this area will assess management of the information systems introduced and altered by the project. This joint approach will ensure that implementation will meet business needs in a cost effective manner, and that management of the systems is delivered and managed in a manner appurtenant to its needs and consistent with industry practice in managing the delivery of complex systems that present significant scope, cost, schedule, and functionality risk. To put it another way, we will assess two related, but distinct aspects of implementation:

- Management of the IS "project" to control the scope, cost, and schedule of system delivery
- The ability of the system, as finally delivered, to support effective and efficient gas business operations.

With respect to the first aspect, we will seek to verify the existence and use of:

- A well-defined project approach and workplan
- Well defined project organization and staffing
- Well defined vendors/consultants contractual commitments for the project
- Well defined project management and control procedures including:
    - Scope and change management
    - Policy, functional and technical issues
    - Staffing and training issues
    - Vendor/systems integrator participation and support
    - Status reporting
- Active Business unit and Senior executive/sponsor involvement
- Well defined project control documents
- Well desired business benefits with the approach for achieving and quantifying them
- Well defined business training roll-out process
- Existence of relevant project correspondence and presentation materials.

The discussions under Gas Planning and Work Management address business or user-side aspects of the program.

Customer Information System Conversion

Information Systems Task Area 7

The seventh RFP focus area under Information Systems asks that this audit:

> *Determine the status of KEDNY's Customer Information System conversion and if customer billing errors are occurring as a result of this conversion.*

Like the GBE project review described in the preceding task area, the CIS review will also take place on a joint basis. It will include the lead for Area 12: Customer Operations. We will seek to determine the status of the conversion process. We will particularly seek to identify how project management reporting has addressed turn-over or transition problems that impair or affect the billing process. We will examine the sources of billing errors at KEDNY, and seek to determine their root causes, and any possible contribution from the CIS.

Our examination of the management by IS of system deployment will look for design issues (such as definition and management of the incorporation of billing functionality), and documented cut-

over or transitional problems and gaps in the configuration or systems integration. We will examine planned training for the converted system for sufficiency, design, and extent and timeliness of delivery.

To the extent that major project development work remains, we will employ activities similar to those for GBE, as described in the preceding task area. To the extent that the converted system has been turned over but remains in a transitional state, we will examine whether management is employing sound and effective management approaches, resources, techniques, reporting, and problem identification/solution.

C. Element 3: Electric Planning and Grid Modernization

Electric Planning & Modernization Scope

This third audit Element that the RFP details, Electric Planning and Grid Modernization, includes twelve focus areas, a number of them having multiple dimensions:

1. Ability of DER to Meet Capacity Requirements
2. ER Performance Information
3. DER Billing and Tracking
4. DSP/DSIP Platform Implementation
5. Effects on Capital Programs and Planning Practices
6. Development of DSP Capabilities
7. Marginal Cost of Service Estimates
8. Local Hosting Capacity Data
9. REV Demonstration Projects
    - Development Process
    - Third-Party Contracting and Risk-Sharing
    - Use of REV Connect
10. Non-Wires Alternatives
    - Project Development and Selection Processes
    - Evaluation Criteria
    - Ongoing Oversight
11. Benefit/Cost Framework
12. Bidding Process

The evolution of the electric system planning function has been far-reaching and rapid in New York. Changing industry priorities have affected all utilities, not just those in New York, with the challenge of grid modernization and the need for enhanced reliability. The challenges in New York have been greater, however, commensurately with the opportunities that DER can bring and the fundamental nature of the electric system that may result.

Utilities have primarily retained the tried and true methods to identify area supply deficiencies, but the approach to filling those needs is obviously evolving rapidly, with more focus on non-wires options. The twelve focus areas under Electric Planning and Grid Modernization appropriately focus on issues like REV, DER, and DSP. Even so, approaches and activities associated with and supportive of these areas of focus must take place in a well-structured, staffed, and directed set of work groups empowered and equipped with appropriate systems, tools, and analytical techniques.

We have therefore created a set of task areas designed to examine the environment in which NMPC addresses the 12 focus areas of the RFP. They include the following, all explained below:

13. Planning Capabilities, Processes, and Tools
14. Planning Organization
15. Aging Infrastructure

Ability of DER to Meet Capacity Requirements

Electric Planning & Modernization Task Area 1

The first RFP focus area under Electric Planning and Grid Modernization asks that this audit:

> *Assess the ability of DER, including energy efficiency, to meet forecasted capacity requirements on the NMPC distribution system and the effectiveness of any efforts to enable these technologies to fill these needs.*

We will examine the relation of DER potential, including energy efficiency, to forecasted distribution system capacity needs, with the intention of determining the degree to which DER can be expected to help meet those forecasted needs. We will examine how and how well management assesses and quantifies that potential. We will identify the factors both facilitating and restraining DER growth, examine their likely relative effects on NMPC's system, and weigh those factors in the context of NMPC's forecasted needs.

We will also assess NMPC's efforts to facilitate DER growth and to mitigate DER restraints. We will consider results to date as an important input to this assessment. We will examine the degree of effort and sophistication applied by management to these efforts. Energy efficiency, including consideration of trends, program results, and degree of effort, will form an integral part of this task area.

In particular, we will seek to determine the extent and quality of management's efforts to analyze potential in a structured, quantified manner that addresses an appropriate range of uncertainty and how to plan in response to such uncertainty.

DER Performance Information

Electric Planning & Modernization Task Area 2

The second RFP focus area under Electric Planning and Grid Modernization asks that this audit:

> *Evaluate the processes used to collect and analyze information regarding the performance of DERs with respect to expected performance, including energy efficiency program realization rates.*

A process to monitor performance versus expectations is critical in assessing the success of current efforts and initiatives, and in planning future ones. We will examine the process for the gathering, analysis and reporting of information required to judge performance, including defined performance metrics. Management should have in place processes that promptly identify issues, analyze cause, and bring about improvements. Similarly, the process should allow for "lessons learned" to be shared among providers and projects as appropriate.

NMPC presumably has had performance systems applicable to energy efficiency program realization rates in place for many years. Liberty will examine those systems, success rates achieved in the past, how that information has been used to facilitate cost-effective results, and what use management makes in planning for the future.

DER Billing and Tracking

Electric Planning & Modernization Task Area 3

The third RFP focus area under Electric Planning and Grid Modernization asks that this audit:

Evaluate NMPC's processes for managing billing and tracking billing credits associated with VDER.

We will examine NMPC DER billing processes, to ensure that billing and credits associated with DER are subject to appropriate controls. We will examine the organizations involved, the systems and tools employed, the staffing engaged and their responsibilities, and oversight, auditing, and other controls applied. We will also consider the efficiency of the processes, including administrative burdens, stakeholder satisfaction and the degree to which DER objectives are facilitated by the billing approach. We will place particular focus be on how management determines the value of DER and reflects it.

DSP/DSIP Platform Implementation

Electric Planning & Modernization Task Area 4

The fourth RFP focus area under Electric Planning and Grid Modernization asks that this audit:

Assess how NMPC is preparing for the implementation of its planned DSP/DSIP platform.

We will assess NMPC's activities for the implementation of its planned DSP/DSIP platform. We will review all NMPC program plans, including the existing Distributed System Implementation Plan and changes made and anticipated in the very near term, and determine the day-to-day role of such plans in NMPC operations. We will specifically be seeking the "master plan" which brings all of the related activities together and by which NMPC manages the overall effort to provide a platform that enables and facilitates systems, measures, and activities that support non-wires alternatives.

Especially important here is the process by which NMPC manages implementation, including organization, progress and performance monitoring, reporting, scheduling and oversight. Cross-functional coordination among engineering, operating, accounting, customer care, and regulatory leadership and technical resources will also form an area of focus in our examination.

Below we address the matter of pilots, tests, and demonstrations. We will examine how NMPC plans to incorporate lessons learned from their activities in this regard and from the activities of the other New York utilities in ensuring that its development plans and activities will produce a comprehensive, transparent, accurate, inviting, and readily-usable platform that is scalable to increasing and broader use as DER penetration advances.

Effects on Capital Programs and Planning Practices

Electric Planning & Modernization Task Area 5

The fifth RFP focus area under Electric Planning and Grid Modernization asks that this audit:

> *Assess the efforts by which NMPC is evaluating the potential effects of large scale penetration of DER and future potential load drivers on its capital programs and planning practices.*

Large scale DER penetration stands as an important New York State objective. Major efforts to create an environment supporting it are well advanced, and pilots and tests underway have already created field conditions to test platforms. These factors all call for a structured, comprehensive means (hopefully sufficiently coordinated among the states' utilities, the Commission, and key stakeholders) for assessing the range of reasonably expected impacts on long-term planning processes and the capital programs that they drive. Utility capital planning takes what, for American industry, is an extraordinarily long-range view. That planning process should already be considering future load drivers. A strong but uncertain level of DER penetration offers great promise, but its emergent state adds a layer of uncertainty that management needs to accommodate to ensure an appropriate range and level of flexibility.

DER penetration will impact both the nature and the amounts of spending required to support future energy delivery systems. We will determine how management seeks to quantify the degree of change. We will examine where and how NMPC has marshalled the organizations, skills, resources, and tools needed to ensure that capital planning for the long-range future seeks to identify penetration rates, capture the benefits post-test phase penetration, and protect against vulnerability if penetration ultimately proceeds at a pace at the low range of forecasts.

We consider planning flexibility to comprise a much more important element of the planning process. The risk of putting in major new projects in the past was often a matter of the value of a year or two delay in actual need. Large-scale DER penetration creates greater challenges; *e.g.*, an in-place traditional project that may never prove needed, or the failure to provide non-traditional capabilities whose availability would have provided significant benefits.

We will look at how NMPC has:

- Realigned its planning resources to ensure robust examination of non-traditional approaches, platforms, and components
- Changed methods to ensure a robust approach and sound methods for forecasting the range of expected DER penetration rates
- Incorporated those forecasts into its system planning process
- Begun to test its alternative system plans for sensitivity to DER penetration
- Incorporated uncertainty about DER penetration (and other load drivers) into its long-range system planning
- Assessed how different penetration rates would affect optimum system design and configuration long term
- Incorporated approaches that allow flexible, timely, efficient response depending on how penetration rates may differ from projections.

We will look at the range of forecasted net changes in NMPC's building program as a result of large-scale DER and any substantive load drivers. Presumably, planning efforts will discriminate between grid modernization and expansion. In addition, we will address the degree to which system planning practices and criteria have changed and are expected to change.

Development of DSP Capabilities

Electric Planning & Modernization Task Area 6

The sixth RFP focus area under Electric Planning and Grid Modernization asks that this audit:

> *Determine how NMPC is planning for the development of DSP capabilities, including platform service offerings which will generate utility revenue.*

REV contemplates that the distributed system platform can provide opportunities for revenue enhancement via new services, creatively developed by the utilities and others. We will determine the degree to which NMPC is pursuing such opportunities. Liberty will also examine the approaches NMPC is taking in this Task Area, given new skills are often needed for such pursuits in utilities. This effort will build from the preceding and following Task Areas under Electric Planning and Grid Modernization.

Marginal Cost of Service Estimates

Electric Planning & Modernization Task Area 7

The seventh RFP focus area under Electric Planning and Grid Modernization asks that this audit:

> *Review NMPC's efforts to develop more granular marginal cost of service estimates for planning valuation and DER valuation purposes.*

This area has received significant attention, as the Commission, the state's utilities, and stakeholders have been addressing the question of valuation and how to quantify it. VDER Rate Design Working Group activities have raised questions about how well traditional rate structure and accounting approaches will accommodate changes like those presaged by DER.

The traditional approach to cost of service has operated at a relatively high level (rate class); however, the very definition of DER and other REV initiatives reaches the level where impacts can be localized and individualized. Data at such more granular levels has not normally been collected and analyzed but is required for valuing DER and for related cost-effective planning. We will study NMPC's efforts in this area, including current practices and plans relating to cost of service analysis and collection of requisite data.

Local Hosting Capacity Data

Electric Planning & Modernization Task Area 8

The eighth RFP focus area under Electric Planning and Grid Modernization asks that this audit:

> *Assess NMPC efforts to disseminate available local hosting capacity data to potential DER providers.*

Hosting capacity measures the degree to which DER can be accommodated without requiring upgrades in infrastructure or disrupting the quality of service. We will examine NMPC's efforts to

disseminate local hosting capacity data to potential DER providers. The information should be clear, accurate, up-to-date, timely provided, and actionable by potential DER providers. Management should provide a transparent and accommodating approach to ensuring that potential providers have what they need. We will seek to determine whether interactions with potential providers have raised concerns about information provided or follow-up. We will examine the quality of the data provided to assess its sufficiency to facilitate DER expansion.

REV Demonstration Projects

The ninth RFP focus area under Electric Planning and Grid Modernization asks that this audit:

> *Assess NMPC's REV Demonstration Project development process, including a review of the process for contracting with third parties, risk-sharing with third parties, and the use of REV Connect in selecting projects.*

Electric Planning & Modernization Task Area 9

National Grid recently began a pilot program in Buffalo, at the same time announcing that it will be "testing the DSP concept in additional locations across its service territories in New York." Management's phased approach contemplates engagement of additional customers and an expanding variety of technologies, with management using the results of these steps to "help define current and developing market mechanisms" through DSP participation through October 2019.

We will examine the bases for pilot and test program definition and initiation, to assess the program's breadth in securing data and experience pertinent to wide-scale development over time. We will determine what key metrics and other data management seeks to gain, how it will use it in gauging pilot and test success, and how it will bear on scalability of technologies, operations requirements, billing and crediting, partnering and other arrangements with third parties, and other factors that will drive planning and implementation of platforms that show promise and benefits. We will look to see the visibility to and support from senior management for the pilots and tests and the measurement of results from them. We will seek to verify that senior management has the information and expends the efforts necessary to stay close to developments and results, particularly from the perspective of advancing larger scale roll-out effectively and efficiently.

An aggressive and conscientious approach to demonstration projects is a key element to assure progress of REV. Evaluating how NMPC identifies potential demonstration projects, evaluates them, selects the best options, enters into fair agreements with vendors, and manages the projects will determine the quality and the support behind that approach.

The New York State Energy Research and Development Authority (NYSERDA) launched REV Connect in August of 2017. The launch provided a new website to support collaboration among utilities and technology providers in the development of innovative energy projects. The goal seeks to foster new business models and technology deployments. REV Connect's central location provides a source for learning about opportunities, idea sharing, technical support, and potential partnership matching with utilities like NMPC.

Innovation necessarily and promisingly underlies the future of REV, making market activation - - a central REV Connect objective - - an important contributor. NMPC needs to see REV Connect

as a place for getting important information, for developing its own thinking, concepts, and approaches, and for identifying partnering possibilities that will serve to make REV development an inclusive process that brings the best thinking and the broadest range of technical, developmental, and project management resources to optimizing approaches, platforms, partnering and contracting relationships, and other key elements driving success.

We will look comprehensively at how NMPC approaches REV Connect. Our examination will address how NMPC uses REV Connect (and by whom) to inform its approaches, platforms, and partnering/contracting alternatives. We will look at what information NMPC makes available and for what purposes. We will examine how NMPC examines experience to date with REV Connect and with plans for future changes, in order to remain a contributor to optimizing its effectiveness.

An overall perspective we will apply in this task area is the overall effectiveness of the NMPC process in encouraging and in facilitating the identification and execution of new approaches. One measure by which we will gauge encouragement is the terms that project offerors are granted, including compensation and the nature and degree of risk sharing in arrangements with partners and contractors.

Non-Wires Alternative Project Development

Electric Planning & Modernization Task Area 10

The tenth RFP focus area under Electric Planning and Grid Modernization asks that this audit:

> *Assess NMPC's Non-Wires Alternative project development and selection processes, including a review of evaluation criteria and ongoing oversight of such projects once they are operational.*

In the REV context, Non-Wires Alternates (NWA) do not by any means comprise a minor category. For example, distributed generation, energy efficiency, demand response and any pricing schemes that can help delay the need for new transmission or distribution facilities fall under the NWA umbrella. They need to be considered, as part of the overall process for selecting demonstration programs, thus connecting the work of this task area integrally with the platform and demonstration program development, planning, information-access, and other examinations undertaken in the remaining task areas under Electric Planning and Grid Modernization.

This Task Area 10 will focus on NWA project evaluation criteria and the selection process. We will also examine NMPC's process for oversight of such projects once they are operational. Matching performance with expectations has particular importance for all projects. In the early stages of REV, such measurement serves an added key role in testing early approaches, processes, analytical techniques, benefits and cost measurement for the purpose of adjusting them based on lessons learned.

Benefit/Cost Framework

Electric Planning & Modernization Task Area 11

The eleventh RFP focus area under Electric Planning and Grid Modernization asks that this audit:

> *Review the benefit/cost framework used by NMPC in electric system planning and prioritization to determine its effectiveness and compliance with Commission requirements.*

A 2016 Commission Order describes a benefit cost analysis (BCA) framework. The Order requires the application of the BCA framework to: (a) investments in DSP capabilities, (b) competitive procurement of DER, (c) procurement of DER through tariffs, and (d) energy efficiency programs. In response, NMPC produced an extensive BCA Handbook (Appendix 1 to the Distributed System Implementation Plan). That handbook is now two years old, making experience under use important to consider. Liberty will evaluate how the process has been employed by NMPC, the effectiveness of its application and its compliance with the Commission Order. We will seek to understand where management sees strengths and weaknesses, how it uses experience and information available to it from other New York Utilities, and where it may see opportunities for beneficial change, pursuable through established means for making such change.

Bidding Process

Electric Planning & Modernization Task Area 12

The twelfth RFP focus area under Electric Planning and Grid Modernization asks that this audit:

> *Evaluate NMPC's bidding process and determine if the process is appropriately transparent and competitive.*

We will examine the process by which NMPC prepares bid packages, qualifies bidders, receives bids, evaluates bids, selects winning bids and finalizes contracts. We will evaluate each step in the process for completeness, objectivity, and transparency. We will assess the effectiveness of controls applied by NMPC to assure a fair evaluation. We will also examine the degree to which the process facilitates a level of participation suitable to ensuring competitive outcomes now and sustaining them into the future.

Planning Capabilities, Processes, and Tools

Electric Planning & Modernization Task Area 13

We propose to examine NMPC's vision and plans for integrated system planning (ISP). We will determine its desired end state, NMPC's current position, and the plan to bridge the gap. We will also examine the pace at which the transition has proceeded, and steps being taken to accelerate that pace. We will include both the tangible process steps and the "softer" support activities, such as culture change, expanded skills and capabilities, and organizational realignments.

The new planning approaches demanded for REV (integrated system planning) require that utilities acquire or build new skills and capabilities. Liberty will examine how NMPC has identified those new needs and how any gaps were addressed in filling those needs. We will also determine how processes have changed and new processes developed in response to the ISP

approach. Finally, we will examine any new systems and tools, such as economic models, that have been developed to meet new planning needs.

Planning Organization

Electric Planning & Modernization Task Area 14

Given new skills and capabilities as a requirement, one must also assume that new organizational approaches might be in order to fully implement the changes in thinking required of ISP. The traditional system planning organization had a near-exclusive focus on the building of new facilities. While those skills and the organization to execute them remain necessary, the charge is now far broader. That not only necessitates new skills but, perhaps more importantly, a new culture. Liberty will examine how NMPC has chosen to organize for REV in general as well as the integrated system planning function in particular.

Aging Infrastructure

Electric Planning & Modernization Task Area 15

Industry issues of aging infrastructure are well-known and while REV initiatives may lessen the need for new building for expansion, the quality and acceptability of the existing infrastructure still require significant attention. Liberty will examine NMPC's program for evaluating and modernizing or replacing old facilities.

D. Element 4: Load Forecasting and Power Supply

Load Forecasting & Power Supply Scope

This fourth audit Element that the RFP details, Load Forecasting and Power Supply, includes six focus areas, a number of them having multiple dimensions:

1. Changes Since Last Management Audit
2. Status of Changes Detailed in DSIP Filing
3. Load Forecast Use in Planning
4. Probabilistic Approaches
5. Disaggregated Load Data
6. Supply Hedging Practices

Load forecasting at NMPC is in the midst of a major transition. In the past, utilities have differed widely on their approach to load forecasting. We have seen examples in which staffing and costs associated with load forecasting can differ by a factor of ten among utilities, with the more aggressive programs featuring PhD economists and statisticians using highly sophisticated models. But even the most sophisticated approaches of the past fail to approach the concepts currently being pursued by NY utilities.

NMPC plans a three-method approach consisting of: (a) top down (traditional econometric and growth models), (b) bottom up (customer-specific load and DER growth models), and (c) hierarchical or integrated (which integrates the first two and assures synchronization). It is the "bottom up" element here that is remarkable by all traditional measures. The notion of customer-specific analysis in which, according to the DSIP, "National Grid builds a load and DER forecast for each customer it serves," reflects a concept that would not have been considered feasible in

past years. In an interesting case, REV in general and DER in particular have combined to create a need and National Grid is seeking to respond with a creative solution.

Another interesting product of the new approach is "an 8,760 [hour] forecasted load profile at every level of the hierarchy across all levels and categories". Bottom line results will include 5, 10 and 15-year probabilistic forecasts.

As we did under the previous RFP element, Electric Planning and Grid Modernization, we have carved out several tasks areas that seek to give us perspective on the organizational and process environment in which the RFP's six specific focus areas play out. Explained after our discussion of the task areas addressing the six focus areas, we detail the three contextual task areas we propose to address:

7. Load Forecasting Capabilities
8. Key Load Forecasting Assumptions
9. Management of Load Forecasting Models.

Changes Since Last Management Audit

Load Forecasting & Power Supply Task Area 1

The first RFP focus area under Load Forecasting and Power Supply asks that this audit:

Evaluate changes to NMPC's electric load forecasting process since the previous management audit.

We will review the findings, conclusions, and recommendations of the last management audit, in order to understand what existed at the time. Considering how developments since that audit may have affected circumstances, needs, and capabilities, we will review changes to NMPC's electric load forecasting process since the last management audit. It is our understanding that no major recommendations were made in the area of electric load forecasting in that audit, so any changes would have been precipitated internally, presumably in anticipation of emerging REV requirements or in attempts at process improvement. We will document major changes.

The following four task areas will examine the specific aspects of forecasting specified by the RFP-listed focus areas. The last three task areas we propose to perform under Load Forecasting and Power Supply will address the effectiveness and efficiency of the forecasting organization, assumptions, and models.

Status of Changes Detailed in DSIP Filing

Load Forecasting & Power Supply Task Area 2

The second RFP focus area under Load Forecasting and Power Supply asks that this audit:

Determine NMPC's status implementing the load forecasting methodology changes detailed in its DSIP filing, evaluate the timeliness of the planned changes, and assess the adequacy and accuracy of the resulting forecasts.

Above under the first task area in Load Forecasting and Power Supply, we noted NMPC's new, three-method approach to load forecasting, as described in the DSIP. The DSIP specifies a five-

year implementation plan (starting in 2016), making the transition a work in process. With most deliverables planned for completion by Year 2 or 3 however, we would expect the status update completed in this Task Area 2 to demonstrate real progress.

We will evaluate the deliverables produced so far in response to the load forecasting plan presented in the DSIP. We will consider schedule progress versus the plan as well as the quality of the resulting products, including accuracy and completeness of forecasts. We will examine the pace of implementation, addressing any significant barriers or threats.

Load Forecast Use in Planning

Load Forecasting & Power Supply Task Area 3

The third RFP focus area under Load Forecasting and Power Supply asks that this audit:

> *Evaluate how system-wide and substation-specific load forecasting are incorporated into the planning process, assess the accuracy of those forecasts at the system-wide and substation level, and review NMPC's hierarchical synchronization process.*

We will examine how NMPC uses load forecasts in assessing system needs. The forecasts in question here, system-wide and substation-specific, would ordinarily be derived from NMPC's first method, econometric and growth models, recognizing that substation forecasts also include local knowledge of large customers' plans. We will analyze how System Planners use such forecasts in determining when and where new capacity solutions are required. We will also examine the accuracy of NMPC's system-wide and substation-specific forecasts and how NMPC deals with such uncertainties.

The new NMPC integrated method for load forecasts includes steps to assure that the top down and bottom up forecasts are consistent. Management seeks to ensure consistency through what is termed "NMPC's hierarchical synchronization process." We will examine that process and determine its effectiveness in establishing the required consistency.

Probabilistic Approaches

Load Forecasting & Power Supply Task Area 4

The fourth RFP focus area under Load Forecasting and Power Supply asks that this audit:

> *Determine to what extent NMPC has incorporated probabilistic approaches into the forecasting process as described in NMPC's DSIP filing.*

NMPC's DSIP makes clear a substantial commitment to probabilistic forecasts. Specifically, the "bottom up load profiles will be probabilistic in nature." We will examine the process to determine the degree to which probabilistic methods are used and the compliance of such methods to the commitments of the DSIP.

Disaggregated Load Data

Load Forecasting & Power Supply Task Area 5

The fifth RFP focus area under Load Forecasting and Power Supply asks that this audit:

> *Evaluate NMPC's means and methods for collecting load data that is disaggregated by time and location, and progress against related plans described in NMPC's DSIP filing.*

This task area requires analysis of how disaggregated load data will be collected. Traditionally, extensive load research programs were necessary for utilities seeking to better understand load data at a low level and as a function of time. With the rise in automated metering programs, the availability of such data is much enhanced. We will determine the nature of NMPC initiatives to gather such disaggregated data and the effectiveness of the program.

NMPC's DSIP filing indicates that "National Grid builds a load and DER forecast for each customer it serves." The DSIP does not necessarily make clear the means and methods of collecting the data. We will determine such means and methods in use by NMPC and evaluate the progress against plan.

Supply Hedging Practices

Load Forecasting & Power Supply Task Area 6

The sixth RFP focus area under Load Forecasting and Power Supply asks that this audit:

> *Evaluate NMPC's financial and physical hedging practices as they relate to electric supply.*

NMPC must hedge electric supply costs, using physical or financial mechanisms, for certain classes of customers. We will review the policies in this regard, examine how hedging strategies are determined, identify how the degree of acceptable risk is set, review how hedging costs are optimized, and examine the oversight vehicles applied to such risk management activities. We will assess the appropriateness and effectiveness of hedging and of features like these against requirements, Commission precedent, and market conditions.

Load Forecasting Capabilities

Load Forecasting & Power Supply Task Area 7

We propose a Task Area 7 having the following scope:

> *Evaluate the skills and capabilities acquired or developed for load forecasting and their suitability to support development and implementation of the new NMPC forecasting processes.*

NMPC's new load forecasting program employs a level of detail and sophistication not envisioned five or ten years ago. Such a quantum change in a program clearly requires new skills and capabilities for any organization. We will examine the skills and capabilities required to support the new program and NMPC's effectiveness in acquiring or building those skills and capabilities.

Key Load Forecasting Assumptions

We propose a Task Area 8 having the following scope:

Assess how key assumptions are proposed and approved for use in the load forecasting processes.

Load Forecasting & Power Supply Task Area 8

Load forecasts can be significantly driven by a few major assumptions. For example, assumed changes in key economic indicators can have a disproportionate impact on certain forecasts. It is therefore critical to the process that such assumptions be prudently established and subject to appropriate review. We will identify such key assumptions in the NMPC system, determine how assumptions are proposed and the checks and balances to which assumptions are subjected.

Management of Load Forecasting Models

We propose a Task Area 9 having the following scope:

Where forecasts rely on models, evaluate how management monitors the accuracy of such models and how models are periodically updated as required.

Load Forecasting & Power Supply Task Area 9

Models used in load forecasting processes can be highly sophisticated. It is essential that the functioning of such models be regularly tested to assure that they continue to function in a manner consistent with its original design and intent. We will examine the steps NMPC takes in order to assure its models remain up to date, accurate and functional.

E. Element 5: Gas Planning

This fifth audit Element that the RFP details, Gas Planning, includes five focus areas, a number of them having multiple dimensions:

Gas Planning Scope

1. Models and Inputs
2. Convergence Between Gas and Electric Planning
3. Meeting Increasing Natural Gas Load
4. Gas Financial and Physical Hedging Practices
5. Non-Pipe Solutions and Demand Response

This audit element addresses planning the delivery of natural gas to customers in the New York service territories. This element has two components: (a) the planning and procuring of sufficient gas supplies, and (b) planning a distribution system that can deliver the gas to individual customers. Both components are critical to safety and reliability. Local gas distribution companies (LDCs) must plan for events like cold weather, commercial and/or industrial demands, and pricing volatility affecting supply cost. Gas planning has become more complex as the increasing diversity in gas use places increasingly complicated demands on transmission and distribution systems. With natural gas infrastructure buried and expensive to change, planning and forecasting gas utilization, not only currently but in the future, is critical in keeping costs down while enabling flexibility in responding to changes in loads and load locations.

National Grid's three gas LDCs service three different territories, two of which adjoin. The three distribution systems were largely installed at different times, which means designs and configurations under different standards, different materials, and different conditions. The principal "drivers" for the recent rate cases were the significant capital requirements of each of the three. Much of the investment approved in those cases is required to replace or upgrade aging components, but all three systems are experiencing some growth, due to marketing programs approved by the Commission, and to favorable prices relative to fuel oils. Replacing oil consumption with natural gas for reduction of petroleum pollution is another factor in the growth of gas use in KEDNY's service territory, and on the NMPC gas system. Growth projects for all three include extensions and reinforcements of their transmission and distribution systems, as they seek to provide reliable service throughout their authorized service territories.

New York's Reforming the Energy Vision (REV) Program has added a new dimension to gas planning for the state's LDCs. Though REV's primary focus is the electric utility industry, the Commission has indicated its support for economically-viable gas system projects. Potential interactions between gas-system and electric-system planning have progressed to the point that the Commission has identified convergence between gas planning and electric planning as a discrete Task Area in this Work Element.

Model Inputs

Gas Planning Task Area 1

The first RFP focus area under Gas Planning asks that this audit:

> *Assess the models and inputs used to develop short- and long-term gas forecasts, and determine the extent to which back casts are utilized to determine the accuracy of the forecasting function.*

Different methods and tools typify short-term and long-term forecasting for gas requirements. Short-term forecasts usually focus on scheduling and dispatching available resources to ensure that supply matches requirements over the next few days up to a month. Longer-term forecasts address whether available resources remain adequate over time horizons that match the lead times necessary to revise or replace them.

Different tools, and typically different personnel, perform and support the two functions. In our experience, short-term forecasting has seen the most recent innovation and development, as companies explore the use of neural networks in improving dispatch efficiency. The tools for longer-term forecasting are more established, but their performance is subject to continuous improvement as input parameters are refined.

We will review the tools used, determine how their inputs are identified, assess the reasonableness of the ranges used on assumptions for producing alternate planning cases or scenarios, and examine how management validates the sound operation of its modeling. We will also look at the organization structure, resources, and skills applied to forecasting.

As suggested by the specification of this Task Area, "back-casting," or comparing the results of forecasts that use actually-experienced input parameters with the results that were experienced, is an important tool for identifying weaknesses in forecasting methods. We will examine what the three New York gas operations do in this area, and compare it with industry practice.

Convergence Between Gas and Electric Planning

The second RFP focus area under Gas Planning asks that this audit:

> *Evaluate the convergence between the gas planning and electric planning functions as it relates to gas-fired electric generation.*

Gas Planning Task Area 2

Prevailing trends and new initiatives in electric power generation are affecting the timing, quantity and location of gas requirements:

- The relatively low price and better emissions performance of gas-fired power generation relative to coal-fired and oil-fired has resulted in displacement of those fuels by gas.
- The rapid-start and adjustable-output characteristics of gas-fired generation makes it a preferred source for backing up the intermittent nature of solar and wind-powered generation.
- The variety of available sizes for gas-fired generating units make them strong competitors for distributed-generation options.
- The proliferation of microgrids, with their requirements for backup generation, is also driving demand for gas-fired generating equipment.

The gas pipeline industry has been working on accommodating these demands for some years. Adjustments have included new types of tariffs for these applications, and addition of high-deliverability storage facilities as necessary to maintain system performance. The Utilities must remain actively involved in these adjustments to ensure that the quality of service that they require at their city gates is delivered there.

Distribution system performance is management's responsibility. National Grid has to design and plan its systems to deliver gas to all types of users at the pressure and flow-rate qualities that they require. Performance of this function is simply not possible without detailed knowledge of current and prospective power-sector uses of those systems. In the case of NMPC, this knowledge should be available in-house; the problem is getting the gas-system planners and the electric-system planners together to collaborate. For KEDNY and KEDLI, the challenge is different: they must acquire this knowledge from other companies whose attitudes, interests and priorities may be different. Liberty observes that the parties to the Joint Proposal in their most-recent rate case agreed to 1) changes in the power-generation transportation service classifications in the Utilities' tariffs, and 2) a collaborative to consider power-generation issues. That collaborative was to develop a study of cost-allocation and rate-design issues, which was to result in a report to the Commission with recommendations regarding those issues.

The Joint Proposal also contained a specific example of gas-planning and electric-planning convergence. The Proposal recommended, and the Commission approved, three REV demonstration projects, one of which was installation of micro combined heat and power (micro CHP) home energy management solutions. The micro CHP project was argued to allow the companies, in coordination with the electric service provider, to assess the effectiveness of these units in reducing electric load and deferring future investments in electric infrastructure. The Commission agreed, noting

> *We agree with Staff's conclusion that the micro CHP project could assist in testing … the potential to avoid upgrades to the electric system in a particular*

constrained area, as well as the impact of micro CHP systems on the overall peak demand on the electric and gas systems.

We will review the Utilities' efforts in this area. We note with some interest that their UK affiliates are members of an Energy Networks Association that developed a Gas Network Innovation Strategy paper in 2017 for discussion with various interested parties. An Electricity Network Innovation Strategy was developed in parallel, for presentation and discussion at the Association's Low Carbon Networks and Innovation conference earlier this year. We will inquire whether lessons learned in that effort are being applied in New York.

Meeting Increasing Natural Gas Load

Gas Planning Task Area 3

The third RFP focus area under Gas Planning asks that this audit:

Assess the readiness, capability and possible impediments to meeting increasing natural gas load, and possible alternatives to new long-term projects like pipeline capacity, including the ability of conservation, temporary compressed natural gas facilities, demand response or other programs to meet peak load requirements in the future.

In NMPC's recent rate case, the company's Gas Infrastructure and Operations Panel stated that:

... natural gas supplies are likely to be available to Niagara Mohawk and its customers now and for the foreseeable future at a significantly lower cost than the cost to develop alternative energy sources. To take advantage of the favorable gas supply dynamics, natural gas utilities are increasing their reliability and growth spending to offer the economic benefits of relatively inexpensive natural gas supplies to meet consumer demand.[1]

With increases in the availability of gas supplies in the Northeast Region, and increased pipeline capacity, impediments to meeting increasing gas load have become less likely to be upstream of the city gates. The location and condition of the transmission and distribution assets could be an issue, but their investment programs are intended to address such issues. It is also possible that, given the companies' history, the locations where they have capacity are not the same as the locations where they are experiencing growth.

Liberty has found that the best-managed LDCs have long-term plans for their distribution systems. Upgrading projects are developed in the context of those plans. To be effective, long-term plans must anticipate where growth will occur, but must be sufficiently flexible that they can adjust as growth actually occurs. Alternative ways of meeting peak load requirements, including conservation, temporary compressed natural gas facilities, demand response, etc., can be considered as opportunities present themselves. Each alternative must meet the requirements of long- and short-term plans, and address or rectify the condition that requires correction.

[1] Case 17-G-0239, Testimony of the Gas Infrastructure and Operations Panel, April 28, 2017, at page 14.

The National Grid gas utilities have plans for upgrading their distribution systems, as evidenced by the very significant capital expenditure programs that they have presented in their recent rate cases. Those programs are to be supported by their Gas Business Enablement Program, described as

> *... an initiative to develop and implement a comprehensive framework of new technology solutions and business process changes that will enhance gas safety, compliance, and customer service performance across National Grid's gas business.*[2]

Liberty will examine those plans and programs, including whether and how effectively they are being implemented.

Gas Financial and Physical Hedging Practices

The fourth RFP focus area under Gas Planning asks that this audit:

Gas Planning Task Area 4

> *Evaluate the effectiveness of gas hedging methods (physical and financial), strategies, and processes.*

Many providers of gas-supply services, including most gas utility companies, employ financial and physical hedging to reduce volatility in gas costs. Effective hedging programs require: (a) careful statements of their objectives, (b) well-defined strategies to be pursued in support of those objectives, and (c) measurement of the effectiveness of the strategies employed in attainment of stated objectives.

Financial hedging programs also require carefully-designed systems of controls. Required controls include at least the following:

- Carefully-constructed policies regarding exposure to risk. Statements of these policies may include specification of metrics to be used in assessing risk exposure
- Separation of the trading function from the reconciliation and payments functions
- Sophisticated systems for tracking transactions and assessing exposures
- A risk-oversight structure for maintaining and enforcing policies and procedures.

We will examine the financial and physical hedging programs and practices for these essential requirements. Our review will compare the Utilities' programs and practices with industry best practices as we understand them. We will not address the financial-reporting aspects of hedging, as external auditors routinely examine these aspects as part of their annual audit work. We will, however, provide recommendations for improvement of the programmatic aspects of hedging activities if we find aspects that could be improved. Our recommendations will address reductions in exposure to risk, as well as reductions in cost, if appropriate.

[2] *Ibid.*, at page 9.

Non-Pipe Solutions and Demand Response

Gas Planning Task Area 5

The fifth RFP focus area under Gas Planning asks that this audit:

> *Determine the extent to which the Utilities incorporate the consideration of Non-Pipe Solutions as well as both traditional and non-traditional demand response techniques into their gas planning processes.*

One element of gas system planning is to consider the development of the LDCs' transmission and distribution systems as a whole - - another considers individual projects. The work in Task Area 3 under Gas Planning will focus more on planning for the systems as a whole, whereas this one will focus more on evaluation of individual projects.

A proper planning process for individual projects considers alternative solutions to identified problems. This requirement is especially important when considering a network; almost any problem in a network can be resolved in more than one way.

Here we will examine whether and how management includes atypical solutions as alternatives for each project. The RFP identifies "Non-Pipe Solutions as well as both traditional and non-traditional demand response techniques." There may be other types of atypical solutions, as well. The inquiry here will address how such solutions are considered in planning individual projects.

Consideration of atypical solutions has achieved some formality on the electric side. For example, the Commission has established a proceeding to develop accurate pricing for distributed energy resources, such as solar power. This process allows such resources to compete more effectively when a company is considering how to solve a particular power-supply problem. We don't know whether consideration of atypical solutions has progressed to this level of formality on the gas side, but we will explore what the Utilities do in this area, particularly how they identify and consider atypical alternatives when developing solutions to particular gas-supply problems.

F. Element 6: Gas Safety

Gas Safety Scope

This sixth audit Element that the RFP details, Gas Safety, and includes eight focus areas, a number of them having multiple dimensions. The evaluation of National Grid's Gas System Safety programs will encompass nine (9) tasks (a new task on worker safety was added). These tasks are listed below:

1. Leak Prone Pipe Replacement Programs
2. Leak Prone Pipe Unit Costs
3. Incident Investigations
4. Gas Safety Violations
5. Contractor Training and Qualifying
6. Employee Training and Qualifying
7. Contractor Oversight
8. Employee Oversight

A number of these focus areas involve worker safety directly or indirectly. We have added a Task Area that addresses in-house and contractor employee from a programmatic perspective:

9. Worker Safety Programs.

Leak Prone Pipe Replacement Programs

Gas Safety Task Area 1

The first RFP focus area under Gas Safety asks that this audit:

Assess the leak prone pipe replacement programs, including flood zone management, risk models, and other factors used to determine mains to be replaced, verification that high risk pipes are replaced, and the program's impact on total system leaks.

Each of National Grid's operating utilities manages large-scale replacement programs to reduce the amount of leak prone mains and services. Cast-iron and unprotected steel generally comprise much of an LDC's population of leak-prone mains and services. The New York City and Long Island areas are subject to an additional program to target leak prone mains and services in the FEMA flood zones, responsive to operational issues following Storm Sandy. As our staffing study reported, these programs have raised major prioritization, program management, resource acquisition, and related issues that will extend over long periods. Recent rate cases have accelerated the pace of these replacements.

We will determine whether management uses a sufficiently structured and comprehensive approach to modeling and using risk in prioritizing replacements and in developing annual plans that appropriately use risk rankings in combination with consideration of municipal and other utility work planned and in a way that otherwise promotes efficiency to the degree consistent with the paramount objective of risk reduction. We will review the structure, inputs, and use of models used by each of the Utilities to validate their identification of highest-risk piping for first replacement, and to see if and how other leak-prone piping is considered.

We will determine whether planned work accords with risk rankings and verify that actual work corresponds to plans, with deviations clearly justified. We will determine and assess how management measures leak rates - - particularly how they are being affected by replacement activities to date. We will examine how management uses leak rate changes to assess the quality of its prioritization and work execution, and whether data on those changes has or should be used to adjust plans. We will examine how management coordinates short-term plans with other municipal and utility work in proximity. We will seek to determine whether more cost-effective approaches to these short-term plans may be possible while still working expeditiously to remove highest-risk pipe first.

Our staffing study described the very significant resourcing challenges involved in performing the work activities required to sustain progress under accelerated replacement programs. Coordinating the examinations of this task area with that under Element 10: Work Management, we will examine how National Grid has addressed needs to plan, acquire, and develop needed resources in a market of high demand for workers and supervision that is likely to continue and perhaps accelerate. Those plans and resources need to address both contractor and employee sources.

Leak Prone Pipe Unit Costs

The second RFP focus area under Gas Safety asks that this audit:

Evaluate the process used to track and report unit costs that are tied to positive incentives related to leak prone pipe.

Gas Safety Task Area 2

Cost incentives for leak-prone piping removal and replacement require careful, objective, and thorough tracking and reporting, if they are to induce the intended behavior. They depend first on a sound system for unit-cost tracking at the management level. As our statewide staffing study found, unit-cost measurement and reporting were not strengths common to the state's utilities.

Each of the three operating companies operates under ratemaking incentives tied to replacement costs of its leak-prone pipe. These incentives, both positive and negative, address cost and production levels and can affect return rates. We are completing for another public service commission an audit of a rate-incented replacement program. Our work there and elsewhere demonstrates the complexity that can exist both in measuring installation work and the costs associated with it. For example, installation measurement issues may have to deal with factors like planned versus actual work, the meanings of key terms like "complete," the application of terms like "installed" and "retired," among others. The cost side can present equal measurement complexity and uncertainty. Just two of a number of examples may include identification of which estimate forms the basis for comparison to final costs or what work may remain even after costs are reported as final. If incentives are to work properly, management needs to:

- Employ definitions that conform to ratemaking incentives
- Find ways to tie them to "real" information verifiably connected to management reporting
- Consistently apply repeatable measurement methods and calculations.

Our first efforts will focus on organizations, systems, tools, and methods used to track installation and cost performance in a manner that accurately and thoroughly captures unit rates. We will then examine the means and methods for transfer of data produced by management for controlling installation and cost performance to reports used for measuring incentives. There should exist complete consistency between the two, and the former should be comprehensive and reliable enough to drive calculations associated with the latter.

We will identify any gaps in or other aspects of the management systems and reporting that may impair incentive calculation and we will seek to verify that such calculation uses management system data properly. Should we find any gaps, we will identify corrective measures intended to produce fully reliable incentive calculations.

Our review will separately consider projected and actual costs for each of the National Grid New York gas operations. Our staffing study demonstrated that one can expect replacement costs to vary, in some cases by very large factors among the types of environments involved, which extend across very broad swathes of the state, from the New York metropolitan area to each upstate corner.

Incident Investigations

The third RFP focus area under Gas Safety asks that this audit:

Assess the Utilities' Incident Investigation processes used to comply with Pipeline Safety Regulations and Best Practices.

Gas Safety Task Area 3

State and federal gas safety regulations require that management thoroughly investigate all gas safety incidents, and implement appropriate responsive actions as quickly as possible. We will examine the organization, staffing, methods, and procedures applied by each of National Grid's New York gas operations to incident investigation. We will seek input from those responsible for NYS Pipeline Safety Program activities involving the Utilities.

We will also examine representative investigations performed by management. This sampling will provide a means for verifying that actual practice conforms with expected practice, and that investigations take a form, scope, and depth appropriate to the circumstances involved.

National Grid also operates LDCs in other jurisdictions. We will compare New York processes and practices with those used there. We will also compare the New York organization, staffing, methods, and procedures with best practice. The scope and size of National Grid's gas operations provide it with substantial "leverage" in affording best practices and in combining resources to promote economy.

Recent rate proceedings have addressed the importance of pipeline damage prevention and of enhanced first responder training programs. Measures like these are important in avoiding incidents and in mitigating their consequences, whether violations or not. We will examine programs and measures used in these two areas.

Gas Safety Violations

The fourth RFP focus area under Gas Safety asks that this audit:

Evaluate the Utilities' record of gas safety violations and determine what, if any, systemic improvements are warranted.

Gas Safety Task Area 4

Safety violations and accidents can provide indications of systemic issues. Management needs to establish and operate a structured, comprehensive program to identify where such issues exist, to analyze and identify underlying causes, and to create and execute programs that get at root causes. Even single violations or incidents can indicate larger and more pronounced issues. Lack of management focus, poor quality control, and training exemplify some of the types of underlying causes that require more than an incident-specific response.

We will first determine how and how well management identifies and logs violations and incidents. We will determine what level of fact-finding underlies their logging and description. We will also examine the quality of management's categorization of violations and incidents by type, severity, location, for example. This work will enable us to assess whether the data accumulated provides an effective basis for assessing severity and for identifying recurring issues that may evidence systemic gaps or weaknesses.

We will then seek to determine how management uses the data in analyzing root causes and in identifying appropriate response plans. We will compare management's views of what the data show with observations that we can form from the information.

We will also identify instances where management has formed plans to deal with recurring or systemic issues. We will examine the quality and completeness of those plans, and means and methods used to ensure their prompt execution, test their effectiveness, and monitor for potential recurrence.

Here, as is the case for other tasks under Gas Safety, we will seek the views of NYS Pipeline Safety Program personnel knowledgeable about National Grid's New York utility operations, working with them to ensure that we secure available documentation for review.

Contractor Training and Qualifying

Gas Safety Task Area 5

The fifth RFP focus area under Gas Safety asks that this audit:

> *Evaluate the onboarding, training, and qualifying of contractors performing construction of the Utilities' pipeline facilities and operation and maintenance on the Utilities' pipeline facilities.*

Our recent statewide staffing study addressed the challenges existing and expected in securing and developing the resources necessary for pipe replacement. As that report concluded, reliance on contractors will remain primary for many years. Those contractors, already facing the challenges of normal turnover and acquisition, will have to deal with the need for increasing their resources. While not directly addressed by the RFP's delineation of this audit focus area, utilities will face greater resource challenges as well, as expanded work will give their employees greater options to work for others.

Expansion of gas availability also has, again as our staffing study observed, increased new construction needs. The combination of accelerated replacement work and increased new construction have ripple effects across other areas as well, affecting resources applied to operation and maintenance. The result is that the already significant challenges of ensuring the capability of contractor work and supervision resources are sure to increase.

Gas training for newly-hired contractor staff is an import facet of providing safe and cost-effective service, and for ensuring public and worker safety. Ensuring proper qualification of existing contractor personnel has equal importance. Today, programs and verification must not only be sound, they must be scalable to account for greater turnover (given larger workforces) and for work expansion in the future. Retirements of seasoned workers and growing expansion and replacement have required contractors to bring in more new employees with little or no gas installation experience.

Factors like these expand the scope and nature of training and qualification important for safety, cost control and quality control. Minimum training and qualification standards exist, but most companies employ standards specific to themselves for required contractors Operator Qualification (OQ). They may use outside organizations such as gas associations or internal

resources to provide training and testing, and for validating completion of training and competence.

We will review the training and certification requirements of National Grid's New York gas operations. We will examine training-completion documentation. We will determine whether any increases in contractor workload have led to reduced emphasis or documentation of training and qualification. We will test whether qualified individuals are performing work requiring qualification.

We will also review contractor management programs for verifying required training and continued qualification of individuals. We will also examine how management oversees and reviews contractor program and training/qualification requirements and verification to ensure that they produce fully qualified resources.

Employee Training and Qualifying

Gas Safety Task Area 6

The sixth RFP focus area under Gas Safety asks that this audit:

Evaluate the training and qualifying of the Utilities' workforce performing construction of the Utilities' pipeline facilities and operation and maintenance on the Utilities' pipeline facilities.

The same contractor factors and needs addressed in preceding Task Area 5 exist for employees. As our staffing report described, replacement and expansion also give added emphasis to the need for enhancing internal capabilities, both as a need to provide resource flexibility and as an opportunity to use long-term programs as a means for supervisory and management development supporting succession planning. We will undertake the same examinations planned with respect to contractors, in terms of training and qualification.

Contractor Oversight

Gas Safety Task Area 7

The seventh RFP focus area under Gas Safety asks that this audit:

Assess the inspection, quality control, quality assurance, and oversight of contractors performing construction of the Utilities' pipeline facilities and operation and maintenance on the Utilities' pipeline facilities.

Whether management uses employee or contractor resources, comprehensive quality assurance, quality control, and oversight programs are required to ensure that installation, removal, maintenance, and operation activities meet applicable standards and requirements. Expanded and expanding workloads and reduced levels of experience among workers expand the challenges of providing that assurance.

We will examine the quality assurance and quality control programs of the National Grid New York gas utilities. We will also examine how and the degree to which management requires contractors to maintain and operate quality assurance and quality control programs and measures consistent with those of their own. We will also examine where management places authority for day-to-day measures to oversee and inspect contractor work methods, installations, repairs,

replacements, and other activities, from the perspectives of assuring quality work in accord with designs, standards, and practices.

Over and above these day-to-day roles, we will also determine what organization, resources, methods, reports, checklists and other tools management uses to ensure proper controls on all work (including direct work, supervision, and inspection) assigned to contractors. We will determine the use and extent of on-site presence employed by contractors in performing inspection and oversight. We will do the same for management in cases where it directly performs inspection and oversight, and in cases where its role is to ensure that contractors effectively perform such roles.

As the preceding activity descriptions indicate, we will focus on the robustness and effectiveness of quality assurance and quality control programs, and the organizations, resources, methods and practices implementing them. Management oversight of contractor execution of effective oversight and inspection will form an important focus. Inspection processes need to be multi-tiered and well-coordinated. Contractors often perform work for multiple customers at the same time, resulting in shifting resources among them. Company standards, procedures, specifications, and policies be enforced, which requires monitoring of contractor crews. We will therefore examine resource plans for contractor-performed work.

We expect that management will be performing or providing for regular inspections of work being performed. We will examine the records of those inspections to assess factors like the completeness of their scope, documentation of completeness of the inspections themselves, the extent and regularity of inspections, and the use of appropriate templates and checklists. We will also examine how management aggregates information from inspections, uses that data in management discussions and assessments of discernible gaps or problems, designs and executes corrective actions, and transfers lessons learned among operating companies.

Employee Oversight

Gas Safety Task Area 8

The eighth RFP focus area under Gas Safety asks that this audit:

> *Assess the inspection, quality control, quality assurance, and oversight of the Utilities' workforce performing construction of the Utilities' pipeline facilities and operation and maintenance on the Utilities' pipeline facilities.*

The scope of this task area corresponds to that of Task Area 7, focusing on work performed by employees rather than contractors. We will undertake the same activities for the same reasons, adjusting them to reflect what is likely (given removal of contractor management and oversight from the mix) a more direct relationship between management, supervision, and inspection, on the one hand, and work performance, on the other hand.

Worker Safety Programs

Gas Safety Task Area 9

The ninth RFP focus area under Gas Safety asks that this audit:

> *Review worker safety programs and accident rates for company employees and contractors involved in construction and operations and maintenance activities.*

Other task areas under Gas Safety involve worker safety. We propose the addition of this Task Area 9 to ensure that our work and final report provide a discussion of the subject in its own right. Ever a critical area in the gas utility business, expanding resource needs (whether contractor or employee) and the new personnel they bring to the field will increase risk in the absence of heightened emphasis on worker safety. We will examine the scope and depth at which management measures worker safety at each of the Utilities, broken down by company versus contractor resources. We will look at the trends and we will query management about what they see as issues or concerns (or perhaps improvement) arising from comparing trends among the Utilities and between contractor and employee forces.

If those trends show potential problem areas, we will look at the specifics of safety programs and training at each company and among contractors. We will also consider differences in work activities that may influence safety data. Our goal will be to ensure that at each company, efforts to secure contract and employee worker safety are sound.

G. Element 7: Budgeting and Finance

Budgeting & Finance Scope

This seventh audit Element that the RFP details, Budgeting and Finance, includes seven focus areas, a number of them having multiple dimensions:

1. Capital Budgeting and Analysis
   - Board of Director Roles
   - Project Selection, Prioritization, and Status and Variance Reporting
2. Cost-Effectiveness of Goods and Services Procurement
3. Utility Pension & OPEB Management
   - Asset and Investment Strategy
   - Consideration of Risk Ability to Meet Obligations, and Asset Diversification
4. Utility Financing Effectiveness
   - Optimal Corporate Level for Debt Issuance
   - SEC-Registered Versus Alternatives
5. Credit Ratings Management
   - Awareness of Earnings Adjustment Mechanism Revenue Opportunities

Capital Budgeting and Analysis

Budgeting & Finance Task Area 1

The first RFP focus area under Budgeting and Finance asks that this audit:

> *Evaluate the Utilities' capital budgeting processes, including the roles of the NGUSA and National Grid plc Boards of Directors, project selection, project prioritization, and status and variance reporting.*

These five task areas listed under RFP Element 7 present overall an agenda with which we are familiar in addressing utility budgeting and finance in management audits, but make some important and very specific additions. This first task area will address what should be an integrated set of approaches for: (a) performing capital budgeting and analysis processes, (b) incorporating clear points of engagement by the NGUSA and National Grid boards of directors, (c) capital project origination and selection, (d) capital project prioritization and application, (e) O&M

expense budgeting, and (f) capital project and O&M status and management reporting and monitoring.

The Utilities' capital budgeting processes should play a central role in supporting and in controlling capital spending at each of these capital intensive utilities. We will look specifically at the capital budgeting processes applied in the cases of each of the Utilities. We will evaluate all elements of these processes, as applied by and at the board of director, holding company and utility levels, expecting integrated and coordinated work by all participants.

We will begin with an examination of holding company board involvement in capital allocation and proceed to project origination at the utility level. We will examine budget and planning approvals and authorizations, and assess project status and cost variance management processes for approved capital projects and O&M budgets.

Utility planning processes should link to strategic planning and goals and objectives for the holding company, National Grid. Each of the Utilities should also develop and manage to clearly identify utility goals and objectives that should at the state and local level drive capital budgeting and business planning. Each operating utility should incorporate these goals and initiatives in planning guidelines or directives for planners. At the holding company/corporate level, there should exist electric and gas organizations responsible for system planning directives, providing engineering guidelines and planning analysis for local planners and engineers to use in initiating, designing, and evaluating system rehabilitation projects and expansions.

Business analysis or similar financial management groups typically have capital budget coordination roles. Changing financial conditions, directives from the State and Commission or energy policies such as REV can result in additions to or reductions in the capital budget. We will assess the processes used to develop capital budgets at the holding company and at each utility and for allocating capital among them. These reviews will provide an understanding of the emphasis and balance that NGUSA, National Grid and the individual utilities place on infrastructure and quality of service, and on capital allocation to meet public service requirements and stakeholder expectations.

The budgeting processes should take place under guidelines, procedures, and schedules that produce results sufficiently coordinated to produce a consolidated, overall budget. We will examine budgeting procedures and their execution. The detailed budgeting process should involve all organizations whose distinct contributions to utility service require material capital expenditures.

Utility holding companies often employ a strategic planning process that allocates capital to each utility from the top down. After receiving its allocation, management at the utility level is typically responsible for reconciling the bottom-up and top-down budget efforts. However, top-down budget allocations are sometimes insufficient to fund all of the requirements identified in the bottom-up budgeting processes performed by local engineering and planning groups. We will examine how the balance is struck for the New York utilities. We will examine bottom-up budgeting that defines utility spending requirements. Bottom-up budgeting starts with engineering and field operations employees applying their view of the local system requirements and specific reliability metrics to

identify capital requirements starting on a project-by-project basis at the local level. Annual capital programs required for operations or maintenance purposes should also be planned for from the bottom up. The operating utilities should have personnel responsible for implementing planning guidelines, whether assigned at a National Grid or individual utility level.

NMPC develops electric capital plans for both its transmission and distribution systems. Capital projects and programs are originated and developed in the following categories: system capacity, asset condition, reliability, damage/failure, communications and controls, and public requirements/customer requests. In addition, capital expenditures related to programs such as Reforming the Energy Vision (REV), the DER electric system, and non-wires alternatives are also developed as part of the process. For the three gas utilities, capital plans may be developed using wide spending rationales to define investment categories, such as mandated (e. g. relocations, main replacements, corrosion testing); growth and system reinforcement; reliability; and non-infrastructure (*e.g.*, tools and equipment). Inclusion/exclusion of both electric and gas capital projects may be based on several factors such as project in-progress status, risk score, scalability, and resource availability.

Using gas and electric engineering guidelines, planners identify growth and modernization requirements, mandatory capital projects, maintenance or operating improvements, facility needs, technology improvements, public policy (such as REV) requirements, and service-improvement initiatives. Growth spending is typically driven by forecasts of increased usage, either overall or in particular areas of the serving region. Modernization projects are required to replace facilities to meet new service needs. Events such as relocation of facilities due to road construction drive obligatory types of spending. Maintenance or operating improvements are projects to replace or relocate existing facilities.

Each capital category consists of a number of projects and annual programs for each year during the planning period - - generally either five or 10 years, or both. Specific justification methods, criteria and analysis should apply, with formal capital requests prepared for each individual project. Economic analysis should exist for large discretionary projects to provide ranking and prioritizing.

We will examine the methods used to assign priorities to various projects. There should be a clear and timely process for expenditure prioritization with as much objectivity as can be incorporated. Management should also undertake periodic, structured examinations of the ultimate effectiveness and economy of past prioritization efforts (*i.e.,* projects that did and did not "make the cut"), in order to validate the effectiveness of prioritization processes and decisions made. An industry best practice is to also perform risk analysis to assess the impact on service quality when assigning priorities to work items for the capital budgeting process. Prioritization by economic benefit should also be among the tools, especially for larger, discretionary projects.

Planners should also quantify the effect on installation and maintenance headcount and other expenditures for potential projects. In Liberty's experience, short-term net income objectives or expenditure levels included in rate plans frequently dictate the level of the overall operating and maintenance budget and individual items. Maintenance budgets typically include preventive maintenance or corrective maintenance identified by inspections or firm time cycles, and proactive

repair programs. Because the primary O&M expenditures are force driven, we will consider the effect of changes in the maintenance budget on force planning. This approach will establish an accurate baseline for comparison of the year-over-year changes in spending as it relates to quality of service. The factors driving increases and decreases in individual O&M expense line items will be determined and evaluated for their impact on total utility cost levels.

Management reporting systems and processes used to monitor budget performance and variances help drive budgeting and planning effectiveness. Management reporting processes provide a recurring (generally monthly) forum for comparing actual to budgeted expenditures, and for identifying variances. Specific explanations of variances and proposed remedies and actions should be required from managers responsible for projects and programs. Budget variances should be identified, evaluated, and corrective action taken to effectively manage the process.

Reporting on variances should also be provided to senior management regularly. Significant capital budget increases or decreases should be properly justified and approved by senior management and the boards involved. Management reporting systems for monitoring budget performance provide key spending control information. Procedures to control and manage total company, program and project capital costs should also be in place and effective.

Audited feedback loops should also be in place and operated effectively so that both the management of the budget and the quality of the financial information on which decisions are made constantly improve.

Cost Effectiveness of Goods and Services Procurement

Budgeting & Finance Task Area 2

The second RFP focus area under Budgeting and Finance asks that this audit:

> *Evaluate whether the Utilities are utilizing the most cost-effective means to procure goods and services.*

The acquisition of goods and services in a holding company as large and diverse as that of National Grid raises particular opportunities and challenges. We will examine procurement in two contexts: (a) from outside providers, and (b) through the use of affiliates to provide goods and services commonly. Both have implications in optimizing cost effectiveness. A particular area of focus will lie on contracting for goods and services under programs for leak-prone pipe replacement. The scope and scale of the National Grid utility replacement programs present challenges in ensuring access to sufficient resources. They also present opportunities for leveraging program size and duration in seeking favorable contract terms, conditions, resource availability commitments, and even training programs.

With respect to outside providers, all utilities have procurement processes with generally rigid rules that seek the best deal for the utility while maintaining fairness and transparency. Such processes are not complex and are subject to continuing oversight and periodic audit. When the utilities are a part of a larger entity, as is the case at National Grid, the processes can become more complex in at least two circumstances: joint procurement among affiliates and cross subsidization among them.

We will evaluate the cost effectiveness of procurement in the broad perspective as well as in the specific case of joint procurement initiatives. Under National Grid, several utilities operate in reasonable proximity to the Utilities, which may serve to provide added opportunities in the procurement of goods and services from others. We will seek to determine how the National Grid Utilities get a better deal through such arrangements and how management determines that it is optimizing procurement, considering the needs of the Utilities.

We will review procurement procedures, templates, and controls, and examine the nature and extent of oversight applied, including audits, measures used by management to gauge the effectiveness of the process, and any recent initiatives to improve program effectiveness. We will also examine organizational responsibilities and how the integrity of the process is maintained.

Turning to common services, a generally accepted rule holds that use of an internal group serving at "cost" provides: (a) increased economies of scale, and (b) avoidance of the addition of "profits" as a cost component. Thus, this theory proceeds, a well-designed set of common service organizations should compete well against market alternatives. However well this theory works generally in practice overall, it takes many specific inquiries to verify that any particular operation (in this case four New York utility operations; one electric and three natural gas) is not the exception to the rule.

One key method for assuring that the Utilities are not an exception to the "all-for-one" rule is for the conduct of objective, reasonably frequent examinations of market alternatives. For large, diverse, and dispersed operations, it is also important that such examinations on regular occasion look at utility-group-only and sometimes at single-utility-only (particularly where there is significant size or geographic disparity between members of the utility subsidiary group) alternatives. It is not sufficient to look only at market alternatives only on an all-subsidiary or a combined utility/non-utility basis.

We will identify the New York and supporting organizations and interfaces, determine the principles and philosophy underlying the organizational design *e.g.*, autonomy of various service functions, degree of control of services by the regulated utilities, design techniques to enhance synergies). We will identify functions provided in a "shared services" environment, identify the nature of services provided, and their costs. We will identify opportunities for improved goods and services and we will determine whether the Utilities have explored all opportunities for combining internally provided and outside goods and services.

Pension and OPEB Management

The third RFP focus area under Budgeting and Finance asks that this audit:

> *Assess each Utility's Pension & Other Post-Employment Benefits plan asset investment strategy, considering risk, ability to meet obligations, and diversification of assets.*

Budgeting & Finance Task Area 3

Pension and Other Post-Retirement Benefits (OPEB) plan funding risks have been significant for many utility companies over the past ten years. Steep equity market declines in 2008 and early 2009 took pension plan assets far below projected benefit obligation (PBO) liabilities. Funding ratios for many companies fell to 50 to 70 percent, with many plans having targeted about 60

percent in equity and alternative investments, leaving the other 40 percent to fixed-income investments. Such allocations comprised a fairly aggressive stance, but one common in industry pension funding. Changes to more conservative re-allocations at many utilities have produced mixed results. The recovery in equity markets has caused some funding ratios to improve significantly in recent years, but funding deficits remain fairly common.

Management should consider lingering deficits in pension and OPEB funding as a primary financial risk. We will assess historical and current statuses of pension and OPEB assets and funding to meet future benefit obligations at all of National Grid's New York utilities. A clear and reasonable asset investment strategy should guide pension and OPEB plans, fully reflecting the circumstances surrounding retiree populations. Investment strategies should undergo deep analysis by industry experts and pension consultants, and should provide for appropriate diversification. Annual measurement of plans, funding status, and obligations should follow careful, comprehensive, and accurate methods, and produce sound and actionable reporting. Plans should employ clear target funding levels, and specific and actionable plans to achieve reasonable targets over an appropriate time horizon.

As with all investments, risk tolerance should form a clear and soundly derived element of funding strategy and tactics. Utilities have traditionally employed low levels of risk tolerance, given factors such as their business and financial characteristics and the more financially conservative nature of plan participants. De-risking seeks to meet plan investment committee goals of reducing risk methodically over time, as funded status improves. We will examine whether and how management continually reviews risk tolerance for pensions and OPEB, subjects them to continual review, evaluation, and clear expression, and incorporates results into investment strategies. We will evaluate the suitability of current status, and plans for changes to close any gaps or address any concerns for the future.

Utility Financing Effectiveness

Budgeting & Finance Task Area 4

The fourth RFP focus area under Budgeting and Finance asks that this audit:

> *Determine whether the Utilities are using the most cost-effective means to issue securities (e.g., optimal corporate level at which to issue debt, SEC registered vs 144A or private placement).*

Utility holding companies have a range of options for securities issuance, both in terms of the level of the overall corporate structure issuing them and in the nature, tenor, and other terms and conditions of the instruments used. We will address in this fourth task area the effectiveness of financing for the extensive capital requirements of the National Grid utilities. Equity capital funding for utilities within a holding company structure often employes equity injections into the utilities as required to meet capital structure objectives. Debt capital frequently comes in the form of individual utility issuances of securities in the capital markets. Such debt frequently is issued in the name of and under the responsibility of each utility entity. We will review the process for debt issuances, the types of securities employed, the balance struck among them, maturities, and placement status (public/private) in providing an assessment of overall financing effectiveness for each of National Grid's New York utilities.

We will evaluate whether the New York utilities have used and are planning future use of the most cost-effective means to issue securities, including the optimal corporate level at which to issue debt. We will examine rationales for past decisions to use SEC-registered or private placements, (two alternatives to accessing debt capital markets). We will also explore current thinking regarding future issuances, considering perspectives on existing and emerging financial market conditions and circumstances. We will focus on key steps in the financing process, including solicitation, investment banker selection, types and structures of securities analyzed, terms and conditions, maturities analyzed, and alternative financing methods such as unsecured notes or debentures.

We will also undertake a broader review, examining planning for financial requirements. Sound planning should underlie financing, to promote near- and long-term utility access to sufficient capital on a timely basis at reasonable rates. We will look at long-run financial requirements planning and planning for the short run. Management should employ utility-level financial forecasts - - an essential tool of financial requirements planning. We will examine financial forecasts for consistency with approved long-term plans and budgets, and seek to determine whether management conducts effective analysis of alternative capital plans to gauge capital-related financial requirements and contingency plans. Treasury personnel should construct for each utility a financing plan for each year covered by financial forecasts to identify and support planning for external capital requirements.

Specific processes for raising capital should follow the determination of specific external capital requirements for each utility. We will examine whether and how well management executes processes for equity financing for each utility, considering internal cash generation, dividends to the parent, and equity required to maintain targeted capital structures. We will look for a regular approach (*e.g.*, quarterly) to performing financing calculations seeking to keep utilities' capital structures in balance at all times. We will determine whether equity injections have occurred timely to maintain such balance.

We will also verify the existence of appropriate utility strategies for responding to changing conditions in the financial marketplace and for reflecting an appropriate mix of financing alternatives to secure overall lowest cost of capital. We will consider both near- and long-term requirements in this review.

We will also evaluate the Treasury and corporate finance organization for required expertise and experience. We will examine the processes and systems they use to analyze financing alternatives. We will also determine what advice from capital market experts (such as investment bankers and major lenders) management seeks in planning and executing securities issuances.

Integration with and coordination between capital-expenditure planning and financial market realities will comprise an important aspect of our examination. We will be looking for the use of proper strategies for responding to changing conditions in utility cash flows or financial marketplaces. Financial planning should effectively support utility capital requirements, while also recognizing that constraints may arise that may require changes in spending plans to secure required funding at the overall lowest cost of capital. Capital market financing constraints should

be considered as part of the budgeting process, but should not operate as a barrier to needed capital expenditures.

Debt financing of the holding company, utilities, and all affiliates can also represent an area of risk for utilities. We will examine this area. Encumbrances on utility assets in the financing agreements of the holding company or of an affiliate should not be allowed, for example. Guarantees and support agreements provided by the utility to the holding company or to an affiliate should not be present, as it would affect the utility's credit standing. Potential financial inter-ties such as cross-default provisions in debt documents, or interlocking Material Adverse Change clauses should also be avoided. Such interlocking clauses can place debt commitments in default due to financial problems at a related holding company or affiliate. Interlocking ties may be included in financing documents, or may be indirect relationships whereby the utility is the "only deep pocket" for affiliate or holding company creditors to pursue in the case of financial distress, and should not be present.

Credit Ratings Management

Budgeting & Finance Task Area 5

The fifth RFP focus area under Budgeting and Finance asks that this audit:

> *Evaluate how the Utilities interact with credit rating agencies (e.g., are the credit rating agencies aware of the additional revenue opportunities associated with EAMs).*

Credit ratings for the debt securities financing of National Grid's New York utilities from agencies like Standard and Poor's, Moody's and Fitch form a primary determinant of the marketability and costs of debt issuances. Ensuring that the credit ratings of the Utilities flow from the credit charactertics of the utility, without negative influence from the parent or other affiliates, should comprise a priority of management. We will examine how the Utilities are kept free of negative influence and how they ensure that the agencies remain currently and fully informed about utility conditions and circumstances affecting financial health and strength. The credit ratings should also take into account the specific credit metrics and cash flow of the individual utility, including the effects of revenue mechanisms such as Earnings Adjustment Mechanisms (EAMs). The REV proceeding has led to mechanisms that provide alternatives to the traditional cost of service model, creating opportunities to tie earnings to new sources (*e.g.*, effective non-wires alternatives, energy efficiency, and cooperation with interconnectors).

We will examine sources of business risks - - typically involving factors like the regional economy, cost recovery mechanisms, past earnings performance and changes in state and national utility structures and markets. Financial risk comprises the other primary area assessed by the credit rating agencies. A number of factors drive financial risk, with the level of debt leverage in each utility's capital structure a key determinant. Operating cash flow generated by each utility offers another key financial risk indicator, measured against capital expenditures to gauge the "coverage" of cash flow to internally fund expenditures. Expected dividends can also have an impact on cash flow coverages. Regardless, the levels of "free cash flow" to cover interest and principal payments on debt is a key measure of financial risk.

Credit metrics measure overall relationships between operating cash flows and debt levels, interest payments and other fixed obligations. Key credit metrics include Free Cash Flow/Debt, Free Cash

Flow/Interest, Free Cash Flow/Fixed Obligations, and variations and permutations of these components. Rating agencies establish a range of metric coverages to qualify for each credit rating level.

Liberty will review all of the credit rating reports for each National Grid New York utility and for the parent for the last three years. The utility companies should maintain investment-grade credit ratings that accurately reflect the financial structure and business risks of a stand-alone company. The specific credit rating business risks and financial risks of each company will be noted for each of the three credit rating agencies. Specific risks for each company that are currently important will be noted, as well as forward-looking risks that may impact future credit ratings. For instance, the cost recovery mechanisms in place for each company will specifically be considered as part of the "business risk" evaluations, as such mechanisms are recognized as important to utility cash flow, credit metrics and resulting credit ratings.

Credit ratings also offer a key indicator of whether the financial operations of the utility holding company and affiliates are affecting utility finances and credit. The financial performance of each of the affiliates in a holding company structure affects all other affiliates, including the utilities. One of the exposures created by a utility's inclusion in a holding company structure is the potential for removal of equity capital or cash diversion by the parent. The potential for holding companies to direct equity and cash earned by the utility toward non-utility affiliates is the reason that many utilities have had their credit downgraded for problems at affiliates. The influence of the holding company and affiliates on utility credit ratings should be minimized to the extent possible.

H. Element 8: Project Management

Project Management Scope

This eighth audit Element that the RFP details, Project Management, includes five focus areas, a number of them having multiple dimensions:

1. Capital Project Selection Process and Documentation
2. Capital Project Prioritization and Selection
3. Capital Project Scope, Cost, and Schedule Controls
4. Capital Project Information Provided to DPS
5. Estimating Processes and Systems.

RFP Element 8 sets forth a list of study activities generally in line with how a traditional management and operations audit looks at capital project selection and cost controls. We have grouped the Task Areas consistent with five components of a project management study: Capital Project Selection; Project Prioritization; Controls for Costs, Scope and Schedules; Project Transparency with the NYPSC; and Project Estimating.

The table below illustrates the breakdown of Element 8. Again, the grouping is for convenience only in understanding the flow of the Task Areas. Each Task Area will be treated as an independent challenge and will be a project in itself.

Capital Project Selection Process and Documentation

Project Management Task Area 1

The first RFP focus area under Project Management asks that this audit:

> *Evaluate how the Utilities identify and select capital projects, consider alternatives, and memorialize which projects move forward and which do not.*

The selection of capital projects in utilities begins with processes typically operating under engineering guidelines, processes and procedures and planning analysis tools available to local planners and engineers for use in identifying and originating capital projects. These initial activities address projects at the individual or sometimes fairly confined group level. Sometimes projects, particularly small in individual costs, get grouped into programs for convenience in estimating costs and in prioritizing them as part of the integrating of phases of capital planning. The overall capital approval and budgeting process will, as described below, consolidate individual projects or programs into large categories.

All elements of the process ultimately link to holding company strategic planning and the capital initiatives defined in this top level plan. Each of the Utilities should also employ clearly identified capital initiatives, programs and directives reflected at the state and local level through the capital project planning processes. Effective capital planning processes depend on clear and uniformly applied guidelines, procedures, and schedules that produce results sufficiently uniform to allow for those selected to be incorporated into consolidated capital plans, prioritized, and scheduled across the number of years that capital plans address.

Local engineers and central planning groups both have responsibilities, depending on needs and project types, for the initial identification of a roster of potential capital projects and programs, generally working from the bottom and for each utility system in multi-utility structures. Local engineering and field operations employees apply the applicable planning guidelines and templates, considering their views of system requirements within their areas of responsibility and applying the specific reliability metrics applicable. They identify and provide overall scope, costs, and schedule dimensions for projects they identify as needed to meet requirements. The integration stages of capital planning follow identification of capital project requirements on a project-by-project basis at the local level for individual utility lines of business.

The Utilities should each have dedicated personnel responsible for applying guidelines, metrics, templates, required consideration of alternatives, and other clearly defined criteria in the identification and broad scoping of individual projects. Custom in the industry encompasses assignment of such personnel at either at a National Grid or individual utility level, recognizing that the critical factor is responsibility for and knowledge of local conditions and data. We will examine the organization, resources, methods, procedures, tools, templates, and outputs of initial project identification activities, seeking to verify the use of a regular, orderly processes. These processes should be carried out by experienced personnel operating, wherever assigned organizationally, in appropriately defined sectors, regions, or areas.

Electric utilities nearly universally group candidate projects and programs into broad groupings, to support the necessary integrating processes, which consider affordability and establish priorities. Factors used for categorization use characteristics like system capacity criteria, asset condition, reliability, damage/failure, communications and controls, and for public requirements/customer

requests. Using electric engineering guidelines, planners identify growth and modernization requirements, mandatory capital projects, maintenance or operating improvements, facility needs, technology improvements, public policy (such as REV) requirements, and service-improvement initiatives.

We will examine how management categorizes projects for purposes of allocating capital dollars, how carefully categorization occurs, how categorization is used in allocating capital, and how, within categories, prioritization of projects occurs. We will also be looking at how factors like engineering criteria, reliability metrics capacity and other equipment ratings, special initiatives or categories (for example, REV and non-wires alternatives), and work produced by regular inspections apply.

Gas utilities often develop capital plans using wide spending rationales to define investment categories, such as accelerated main replacement, mandated work (*e.g.*, combining relocations, main replacements, corrosion testing), growth, system reinforcement, reliability, and non-infrastructure (*e.g.*, tools and equipment). Inclusion/exclusion of both electric and gas capital projects may be based on several factors such as project in-progress status, risk score, scalability, and resource availability. We will look at the same elements of capital project selection as for electric companies, recognizing the fundamentally different needs driving them and the way they are categorized.

For the gas Utilities, some projects are simple, straightforward and easily measured. One such example is as a system reinforcement improvement to provide additional pressure during a forecast design day. Such a project can be modeled and checked via actual pressure measurements. Measurements of system metrics are developed and tracked before and after the project has been implemented and executed, and are key to project identification.

Requests for capital expenditures should be made in a standardized format using what are normally termed "Capital Request" forms for both projects and programs. Such capital requests should describe the capital requested in detail, provide justification for the project, include analysis and alternative evaluations, and include cost estimates. An important part of this process is the consideration of alternatives, which should be analyzed for comparative system impacts, as well as differences in cost and operating efficiency. The comparative alternative analysis may be performed with specialized models used for this purpose. The comparisons of alternatives should be a requirement and central feature of the capital request forms, and used to select projects for the capital plan.

Each capital category consists of a number of projects and annual programs for each year during the planning period - - typically either five or 10 years. Specific justification methods, criteria and analysis should be required, and official capital requests should be prepared for each individual project. The planners then develop, design and price out the projects. Economic analysis should be prepared on large discretionary projects to provide ranking information that allows for maximizing the "bang for the buck" of capital expenditures.

Capital projects and programs should be documented along each step of the selection process. All capital requests should be documented and retained, whether they have survived the approval

process or not. All projects are then prioritized as part of the capital planning process; the documentation for this process should also be retained and available. Once capital projects are prioritized, a "first cut" of the bottom-up capital plan is prepared for senior management. Following iterations between the planners and senior management, a capital plan is approved for presentation to each utility's Board of Directors for authorization.

Approved capital plans should be documented and readily available. We have often found greater formality in structure, methods, approaches, and documentation between electric and gas companies. Our staffing study work indicated that National Grid was closing the gap between its two businesses. The Gas Business Enablement Project (subject to a separately scoped examination under the Information Systems audit element, but one closely coordinated with the work in this task area) should produce even greater positive movement.

Capital Project Prioritization and Scheduling

The second RFP focus area under Project Management asks that this audit:

> *Evaluate how capital projects are prioritized and scheduled, including a review of the variables considered in this process.*

Project Management Task Area 2

Capital project prioritization has become an integral part of utility capital planning. It seeks to ensure the expenditure of capital dollars efficiently on a system-wide basis. It recognizes that various factors emerging after plans get set can disrupt schedules, require transfer of authorized dollars between projects and programs, and require flexibility generally in getting highest priority work done with dispatch. Prioritization also aids in the process of selecting the most effective projects and programs for approval before final plans become set. Various types of scoring systems find common use, including elements like system benefit scoring, strength of benefit/cost ratios, and overall economic and risk scoring.

Capital planning and monitoring processes should employ priorities assigned to individual projects considering decisions made by its engineering groups following their identification, selection, analysis and preparation of Capital Requests. Clearly, however, more senior management, reviewing capital project lists as the integration and approval process continues, should apply judgment from their perspective, which will often be based on a broader view of system conditions, needs, regulatory initiatives, public visibility and notoriety of some projects and other factors.

Liberty will examine the methods, processes, and variables used to assign priorities to various projects. There should be a clear and timely process for expenditure prioritization with as much objectivity as can be incorporated into that process. We will evaluate the quality of service analysis, engineering criteria and reliability metrics included in the process, and the roles played in setting the priorities for the competing plans and projects. When effectively applied, benefit/cost ratio scoring evaluating quantifiable benefits of the project in relation to costs can provide a powerful tool. If NMPC or the gas utilities uses it, we will examine how well it does so.

Projects should be prioritized using consistent evaluation methods, whether through service quality, engineering, benefit/cost or risk scoring. An industry best practice is to perform risk analysis to assess the impact on service quality when assigning priorities to work items for the capital planning process.

Gas utilities often perform risk analysis in analyzing and prioritizing capital projects and programs. Gas system historical materials included cast iron and bare steel for mains and bare steel and other materials for services. The focused replacement of these leak prone materials in a risk based replacement program can select the greatest risk reduction at the most reasonable cost for ratepayers. A model of the company's system along with historical leak and failure data is typically used to determine which leak prone pipe segments and associated services should be replaced first. Such modeling provides information to be used in prioritizing gas capital projects.

Prioritization by economic benefit is also a tool that should be used, especially for larger, discretionary gas projects where it is important to maximize "bang for the capital buck." In addition, there should be periodic, structured examinations of the ultimate effectiveness and economy of past prioritization efforts (*i.e.*, projects that did and did not "make the cut"), in order to validate the effectiveness of prioritization processes and decisions made.

Capital Project Scope, Cost, and Schedule Controls

Project Management Task Area 3

The third RFP focus area under Project Management asks that this audit:

> *Evaluate the methods used to control capital project costs, scope expansion, and schedule adherence.*

Management reporting processes provide a monthly forum for presenting actual expenditures versus budgeted amounts, and identifying variances in performance. The reporting systems and processes used to monitor project and total capital performance and variances provide key spending control information. Of particular importance are the monthly meetings and management reports supplied, and for procedures for actions taken in response to budget variances. Specific explanations of variances and proposed remedies and actions should be required from the manager responsible for the project or program. Project cost variances should be identified, evaluated, and corrective action taken to effectively manage the process. We will examine how management provides for each of these key elements in controlling capital project and program scope, costs, and schedule.

Management should employ controls to ensure that increases or decreases to the construction budget/expenditures are justified and appropriately approved. Procedures to control and manage total company, program and project capital costs should also be in place and effective.

Reporting on variances should also be provided to senior management for their review and regular monitoring. Significant increases or decreases in the costs of capital projects should be properly analyzed, justified and require approval by senior management and the Board. Management reports should also be provided to senior managers whose subordinates are directly responsible. Manager compensation should have a component that is directly tied to performance to project costs and schedules, a key factor in cost control management.

We believe that the quality of analysis can be judged by the degree to which it facilitates corrective action. Analyses that provide no ability for management correction are of no real value. Liberty will evaluate how variance analysis is performed and how the resulting data flows into the

forecasting process. We will also consider the degree to which feedback to the initial estimating process, in terms of better data and assumptions, is taking place as a result of variance analyses.

Another capital control objective is to control the scope of capital projects, particularly against scope expansion. The project requests, including justifications, analysis, alternative considerations, design and cost estimations are all based on a specific project scope. Any expansion of the project scope will increase the equipment, labor, contractor expense, schedules and the cost of the capital project. The original scope of the original project request must constantly be monitored in the capital management reports. Any significant change in the scope must be justified, analyzed, schedules adjusted and the costs re-estimated. Project scope changes must be presented to and approved by utility senior management. Best practice to control scope expansion is to require re-authorization of capital projects that have experienced substantial changes in scope.

Capital projects must also adhere to their schedules in order to be effectively implemented and completed. Capital projects require detailed schedules, both to reflect a logical and coordinated plan as well as to provide a mechanism for tracking progress. The degree of detail will vary, with some utilities carefully detailing every function and task, while others may focus only on construction. The content of schedules will also vary with some utilities including resources, quantities or other related parameters. Control of project scheduling is another key function of the monthly meetings and reporting processes.

Managers responsible for the capital budget must first ensure that the approved capital projects are properly scheduled to be completed during the budget year. The exception to this rule are multi-year projects that should be categorized separately. The construction scheduling process must consider the balance of economic feasibility and operational requirements. Monthly project reviews should be structured to allow for meaningful measurement, approval, and control of increases that may prove to be required as projects progress. Liberty will examine the project scheduling update process, analysis of schedule variances, and how management oversight of schedule performance is maintained, including progress reporting at all levels.

Capital Project Information Provided to DPS

The fourth RFP focus area under Customer Operations asks that this audit:

> *Assess the adequacy and transparency of information provided to the Department related to capital project selection, prioritization, and schedule, budget, and rate plan adherence.*

Project Management Task Area 4

We understand that the Commission has employed three-year forecasted rate plans, key components of which are associated capital plans and forecasted O&M expenses. For example, an NMPC rate Order in March 2018 provided for a three-year rate period beginning on April 1, 2018. The rate Order approved capital expenditures of $613 million, $645 million, and $674 million for Years 1, 2 and 3, respectively. The forecasted three-year capital and O&M plans presented as part of each rate filing undergo questioning, negotiation, and ultimate resolution in the form of a rate order that effectively provides a capital and O&M blueprint for spending and operations for the three-year rate period.

The capital and O&M plans filed by each utility for its rate case should contain the same components as its most recent five-year capital plans and O&M forecasts approved by senior executives and presented to the Board of Directors. The contents of the rate filing should be completely consistent and adhere to the approved capital and O&M plans.

The utility rate filings should be consistent with and adhere to the company's approved capital and O&M plans. In the case of NMPC, the rate filing for both gas and electric for the three-year rate period set in the recent rate Order should be consistent with the authorized plans of the company for 2018-2020. In other words, the capital and O&M plans debated in rate base proceedings should adhere to the contents of each company's official, approved internal capital and O&M plans that are a topic of this management audit.

Liberty will compare the rate case capital and O&M plans to the authorized and approved plans of the Utilities, identify any barriers to reliance on the latter to provide timely, meaningful, accurate information regarding the former, and identify means for maximizing consistency and ease of producing information enabling comparisons of the two.

Estimating Process and Systems

Project Management Task Area 5

The fifth RFP focus area under Project Management asks that this audit:

> *Determine the extent to which project estimating processes and systems support the development of accurate estimates for project selection, budget development, and customer estimates, including an assessment of the impact of project estimating enhancements implemented subsequent to the previous management audits and rate cases.*

Project estimates fill many roles, three of which the RFP specifically includes. In judging the adequacy of estimates and estimating processes, one must first define the intended use of the estimate, and that intended use will then dictate the quality, accuracy, and level of detail required for the estimate. We will look for estimating procedures that define intended use and specify estimate quality as a result.

We will examine the organizational approach to estimating and the degree to which professional estimators are used for program design and preparation of estimates. The program should include clear procedures and templates, a supporting database that is maintained as current, and requirements for estimate reconciliations when actual results differ from the estimate significantly.

We will also assess how treatment of the three applications noted in the RFP (project selection, budget development, and customer estimates) differs in the estimating program, if at all, and how estimated parameters are consistent with those three intended uses.

I. Element 9: Program Management

Program Management Scope

The RFP seeks an examination of the Utilities' Energy Efficiency (EE) and Demand Response (DR) programs. A Commission Order in Case 15-M-0252 directs the utilities to conduct internal assessments of data quality procedures, protocols, and controls related to EE program data.

Each of the Utilities must file an EE Data Governance Assessment Report in mid-September 2018 detailing findings of their internal assessments. The utility reports will include descriptions of the management structure responsible for ensuring quality of data, the systems and technologies used to support data quality, data risk assessment processes, data quality controls, processes for determining what warrants a material change of reported data, and data quality measurements and goals, along with identified deficiencies and planned corrective actions.

The RFP outlines four focus areas for this audit Element:

1. Management of Energy Efficiency Programs
2. Contracting Procedures
3. Coordination of Energy Efficiency and Demand Response with Forecasting and Planning
4. NMPC's Management, Tracking, and Maintaining of Street Lighting Assets.

Management of Energy Efficiency Programs

The first RFP focus area under Program Management asks that this audit:

> *Assess the management of the Utilities' Energy Efficiency programs, including a review of procedures for collecting, reporting, remediation of data errors, the impact of data errors on the planning process, and QA/QC procedures for ensuring data quality.*

Program Management Task Area 1

National Grid manages several energy efficiency programs designed to reduce energy consumption by its customers. These programs include replacement of commercial lighting with high-efficiency equipment and equipment maintenance. National Grid offers customers no-cost assessments of their energy needs, and offers discounts on energy-saving technologies and equipment, including rebates and incentives for new and upgraded buildings, equipment, and technology.

National Grid also hosts programs for apartments and other multi-unit properties to assist them in reducing their energy consumption, including climate control and other heating and cooling technologies.

National Grid also provides customers who have interval data meters access to Energy Profiler Online (EPO), which enables customers to access interval load data and day-ahead hourly energy prices online. This access enables shifting of energy usage to lower-cost time periods, and tracking of the results of energy-efficiency efforts.

National Grid offers customers substantial rebates on energy efficient equipment. These include: up to 60 percent off lighting upgrades; lighting occupancy sensors; site-specific custom projects; refrigeration motors; LEDs; High-Efficiency Natural Gas Heating Equipment; water heaters; boilers; controls that meet or exceed annual fuel utilization efficiency (AFUE) and/or other efficiency ratings.

National Grid also supports Energy Management Systems (EMS) to improve the energy efficiency of heating, ventilation, and air conditioning systems. Additionally, the company also promotes the use of Energy Efficient Insulation Improvements and Energy Saving Steam Surveys.

From an overall management and operations perspective, we will examine (intra-utility, cross-utility or service company, and, if applicable, cross-jurisdictional) organizations, resources, programs, systems, tools, communications (customer and internal), and performance measurement of energy efficiency programs. We will identify all regulatory requirements applicable to the programs, in order to ensure that our overall review of defining characteristics like those listed above considers how the management have has considered and incorporated them.

The variety in nature, usage targets, and audience means that they will generate differing benefit/cost ratios, data reporting categories, penetration rates, and perhaps scalability. Measurement of current results, capturing their trends, determining the drivers of those trends, and estimating future results have significance in infrastructure planning and alternatives. They also serve to identify program design or execution changes that have the potential for improving results.

We will examine the specific categories of data that management collects with respect to each - - for example, resources committed, penetration rates, results. We will examine means for ensuring accuracy and completeness in the data collected, including: (a) an exploration of judgmental factors considered necessary, (b) means for testing data accuracy and completeness, and (c) identification of systemic or recurring sources of error or omission. We will seek to verify that management takes a clear and structured approach to controlling data accuracy and completion, including whether or not it applies formal quality assurance and quality control programs.

We will also examine what adjustments management makes and how to correct for errors and to apply appropriately corrected data in forecasting the impact of the measures on planning. Ensuring accurate data and careful consideration of the impacts of changing programs or efforts to stimulate greater penetration rates combine to provide a critical source for future planning. To the extent that all utilities in the state do the same or similar, the resulting opportunities for information and data sharing will further enhance such programs and their impacts - - optimizing the long-term balance between them and wires alternatives.

Contracting Procedures

The second RFP focus area under Program Management asks that this audit:

> *Assess the Utilities' contracting procedures with, and process evaluations of, third-party Energy Efficiency vendors.*

Program Management Task Area 2

Liberty will review the processes by which National Grid contracts with third-party Energy Efficiency contractors who support EE initiatives. These include companies that work in all sectors of the EE program. We will examine efforts to promote third-party participation in the market, operate a procurement process that invites robust, fair, and objective competition, vets and qualifies or certifies vendors, awards contracts on the basis of evaluation systems that maximize objective criteria, and provides system and other controls that keep procurement processes honest.

We will also examine the organization, methods, and reporting used to evaluate EE contractors. It needs to be objective, thorough, focused on material performance and results factors, capable of

use in a constructive/learning/rehabilitating way to address isolated performance issues, yet sufficient to identify recurring, lingering and fatal performance flaws.

Forecasting Energy Efficiency and Load Response

Program Management Task Area 3

The third RFP focus area under Program Management asks that this audit:

> *Evaluate how energy efficiency and demand response programs are coordinated with, and incorporated into, forecasting and planning processes.*

Energy efficiency and load response have become increasingly important elements of a suitably broad definition of "supply" - - one that considers avoidance of the classic alternatives encompassed in what has become an increasingly dated use of the term. Energy efficiency and load response measures promise to make even further, substantial contributions in the future. At one time, utilities tended to largely ignore these components in the forecasting process because of their relative small size and their uncertainty. Early solutions often included a token, sometimes arbitrarily derived amount - - thus recognizing their reality without wrestling with the need to give them a meaningfully predicting value. As EE and DR have become significant component, of forecasts, however, past practice must give way to credible estimates if the planning for resources is to remain optimum.

We will evaluate how National Grid treats EE and DR in its forecasting processes, with the results of our review addressed as well under Element 4: Electric Load Forecasting and Supply Procurement. The methods used to assure an acceptable level of accuracy will form central elements of this review. We will examine the estimating process and the methods employed to check historical accuracy and revise estimating practices accordingly.

Our review will take cognizance of programs offered, such as the following:

- Demand Response programs that pay consumers to reduce electric usage when doing so is beneficial to the overall grid. These programs reduce costs and promote system reliability. Customers may deal directly with National Grid or through a third-party aggregator and are also eligible to participate in NYISO Programs.
- Commercial System Relief Program - - CSRP participants are called one day ahead of a forecasted peak shaving need. These calls for electric load reductions typically come on hot days when the electrical system may exceed acceptable performance levels.
- Energy Profiler Online - - EPO enables customers with interval data meters to view load profiles, usage history and information for multiple sites from previous months or years, allowing usage shifting to lower-cost time periods and energy efficiency results tracking.
- Distribution Load Relief Program - - DLRP incentivizes customers in Kenmore, NY to reduce load in order to help maintain system reliability in a designated community. Participants are given a two-hour notice for a DLRP call.

NMPC's Management, Tracking, and Maintaining of Street Lighting Assets.

The fourth RFP focus area under Program Management asks that this audit:

Assess NMPC's processes and procedures for managing, tracking, and maintaining its street lighting assets.

Program Management Task Area 4

We will assess the processes and procedures for managing, tracking, and maintaining its street lighting assets, including organizational structure, strategic goals, standards, training, use of contractors, and maintenance practices.

Street lights often give customers the most visible indicator of utility maintenance. Maintaining these lights through storm conditions, highway relocations and upgrades requires dedicated systems. The first task in effectively managing an immense and varied street light population is to know "what is where." The company should have an effective and accurate system for recording, inventorying, mapping, and categorizing street light assets. A documented maintenance, repair, and replacement program should exist for each category, should require clearly defined analyses and activities (such as maintenance and inspection) on clear cycles, and should document the performance of required activities. Management should analyze collected data and inspection results to identify systemic issues warranting changes in cycles or their activities.

We will also review the LED Street Light Conversion program approved in the most recent rate request. This program facilitates the upgrading of street lights throughout National Grid's upstate New York territory to energy efficient LEDs. Liberty will review progress to date, including the processes and procedures for managing, tracking, and upgrading lighting assets.

J. Element 10: Work Management

This tenth audit Element that the RFP details, Work Management, includes a single focus area:

1. Work Management Changes Since Previous Management Audits

Work Management Scope

Work management at National Grid has received substantial attention in previous management audits and it formed an element of our recently completed staffing review of each of the state's electric and gas utilities. With all that attention, it is logical to focus on changes made since that time. One major source of change, the Gas Business Enablement Program, will substantially affect work management at National Grid's gas utility operations. With structured work management at various stages of sophistication across the industry, with major changes underway at National Grid, and with a very large gas pipe replacement program underway, it is important to provide a sufficiently broad context for examining the changes made and underway here. We have therefore specified, as we detail below, a number of dimensions of work management - - dimensions that will allow our examination to determine the degree to which the changes made and underway have produced and can be expected to produce fully effective work management at National Grid's New York Utilities. These dimensions include:

- Objectives of Work Management Systems (WMS)
- Work Management Organization, Staffing, and Skills
- Systems Design - - Current, In Development

- Workforce Productivity Measurement and Analysis
- Consistency of WMS Application and Data
- Use of Work Planning to Facilitate Work Execution
- Work Scheduling, Resource Assignment, and Progress Tracking
- Application of WMS to Contractor Work

Work Management Changes Since Prior Management Audits

Work Management Task Area 1

The single RFP focus area under Work Management asks that this audit:

Assess changes to work management processes implemented subsequent to the previous management audits.

Historically, workforce management systems (WMS) took a wide variety of forms, with utility programs ranging from the highly sophisticated to the more basic spreadsheet approaches. This has changed in recent years as utility management has increasingly recognized the benefits technology can bring to efficient operations. It is now common for utilities to employ extensive systems that reflect an expectation of more than efficiencies here and there. Such systems increasingly have a central component in getting work done effectively and efficiently.

As the sophistication of management systems has grown, the activities encompassed by WMS have also grown, but we will focus primarily on the tools used to: (a) scope and plan the work, (b) provide data to facilitate execution of the work, (c) prioritize, schedule and resource the work, (d) define performance expectations for work packages, thereby establishing a basis from which to monitor the work, (e) measure and report the results of execution in selected categories, including cost, schedule, production and productivity, and (f) analyze overall performance for improvement opportunities and re-baselining.

The RFP specifies a single area of focus - - changes made as a result of past audits. Assessing the effectiveness of those changes requires context - - best provided by reviewing those changes against how current thinking views work management and the systems (WMS) employed to support such management. The role of WMS technology and the pace of change in recent years has been substantial. Moreover, National Grid has had substantial problems in its management systems in the past. Third, management has committed to a major new initiative, the Gas Business Enablement Program. Therefore, we will do more than provide a report card on implementation of recommended changes from the past. We will "assess" the changes made in the context of what they have produced and what continuing work is expected to produce in establishing work management and WMS that fully support construction program effectiveness and efficiency.

Summary of Changes Made

We will examine the changes to work management processes as a result of prior audits. There have been significant findings regarding work management in those audits and management was required to provide regular, detailed updates on implementation progress. Liberty will examine the effectiveness of the work management activities with those improvements now in place. This work will provide the factual foundation for our analysis of effectiveness and efficiency. It will also provide a roster of changes made in relation to prior recommendations and company commitments with respect to them.

WMS Objectives and Effectiveness

WMS design and use vary among organizations as a function of the work and the associated management needs. For example, the systems applied to large substation construction projects may be quite different than those used to manage relatively small distribution functions. It is therefore important that clear objectives be established. We will evaluate the appropriateness of those objectives and determine how effective the various National Grid organizations are in meeting them.

Work Management Organization, Staffing, and Skills

Many utilities do not understand the importance of analysis, and fewer possess the organizational skills and capabilities to carry out effective analysis. We will evaluate the ability of Grid to maximize the value of its systems by applying insightful analysis to the data produced. We will do so by examining the organizations involved, the processes for linking and integrating their efforts, their responsibilities, the numbers and skills of the resources applied, and training and development methods to create true work management expertise.

Workforce Productivity Measurement and Analysis

Establishing a database of credible unit rates provides a key ingredient for any WMS. Such rates depict the hours required to produce a unit of work. Those unit rates become a standard of performance against which crew and organizational performance can be analyzed. We will examine the efficacy of such databases at Grid and how they are maintained and updated. We will also examine how productivity data is collected, tracked and analyzed.

Consistency of WMS Application and Data

We will examine the cross-organizational application of WMS. We expect that the WMS employed by various organizations within National Grid's New York utilities may not be fully consistent because of different needs. On the other hand, the fundamental concepts underlying work management should apply consistently. In addition, groups engaged in similar work should also be consistent, to the extent that benchmarking comparisons among such groups is possible and beneficial. Finally, mechanisms should be in place for sharing successful strategies and lessons learned among organizations.

We will examine WMS practices across a number of organizations, with both similar and disparate work, to determine the effectiveness of cross-organizational coordination.

Use of Work Planning to Facilitate Work Execution

For most WMS, the work package comprises the critical and most fundamental part of the system. That package defines the scope of work and details how it is to be accomplished. Work packages not only establish a basis for performance measurement, but also provide guidance such that the execution of the work and supporting activities are facilitated by effective planning.

We will examine sample work packages and judge their effectiveness in meeting these objectives.

Work Scheduling, Resource Assignment, and Progress Tracking

Scheduling and resources comprise principal focuses of effective work management. Utilities generally apply sophisticated scheduling applications, particularly for large, complex projects and for smaller work producing high aggregated workloads. We have found such systems most effective when linked to a strong and effective resource planning and management system. We will evaluate the overall effectiveness of their integration.

Application of WMS to Contractor Work

Regardless of the effectiveness of a utility's WMS for internal work, many utilities do not apply the same principles to contractors, despite the fact that contractors may be performing the bulk of the work in some cases. Utilities do not directly manage the work of contractors, but effective practices for overseeing work planning, scheduling, productivity and production remain important even with contractors. We will examine the methods of oversight of contractor work and determine if Grid is applying appropriate concepts of work management.

K. Element 11: Performance Management

Performance Management Scope

This eleventh audit Element that the RFP details, Performance Management, includes two focus areas, the first of which has multiple dimensions:

1. Utility Focus of Performance Management Measures
   - Employee Performance Standards
   - Internal Reporting Mechanisms
   - Linkage to Compensation
2. External Benchmarking

Utility Focus of Performance Management Measures

Performance Management Task Area 1

The first RFP focus area under Performance Management asks that this audit:

> *Determine how internal reporting mechanisms, employee performance standards, and incentive compensation programs are used to promote corporate goals, grid modernization, safety and reliability standards, and Commission objectives.*

The RFP links employee goals and expectations, reporting on performance and incentive compensation, recognizing that they need to work together effectively to produce effective and efficient performance - - not only at the individual, but at the work group and company levels as well. More importantly, the RFP's requirement to examine them in connection with regulatory goals and objectives, both comprehensive (like cost, service quality, and safety) and specific (like grid modernization) highlights the gap perhaps most commonly found in our extensive work in the area - - performance management, reporting, and compensation that tilt the balance more toward corporate and financial goals, as opposed to those directly related to cost, effective, safe, and reliable utility service that meets regulatory objectives.

Best practice carefully, comprehensively, and hierarchically coordinates use of the three pillars cited in the RFP (employee standards, performance reporting, and compensation incentives) in a

performance management program. Comprehensive, accurate, and timely performance management form an essential link in ensuring effective and efficient performance in meeting goals and objectives. A sound performance management program systematically addresses:

- Planning work and setting expectations
- Continually monitoring performance
- Developing the capacity of the organization and individuals to perform
- Regularly rating performance objectively and at appropriate levels of summary
- Rewarding good performance.

The hierarchical aspect of sound performance management ensures that goals, objectives, and metrics tied to them remain consistent as one moves up and down the management chain. Goals, objectives, and incentive target amounts change at different levels of the organization, but it is critical that from the individual to the work group to the department to the company levels, all aspects of performance management roll up or down in a consistent fashion.

Employee Performance Standards

An overarching aspect of performance management is the need to consider that its objectives and therefore the focus of its execution have two different time dimensions. The first is to assure that there is a sound basis for gauging in the short term the effectiveness and efficiency of the use of budgeted and assigned resources against clear, comprehensive strategic plans and objectives. The second purpose supports the somewhat longer-term goal of seeking improvements in future plans and objectives, whether those improvements consist of greater accuracy in identifying what is achievable, or in allowing senior leadership to "stretch" performance to new extents.

Moreover, consistent performance targets from the individual to the work group and department levels need to provide for specifically-tailored yet consistent and comprehensive accountability and measurement at all levels, from the strategic, or corporate level down through the various operating entities and businesses, then further down to the departments that contribute to effective and efficient performance and then further down to specific work groups, finishing at the individual contributor level. All should operate under goals, objectives, and performance targets that roll consistently up from the bottom and down from the top, while recognizing that, at each level, responsibilities and accountabilities differ, making each measurable in different, yet consistent ways.

These goals, objectives, targets, metrics, and key performance indicators should find their way into clear descriptions of overall descriptions of employee responsibilities and into annual performance plans regularly monitored during the year. Moreover, these components need to focus not just on high-level financial performance, but also on meeting utility regulatory requirements, expectations, and initiatives. Particularly for initiatives like REV and grid modernization, it is important that the messages sent and the goal lines established in these areas respond to what and how individuals and their work groups contribute. Annual employee performance plans need generally to address individual development needs and opportunities. For areas like REV and grid modernization, which implicate changes in culture, approach, and skill sets in many cases, the developmental sector of individual performance planning has even greater importance.

Internal Reporting Mechanisms

Having set plans, employees should be held accountable for working to and succeeding in meeting those plans and managers should engage directly in ensuring that they do. Key in successfully accomplishing appropriate, objective performance is to identify, take, report, use, and hold people accountable for a sufficiently broad and deep set of measures.

Measurements must also be tailored to each of the different levels of people who need to use them. Obviously, data reported at varying levels of detail need to roll up accurately from the most detailed to the most general levels. The failure to use consistent sets of data must inevitably cause either a false sense of success or a misdirection of effort toward problems that either do not exist or have less importance than they may appear to show.

Performance data needs to be collected, analyzed, and disseminated in a manner that is consistent with job responsibilities and accountabilities, at whatever management or supervisory level is relevant. Failure to do so makes it unnecessarily difficult for individuals to measure their own success, and for those to whom they report to do the same. This vertical integration of information reporting is not the only critical dimension, however. Horizontal integration is necessary to ensure that the results of those with similar responsibility in different geographical areas are consolidated accurately. Horizontal reporting is also important for identifying groups or regions that have particular strengths or weaknesses, in order to promote a culture of continuous improvement. Horizontal integration also matters for groups that are divided not by territorial region, but by functional responsibilities that are separate, but must work effectively together.

Effective reporting in large organizations also requires the support of systems and people. Data collection, analysis, and reporting can become unduly burdensome in large, complex organizations. There is clearly too much data for those who do the work to have too much of the burden for measuring the work. Dedicated resources, supported by reasonably automated data systems are necessary to: (a) collect, aggregate, and compellingly display performance data, (b) ensure accuracy and integrity, (c) promote timely dissemination of coordinated reporting that must communicate at many different levels on a wide variety of measured performance, and (d) develop sufficient expertise to spot trends, anomalies, and engender focused reviews of ways to move performance in a positive direction,

Overall goals and objectives provide the starting point for effective performance management. They serve to direct performance in ways that serve overall priorities and that seek specific performance results. Ensuring optimum progress in meeting those goals and objectives requires that management support them with a comprehensive set of metrics and key performance indicators addressing cost, service quality, and other elements that define effective, efficient, reliable, and safe service delivery that also conforms to other requirements and expectations (*e.g.*, REV and grid modernization).

In examining performance management processes and measures, it will be important to examine issues such as:

- Sufficiency of the linkage between corporate, department, work group and other specific goals and objectives
- The performance metrics applicable to them

  - Whether performance metrics are comprehensive and quantifiable wherever practicable
  - Whether metrics include all key performance areas and in sufficient detail
- Where responsibility lies for assuring that performance metrics are sufficient, regularly reviewed and updated, and communicated
- What organizations, resources, and tools are applied to performance management roles
- How performance measurements are used to set targets, track progress in meeting them, and revise targets that have become too easy or too difficult to serve as effective motivators
- The scope, contents, cycle, and audiences of key metrics reports
- How consistent are data sources, completeness, and vintage/timeliness and metric design at the various hierarchical levels (*i.e.*, are measurements at the individual or work group level consistent with those at the department or corporate level)
- Familiarity with, emphasis on, and use of performance information at all organizational levels and across work groups and departments.

Linkage to Compensation

Our experience over many decades of examining utility performance shows a steadily increasing focus on and sophistication in the use of performance management and performance reporting through metrics and key performance indicators (KPIs). Progress in linking these two elements to compensation is visible as well, but, more often is the area where focus on a utilities public service responsibilities lags. Measures too broadly defined, over-emphasis on financial results, weighting individual contributor rewards too much on department goals versus the ways in which they personally and individually contribute all tend to diminish the effectiveness of compensation systems in incenting desired performance.

We will examine how amounts at risk change at various levels within the utilities and service companies, and among the parent executive team. Amounts at risk should increase as responsibility and authority for producing results does, provided they are tied to proper incentives. We will examine the components of the incentive system, looking to see how objectively they are defined, what measures support them, and, most importantly, how they balance the interests of those who own the company with those who are served by it or have other stakeholder interests. We will be looking for what specific measures focus on cost, safety, and reliability performance and on inducing the attitudinal change and specific work activities needed to achieve success in areas like REV and grid modernization.

Individual performance measurement should also drive changes in base pay. We will examine the factors and measures that drive annual assessments and ratings, determine whether the range of variation in ratings indicates more than rote application of them, and examine whether they actually do drive base compensation changes according to measures meaningful to service cost, safety, reliability, and achievement of regulatory objectives.

External Benchmarking

Performance Management Task Area 2

The second RFP focus area under Performance Management asks that this audit:

> *Determine the adequacy of the Utilities' use of benchmarking to compare its performance with affiliated utilities, similarly-situated utilities, and other relevant organizations.*

Utilities generally participate in a variety of external benchmarking activities designed to identify opportunities for improvement in efficiency or effectiveness. Differences in circumstances make it risky to rely on benchmarking as a dominant guide to measuring performance, but the practice nevertheless can provide valuable insights into work performance effectiveness and efficiency. Studies often address benchmarking in terms of numerical measures (maintenance employee numbers per line mile, customer wait times or abandoned calls, for example). Such measures can serve well to identify variances that warrant close attention. Equally important, however, is practice benchmarking, which focuses on how work gets done. This form of benchmarking can identify ways to improve effectiveness and efficiency.

National Grid's large U.S. and international scale and its multiple utility operations present particularly strong opportunities for two distinct types of benchmarking. First is comparison to peers in the industry. The scale of its operations makes it attractive to others as a source of benchmarking information - - in turn giving National Grid access to a broad range of potential benchmarking peers. Both U.S. and international sources should be available, giving it exposure to a particularly wide range of practices and hard "numbers" data.

Moreover, the wide range of activities within its many entities gives it the ability to study in depth its internal group of utility operations. We address that form of comparative analysis under Task Area 4 (Best Practice, Resource, and Expertise Sharing) under the Corporate Governance audit element.

Another critical need in performing benchmarking effectively is to consider trends over time, and not just snapshots of an instant in time. Recognition of differences among operating areas is also a critical factor for National Grid's New York utility operations, which cover quite different service area types as measured by many geographical, demographic, and other factors.

We will examine the:

- Overall approach to the use of benchmarking
- Quantitative (numerical ratios) benchmarking
- Qualitative (process-based) benchmarking
- Range of data sources used to provide benchmarking information
- Means for incorporating lessons learned into methods and processes
- Sensitivity to unique needs not only in New York, but also among the different parts of New York served
- Use of outside experts to assist in reviewing performance information and in identifying improvement opportunities.

In addition to determining how management uses benchmarking, we will also examine the results to assist in guiding our audit team in identifying areas of operation and performance that may warrant examination.

L. Element 12: Customer Operations

Customer Service Scope

This twelfth audit Element that the RFP details, Customer Operations, includes nine focus areas, a number of them having multiple dimensions:

1. Home Energy Fair Practices Act and Energy Consumer Protection Act Controls (to be examined jointly with the second focus area)
2. Controls Related to Rules Governing Provision of Service (to be examined jointly with the first focus area)
3. Budget Billing Effectiveness and Efficiency
4. Field Work Scheduling
   - Service Quality
   - Customer Satisfaction
   - Service Interruptions at Incorrect Service Addresses
5. NMPC's Electric Life Support Equipment Program
6. Low Income Affordability Program
   - Enrollment Process
   - Discount Accuracy
7. Missed Appointment Credits
8. Call Center
   - Responsiveness, Accuracy, and Thoroughness of Information
   - Training and Tools
9. New Service Requests
   - Process
   - Contributions in Aid of Construction.

Home Energy Fair Practices and Energy Consumer Protection Act Controls

and

Controls Related to Rules Governing Provision of Service

We will examine the first two RFP focuses areas under Customer Operations jointly. The first of these two RFP focus areas asks that this audit:

Customer Operations Task Area 1

> *Examine the adequacy and effectiveness of each utility's internal controls related to the Home Energy Fair Practices Act and Energy Consumer Protection Act – Rules (16 NYCRR Part 11).*

The second of these two RFP focus areas asks that this audit:

Customer Operations Task Area 2

> *Examine the adequacy and effectiveness of each utility's internal controls related to the Rules Governing the Provision of Service by Gas, Electric and Steam Corporations to Nonresidential Customers (16 NYCRR Part 13).*

Fully effective customer service combines consideration of public requirements and expectations into an integrated set of objectives, targets, and metrics. Those considerations need to produce organizations, resources, systems, tools, procedures, processes, and activities to meet them. Thus, it should always remain possible to demonstrate compliance with specific requirements. Measuring customer satisfaction should also form an important metric for assessing performance in meeting expectations. Analytical measurement of customer satisfaction will generally not form part of any public mandate - - nevertheless, it is difficult to imagine how one could be comfortable about control without tapping such an important source of information about performance effectiveness.

Improving customer service has become more difficult, and hence more expensive as customer expectations increase. Reasons include rising costs for utility services, frustrations over not being able to speak quickly to a company representative, and personal observations about utility customer service in comparison others who serve them. Customers are becoming more knowledgeable and more apt to hold their institutions, like utilities and regulators, accountable for assuring that they get what they feel they deserve for what they have paid.

Quantitative objectives addressing established public requirements and customer, regulatory, and other stakeholder expectations need to exist. Proper control requires continuous tracking of performance in service delivery. We will evaluate the Utilities' customer operations' goals and objectives to determine conformity with requirements, reasonableness, performance, and progress and problems in achieving goals. We will assess whether resource structure, numbers, and experience match the needs imposed by public requirements and the Utilities' goals and objectives that encompass them. Resource structure, number, and methods form primary elements of control.

Research provides an important source of information in controlling customer service performance - - proving useful in gaining a better understanding, for instance, of why customers are unsatisfied with the elements of customer service and what customers' expectations are. We will review the results of the research with the objective of determining how management makes decisions and takes action that take advantage of the insights gained to control performance results. We will consult with NYPSC Staff regarding complaint rates and other barometers of customer service.

Measurement of performance under clear and comprehensive metrics and observation of performance trends have substantial importance in controlling customer service performance. The purpose of an engagement like this one however, is not just to analyze data, but rather to analyze what data shows about the effectiveness of practices, staffing, facilities, expenditures, and management decisions that contribute to or solve problems.

Our review of the internal controls relating to the Home Energy Fair Practices Act and the Energy Consumer Protection Act (16NYCRR Part 11) will involve the engaged customer operations functions, which we expect to include Customer Contact Centers, Walk-in Offices and Payment Counters, Customer Billing, Customer Accounting, and Credit and Collection. The traditionally defined roles of such functions give them a role in delivering service to customers.

A review of the internal controls relating to the provision of gas, electric, and steam service to non-residential customers (16NYCRR Part 13) will involve a review of the same broad range of customer operations functions as for Part 11, as many of the same systems, processes, and functions play a supporting role in delivering service to non-residential customers.

Public requirements and clear customer expectations require that a utility bill customers accurately and timely. Effective control over billing functions and processes minimizes failures to do so. Process problems in any part of the cycle can have cascading effects. Impacts may show, for example, in frequency of calls, disputes, and complaints and in measurements of customer satisfaction. In addition to getting meter reading, billing, and payment-processing and reconciliation all done on schedule and with low error rates, utilities have to contend with customers desires for convenience. They expect to be able to easily pay their bills through the Internet, and customers who prefer to pay in person or do not have checking accounts want to be able to find business offices and payment stations operated by third parties in locations that are easy to find and near where they do other business.

Liberty will assess the effectiveness of billing practices and procedures, payment receipt, account-crediting practices, and other customer-accounting procedures in meeting public requirements and expectations in an efficient and effective manner. It is not sufficient merely to comply; compliance should not cause unnecessary costs.

Important contributors to meeting requirements efficiently and effectively include organization, staffing, programs, processes, and procedures. Furthermore, the extent to which a company acts firmly, within regulatory guidelines, in matters of extending credit and performing billing and collections functions can be an important factor in controlling costs.

Credit, billing, and collections typically form subjects of statutory and regulatory requirements. Effective and efficient credit-and-collection practices control compliance and they need to do so efficiently. Utilities must balance the emphasis on keeping uncollectibles to a minimum with an appropriately humanistic approach to collections. Utilities can no longer afford to cut-off every delinquent customer, nor should they need to do so. The same solution is not appropriate for every delinquency situation. Utilities must now find more innovative ways, perhaps with the assistance of new technologies, to understand each customer's situation and find the appropriate solution for that customer. Utilities must begin to harness their computing and analytical powers to determine the drivers of customer payment behavior.

For instance, customers who truly do not have enough money to pay their bills on a regular basis should be introduced to available income-assistance programs. In addition, many residences are not as energy efficient as could be, for reasons including lack of knowledge and the financial wherewithal to make the improvements needed. These customers should receive conservation guidance and perhaps even weather-stripping, hot-water-heater wraps, and other available, cost-effective usage reduction measures.

Utilities must balance welfare and safety concerns, on the one hand, with considerations of fairness to its paying customers, on the other. When companies hire collection agencies to take on the task of collecting from especially difficult accounts, these utilities must make sure that the agencies

follow regulatory rulings on how collection actions are undertaken. Utilities also have to make sure that they cannot perform the same tasks more efficiently, especially in terms of funds received.

When customers wish to complain or inquire, companies must have ready processes to resolve problems and provide answers quickly, while keeping regulators duly informed of the disposition of such matters. Commissioners and staffs often judge the customer service performance of the companies they regulate by the level and tenor of complaints they receive, and how they are ultimately resolved. As a result, utilities that exercise best practices control the complaint process accordingly.

We will review complaint-handing techniques and billing-dispute processes, and we will analyze the data on consumer-complaints data that the NYPSC has collected. We will trend information going back several years, disaggregated to the lowest level possible, with the goal of determining the kinds of problems that customers have been having so that the next investigatory steps are targeted at apparent problem areas. We will undertake our analysis problem areas trends in consultation with NYPSC Staff, to flesh out our understanding with by an appreciation of the factors that affect the ability to draw inferences from the data, such as the categories used, how the categories have changed, the timeliness of the recording of complaints, and how the complaints logged by the Commission compare to how the companies track.

Customer service goals should include increasing customer awareness of service requirements, rights, and opportunities. Customer communications also encompasses programs and systems for responding to customer inquiries and resolving concerns or complaints about service reliability, safety, and billing.

Managing the interchange with customers promotes understanding of service rates, terms, and conditions. Well-managed utilities place particular emphasis on providing responsive customer service through the whole chain of contact, from setting up an account initially through the closing of an account. This cycle includes answering telephones after normal working hours, situating business offices in convenient locations, assuring that CSRs are well-trained and supported by advanced systems supporting accurate and timely information retrieval, and by policies and procedures helping representatives solve customers' problems readily. Sufficient numbers of experienced supervisory personnel must be available to manage call centers, and these personnel have to be able to deal with more difficult customer problems.

We will review the application of technology and telecommunications to manage incoming call volume to meet applicable response-time requirements and goals appropriate to customer expectations. We will determine whether quantitative objectives track performance in meeting goals for improving service delivery. We will evaluate the goals and objectives to determine their reasonableness, performance and progress on achieving goals, and assess whether the Utilities have the resources necessary to achieve the goals. We will also explore how supervisors monitor and measure the quality of contact between customers and company representatives. We will also review the employee-evaluation process, employee development, and training and their roles in helping employees comply with company policies and NYPSC rules, and dealing with the public.

Budget Billing Effectiveness and Efficiency

The third RFP focus area under Customer Operations asks that this audit:

> *Examine the effectiveness and efficiency of the Utilities' Budget Billing processes (both manual and automated) relating to customer overpayment/underpayment of bills under the program.*

Customer Operations Task Area 3

We will assess the budget billing process to determine the controls under which it operates serve to meet public requirements and expectations in an efficient and effective manner. We will assess the processes pertaining to instances in which customers overpay or underpay bills while enrolled in the program.

Budget billing programs provide a convenient payment option for many customers, especially in areas of the country that have high seasonal energy demand, such as winter-heating or summer-cooling seasons. Such programs seek to establish a level amount due over a specific period, typically 12 months, to make it easier for customers to budget and pay for energy costs. The monthly budget amount derives from a 12-month projection of energy costs. Actual costs incurred later form the basis to true-up or reconcile projected costs periodically or at the end of the budget period, which results in a new budget amount going forward.

Typical practice controls budget billings through quarterly account reviews that lead to adjustments as necessary to keep the estimated monthly budget payment reasonably in line with actual usage. At the end of the budget year, utilities complete a reconciliation and invoice for any underpayments or credit the account with any overpayments.

We will review all processes relating to the budget billing program to ensure compliance with 16 NYCRR Part 11 and Part 13 rules and requirements, including program promotion, sign-up, budget calculations, reconciliation processes, true-up, and over/under payment adjustments. We will also evaluate processes and actions for addressing slow- and non-payment of monthly budget billing amounts and for treating customers who switch to a different energy provider. Customers leaving a budget billing program require account true-up to switch billing providers or resume monthly billing. This process can provide controls difficulties for some billing systems, involving manual procedures.

We will also review compliance with the May 2016 NYPSC order modifying the utilities' Low Income Programs (Case 14-M-0565). In particular, the order requires a tiered system of billing discounts and automatic opt-out enrollment in budget billing programs for customers qualifying for discounts. We will examine the controls designed to keep the budget billing process compliant with this most recent order.

Field Work Scheduling

The fourth RFP focus area under Customer Operations asks that this audit:

> *Examine the effectiveness and efficiency of scheduling routine field work to ensure goals of service quality and customer satisfaction are achieved, and to prevent service interruptions at the incorrect service address.*

Customer Operations Task Area 4

Meter Reading

Meter reading represents perhaps the most routine source of field work in the industry and performing it timely has significant implications for customer satisfaction. It comprises the critical first-step in the utility revenue collection process, and for many utilities, remains a labor-intensive activity. The use of automated meter reading technologies (AMR) and advanced metering infrastructure (AMI) has increased but the majority of electric, natural gas, and water meters are still read manually, on a monthly basis. Error or delay in the meter reading process postpones billing or necessitates the delivery of an estimated bill to customers - - both negatively affecting service quality and customer satisfaction.

In addition, utilities now more than ever face a growing need for more timely access to energy usage information - - to support real-time pricing initiatives, load forecasting, demand-side management, load control, competition, and customer demand. Additionally, status and usage information provided on an event basis helps to improve reliability and power quality, and to identify outage location and extent. These more complex data requirements drive the need for advanced metering infrastructures, smart metering, and system-wide automation.

The American Recovery and Reinvestment Act (ARRA) Smart Grid Investment Grant Program has spurred a growth in automating usage collection for electric utilities, but at the same time stirred up new challenges, such as, gaining approval for funding, issues with meter-related fires, as well as customer acceptance of smart metering technologies. As of year-end 2016, more than 70 million smart meters have been deployed in the U.S.

The techniques used to perform automated remote meter reading and recording have improved. The capital costs associated with purchasing and installing the necessary equipment have decreased. Further, if automated meter reading is combined with appliance load control, the net economic benefit derived may be improved through use of appliance load control for peak shaving.

Liberty will evaluate any efforts to automate the installed base of meters or, in lieu of automation, explore whether the Utilities have pursued other best practices, including: optimizing read routes to improve efficiency, utilizing GPS-based route mapping, or upgrading hand-held meter reading technologies.

Gathering energy usage readings forms a critical component of controlling the meter-to-cash process. Liberty will examine the performance of the meter reading operation, including productivity, accuracy of reads, completion of schedule, and the level of backlogged work. Customer feedback, including complaints and satisfaction results relating to field metering activities, as well as other quality of work reporting will be reviewed.

Field Services

Utilities rely on field service employees to connect and disconnect customers to and from electric and gas service lines and pipes. These activities implicate the Service Quality, Customer Satisfaction, and service interruptions aspects of the RFP's focus on customer operations. Field forces, through service order requests, work in close cooperation with frontline customer service

representatives in the call center and walk-in locations to start or stop utility service on request. Customers expect these service requests to be completed in a timely manner.

In addition, field service employees also play a critical role in the billing process when the meter reading process fails to deliver a reliable determination of customer usage. In these cases, a field representative visits customer premises to investigate meters and to determine usage. These field visits must be made promptly to ensure that an accurate bill is delivered to customers on-time. Delays in completing field investigations delay bill delivery or cause an estimated bill to be generated by the billing system. Delayed or estimated bills generate customer inquiries, complaints and dissatisfaction.

We will review procedures for creating, assigning, and completing field service orders to support the connect/disconnection of service and the proper billing of customers. We will pay particular attention to the ability of the field and the call center/back office to work cooperatively to serve customers. We will also explore whether the Utilities have appropriately deployed technologies to support field services activities, such as: optimizing routes to improve efficiency, utilizing GPS-based route mapping, or mobile data systems to eliminate paper service orders.

Revenue Protection

Controlling revenue protection activities also has implications for customer satisfaction and for carefully managing service terminations. Utilities have traditionally relied on meter readers and other field employees to identify meter tampering and meter bypass. Some companies offer incentives to employees to identify bypass and tampering. In addition to field personnel, utilities usually establish a work group to pursue and investigate any reported incidents or suspicious activity. Companies generally have standard operating procedures in place to coordinate the investigation, accounting, prosecution, and record keeping. Billing systems are also used to identify, track, and document suspicious usage patterns.

Revenue protection also has cost control implications, with the process sometimes overlooked or under-funded. Meter readers may identify suspicious activity, but follow-up and investigation often rely on individuals spanning different departments and work groups - - operations, accounting, customer service, and legal. Many companies fail to formalize the responsibilities and tasks, letting service theft incidents fall through the cracks. We will review the procedures for identifying and pursuing theft of service. Liberty will also review the organizational responsibilities and outcome of revenue protection efforts.

NMPC's Electric Life Support Equipment Program

Customer Operations Task Area 5

The fifth RFP focus area under Customer Operations asks that this audit:

> *Review and assess the applications and procedures regarding NMPC's electric life support equipment program.*

We will review and assess the applications and procedures regarding the electric life support equipment program. Customers that rely on electrically operated medical devices or have other special medical needs can register with the utilities as a critical care customer. Controlling this important element of service delivery requires that NMPC keep accurate

registers of customers requiring electric life support equipment so as to document their special needs and to ensure proper communications before planned outages and during storms or other emergencies affecting the delivery of power. We will review the processes to identify and register customers on the Life Support Equipment Program, including examining processes to ensure the register is reviewed and updated on a regular basis. We will also review the controls in place to communicate with electric life support equipment customers prior to any planned outages or storms.

Low Income Afforability Program

The sixth RFP focus area under Customer Operations asks that this audit:

Examine the efficiency of the Utilities' processes related to enrolling customers in the Low Income Affordability Program and their accuracy related to providing the appropriate discount.

Customer Operations Task Area 6

This focus area of the Customer Operations element specifically concerns enrollment and the accuracy of discounts. We will examine the effectiveness of the processes for enrolling customers in the new Low Income Affordability Program introduced in 2018 and for ensuring accuracy in providing the appropriate discount. We will examine procedures and activities in light of the requirements of the May 2016 order modifying the Utilities' Low Income Programs (Case 14-M-0565). In particular, the order requires a tiered system of billing discounts and automatic opt-out enrollment in budget billing programs for customers qualifying for discounts. The Commission has adopted fixed discount levels and established a default process with varying levels of discounts based on need, with the level of need demonstrated by receipt of a Home Energy Assistance Program ("HEAP") grant or HEAP "add-on" benefits.

Missed Appointment Credits

The seventh RFP focus area under Customer Operations asks that this audit:

Determine how missed appointment credits are detailed, accounted for, and applied to residential and non-residential customer accounts.

Customer Operations Task Area 7

We will examine the procedures, practices, and activities that control the detailing of, accounting for, and application of missed-appointment credits for residential and non-residential customer accounts. The Utilities apply a service guarantee policy of compensating customers for missed appointments - - applying a $30 credit to residential customers and a $60 credit to non-residential customers (per appointment). This policy has been in place since the 2013 rate plan and the Utilities must report performance annually to the NYPSC.

We will review the process to set and track appointments and to determine if appointments were kept or broken. We will also review the process to credit customer accounts, including accuracy and timeliness.

Call Center

Customer Operations Task Area 8

The eighth RFP focus area under Customer Operations asks that this audit:

> *Assess the accuracy and thoroughness of information provided to customers by call center and contact center representatives, and assess related trainings and tools.*

This focus area in the Customer Operations element specifically calls for a review of call center responsiveness, accuracy, thoroughness of information, and training and tools. Effectively managing the interchange with customers promotes understanding of service rates, terms, and conditions. A failure to handle this relationship properly leads customers to feel that the relationship between them and a trusted supplier has been violated. As a result, well-managed utilities place particular emphasis on providing responsive customer service through the whole chain of contact, from setting up an account initially through the closing of an account. This cycle includes having telephones answered after normal working hours, situating business offices in convenient locations, assuring that CSRs are well-trained and supported by advanced systems so that accurate information can be retrieved quickly, and providing policies and procedures so that representatives can solve customers' problems readily. This means that sufficient numbers of experienced supervisory personnel must be available to manage call centers, and these personnel have to be able to deal with more difficult customer problems.

We will examine how the Utilities ensure that customer calls are answered quickly and in a competent and courteous manner, if business offices meet customers' needs without causing excess costs to be incurred (and ultimately borne by others), and how National Grid's New York utilities compare with other utilities and companies in other industries in adopting innovative approaches to serving customers better. We will examine the organization structure, call center organization, data and communication system design and capabilities, regular staffing, and on-call resources for peaks and emergencies. We will also examine the range of performance metrics used to ensure they are well designed and comprehensive. We will seek to determine whether levels or trends in measurements disclose problems or concerns in responsiveness, accuracy, or issue/question resolution/response.

The ability of a customer service organization to perform responsively, accurately, and clearly and appropriately in resolving customer issues and answering their questions depends to a very large degree on recruitment, training and development, and performance management. We will review these contributors to effective performance in complying with company policies and regulatory requirements, and in meeting the needs and expectations of customers with whom they interact.

New Service Requests

Customer Operations Task Area 9

The ninth RFP focus area under Customer Operations asks that this audit:

> *Examine the new service request process, including the application itself and the Contribution in aid of Construction process.*

We will examine the efficiency and effectiveness of the new-service request process. Our review will specifically address the processes for applying for new services and for determining issues and amounts associated with contributions in aid of construction.

Requests for electric or gas service to a new or modified home or business can require coordination and support from customers, city permitting and inspectors, and company engineers and construction management and crews. Most utilities offer self-service options to assist prospective customers with the application process. Some offer tracking of customer job progress from application to meter set. Liberty will review the new service request process from start to finish and evaluate the use made of customer-facing tools and tracking tools to manage projects from design to completion.

We will also evaluate the processes used to determine costs, including customers' contribution for construction, as defined in the electric and gas tariffs. We will look at the tools and methods for calculating when contributions are required and for determining their magnitudes. Our work will seek to verify their consistent and accurate use.

III. Approach, Methods, and Project Management

A. Philosophy

Utility management that sees opportunity in management and operations audits sponsored by their regulators help create a positive environment for engagements like this one. We encourage such thinking and hope that those responsible for National Grid USA's New York operations will approach the audit as a chance to produce real benefits. While defensive or disinterested postures are not unknown, constructive management engagement and encouragement will help to produce an outcome that all consider beneficial. We certainly will do all that we can to facilitate a healthy, three-party approach. Our efforts to do so, we believe, have served well our New York work. On the other hand, after 30 years of experience, we understand what it takes to complete an engagement like this effectively in other types of environments when encountered. Our team members have demonstrated the ability to maintain a professional approach, always taking the high ground and remaining focused on engagement objectives.

Our philosophy dictates that we begin with a basic commitment to the objective of improvement. We further commit to establishing an environment of mutual respect for all participants, which demands full and honest communications. We cannot guarantee consensus, but we can and will guarantee that each participant will have a voice and that voice will be heard, respected and considered in our analyses.

We have no interest in damning people or organizations; instead we look for opportunities for improvement, and present them in a manner best designed for acceptance and effective implementation. At times this requires critical comments - - we will present conclusions necessitating them professionally and objectively.

A solid relationship with Staff also forms a tenet of our philosophy. We have incorporated specific elements designed to raise this "team approach" from a simple feel-good concept to a meaningful working reality. These include an honest commitment to full communications among the Staff-consultant team, with no exceptions. "What we know – Staff knows," says it in a nutshell. Liberty brings no surprises, has no hidden agendas, conceals no behind-the-scenes disagreements, and does no sanitizing of the facts.

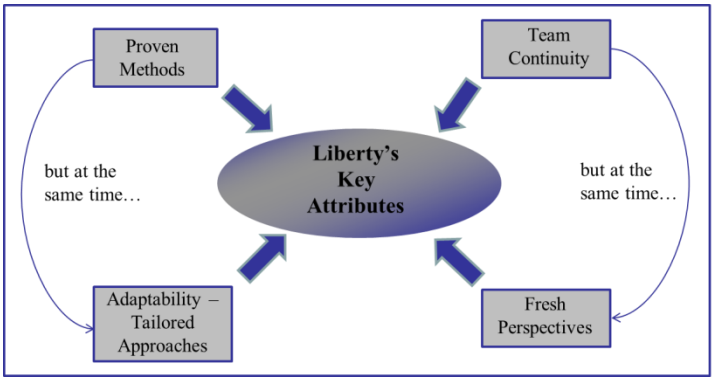
Our philosophy accepts diversity of thought among our professionals as a strength of a capable team, not a weakness to be shielded from Staff view. Discussions and debate at a professional level are encouraged, and should include the Staff as valued participants. Candor serves to achieve the best technical results and the set of results with the maximum effectiveness.

B. General Approach

Four key attributes give Liberty the performance strengths it has taken to become the leader in service to utility regulators. The approach, methods, and the team that will apply them are:

- Mature, well developed, and comprehensive audit methods
- Team member continuity and familiarity with methods and with each other
- Broad experience that promotes adaptability
- Fresh perspectives from senior consultants.

Liberty has developed its ***audit methods*** and procedures through the performance of 300 or more engagements for public utility regulators conducted over 30 years. Most of these engagements have been management and operations, energy procurement, and affiliates audits. Liberty began performing comprehensive energy utility management audits for commissions more than 25 years ago. Our work in this field includes the New York Public Service Commission, for whom Liberty has performed major audit engagements involving each electric and natural gas utility as part of our Staffing Study, and individual audits of CECONY, Iberdrola, Energy East (NYSEG), Central Hudson Gas & Electric, and Verizon (NY Tel).



Liberty has maintained ***team continuity*** by keeping together a senior core of consultants over a very long time - - measured in decades. Thus, Liberty's teams are accustomed to working both under methods and procedures that are familiar, and with other team members who are familiar.

Liberty's ***adaptability*** generates the ability to tailor methods and procedures to the specific project at hand, based on the great length and breadth of our work for utility regulators. Our work with utility regulators in more than two-thirds of the U.S. jurisdictions and a number in Canada has covered a wide array of engagement types, work processes, organizational units, utility types, geographic and political environments, relationships with commission staffs and utilities, and policy and technical issues. We have worked on some of the most controversial issues that commissions have faced and we have performed our share of routine (both large and small) engagements. Our experience gives us a hard-to-match ability to adapt our approach and methods, not based on speculative or merely hopeful notions about client expectations, but upon having lived through such an immense variety of job, client, and utility types.

C. First the Facts

Our work will begin with the development of a comprehensive qualitative and quantitative (costs, performance metrics, resources, for example) understanding of how National Grid, the New York utilities, and the affiliates providing them commonly with various services are organized, structured, and staffed in the 12 audit Elements addressed in the RFP, in the areas identified under each as areas of focus, and in a number of additional task areas we have identified as meriting review, given their importance in defining the circumstances and in guiding management and operations in the many focus areas of the 12 audit Elements. Specific goals underlie early audit activities designed to provide that qualitative and quantitative understanding, which will

eventually take the form of clear, comprehensive, yet concise "Findings" sections of each task area in our draft and final reports. These goals include:

- Providing the RFP's requested framework assisting staff in developing a more comprehensive understanding of the Utilities' operations
- Developing the information necessary to tailor our comprehensive set of performance criteria to the particular circumstances we find here and to the potential areas of improvement that appear to have some promise - - we have developed that extensive set of criteria over three decades of performing engagements of this type and addressing similar areas of management and operation
- Ensuring that we develop the factual information, analyses, and quantitative data sets necessary to provide conclusions about the effectiveness and efficiency of performance in each "Task Area" - - one for each of the focus areas specified under the 12 audit Elements and for each additional one we have proposed, largely to provide an overall context for management and operations in some of those audit Elements that have more particularly circumscribed focus areas.

D. Developing and Using Clear, Comprehensive Evaluation Criteria

Applying clear, comprehensive evaluation criteria, documented in the work plan that we will deliver for staff review, we will undertake additional fact-finding, data acquisition, analysis, improvement hypothesis formulation and testing, and other activities needed to form conclusions about effectiveness and efficiency that respond to each evaluation criterion approved for inclusion in our detailed work plans. We have been performing engagements like this for 30 years using clear, comprehensive, well-tested evaluation criteria for each task area into which we divide audit work. As we begin to develop the qualitative and quantitative information from which we will eventually prepare detailed findings, we will compare what we have learned, recognizing any emergent concerns or issues as well, with our body of criteria, adjusting it to the circumstances. We have provided an link in Section VIII of this proposal which provides a model of how we use criteria to respond to the scope of a task area and to drive work activities designed to enable us to reach conclusions about the quality (effectiveness, efficiency, timeliness, for example) of management and operations performance under each of those criteria.

Tailoring criteria to early fact gathering ensures that we do not miss opportunities for positive change. As importantly, it provides an opportunity for interchange with Staff to ensure that aspects of performance affected by particular public policy or regulatory requirements and expectations in the jurisdiction become properly embedded in the standards by which we will evaluate management. We do not begin, for example, with a detailed knowledge of all of the "scene setters" described above, but we do intend to become sufficiently informed about them before determining the final bases for assessing performance.

E. Tying Recommendations to Root Causes and Analyzing Costs and Benefits

For each conclusion that identifies a weakness, gap, or other improvement opportunity we will:

- Discuss its root causes in the conclusion(s) addressing the applicable evaluation criteria

- Propose a clear recommendation addressing those causes and their contribution to the applicable conclusion's observed and supported weaknesses, gaps, or other issues
- Lay out a clear recommendation for addressing those causes, explain how it addresses root causes, and address how the recommendation responds to them
- Conduct the analyses necessary and document Customer/Benefit Analyses for each recommendation in agreed format and content.

F. Focused and Comprehensive Audit Work Planning

As suggested above, very detailed work plans form the cornerstone of Liberty's overall approach to audits of this type. In no small measure, Liberty's past work for the Commission on comprehensive management audits of New York combination utilities promoted the development of this approach. This approach has been refined and improved over the years. We use sound and comprehensive work plans first to assure client comfort that: (a) our full team begins with a sound understanding and acceptance of project scope, goals, and objectives, and (b) the client has a comprehensive basis for continually measuring the time, cost, and content progress of our work.

At the project working level, our teams use detailed work plans to manage work at the day-to-day level, assuring that all required scope areas and items get sufficient attention, and conclusions and recommendations flow from a sound set of criteria that conform to proper standards of good-utility practice.

Section II of the proposal sets forth the basis that Liberty will use to begin developing the detailed work plans that will guide audit work in each of the 72 RFP-generated Task Areas and the several we have added, primarily to give context to the others in certain cases. The first several weeks of audit work will lead to amplification and change, as well as to added substantive detail and the RFP-required details about individual work assignments and schedules. Liberty appreciates the fact that the RFP to which this proposal responds anticipates detailed work plans to come later, after initial audit work.

We will produce plans according to the structure and at the level of detail shown in the detailed work plan sample (from our NYSEG/RG&E management audit) provided via hyperlink in Section VIII of this proposal. We will do so following a review of regulatory proceedings and initiatives like those listed earlier, responses to initial data requests, the orientation meeting, introductory planning interviews, and consultation with Staff.

Liberty welcomes the opportunity for Staff dialogue that will lead to the creation of detailed work plans for this engagement. The New York Commission's Staff is a large and sophisticated one. Its strengths and capabilities make it important to assure that detailed audit work takes advantage of both the Staff's general background and experience, and its particular knowledge of NMPC, KEDLI, and KEDNY management and operations. Liberty will seek to ensure that the work plans that will guide audit work have the benefit of combining:

- The approaches we have developed over time and applied often, including here in New York
- Insights that our team members can bring from very recent and extensive experience in a changing industry environment that presents new challenges

- Knowledge and insights that Staff can offer about current circumstances and issues affecting NMPC, KEDLI, and KEDNY - - not just those associated with the public policy and regulatory proceedings, orders, and statutes into which we will delve initially
- Knowledge we gain in early audit efforts about new initiatives and programs - - in progress or in contemplation
- Benefits of our long experience in examining New York utility management and operations.

G. Beyond a Paper Audit - - Sampling

A focus on processes and measurements is appropriate, but care must be taken to get beyond what a utility says it does, and how well its measures say it did. Liberty does not propose to halt after completing a "paper" audit, which addresses policies, procedures, guidelines, and reports of performance. These indicia are certainly important, and provide an essential baseline for forming conclusions. They are not in and of themselves convincing, however. Interviews can help to confirm what documents say, but, again, may leave room for doubt about how things really happen and what results they produce. Liberty therefore does not propose to rely only on paper exercises; *i.e.*, determining the appropriateness of various policies, the degree to which processes and programs are in place to carry them out, and representations about how they are carried out. Nor do we give only "lip service" to the need to get "out in the field" or to dig "behind the numbers." Going beyond what the paper says in a project of this type takes senior, experienced consultants who are used to looking at multiple sets of data that bear on the same factor. We have those people and we intend to take advantage of their ability to cross check data sets against data sets and what their seasoned eyes tell them against what the reports say.

The key to making this approach work is to bring to the audit team members with the experience to know:

- Which secondary data sets help to verify primary ones
- What to make of visual observations taken in the field.

This need is primary among the reasons why Liberty brings to this engagement a team of specialists who have direct, hands-on experience. In short, their capabilities allow us to get at the risk of over-reliance on what paper and people say how something should be done. Measured approaches to hands-on validation are important in engagements like this one. This does not mean every area, nor does it suggest excruciating detail. But failing to use such validation appropriately can produce conclusions that simply are not valid.

Liberty consultants use guidelines like the following to determine when further data analysis or field inspection is required as a normal part of the audit process:

- When input data is heavily relied upon by a critical process, the sources and quality of that data should be validated (for example, reliability inputs to the system planning process)
- When analytical data reveal inconsistencies with process data (for example, when process reports say something is working but quality reports say it is not)
- When differing opinions exist on the same "facts"
- When the auditor needs a field examination to fully understand the topic
- When a sample is appropriate as good audit practice

- When the auditor's judgment suggests the need for further study.

Liberty will use early audit work to identify where and how much sampling should be incorporated into the detailed work plans. Where practicable, these plans will provide sampling details. Where not, the work plans will make time and schedule allowances based on experience, allowing for alteration as appropriate as field work uncovers more data and supports more in-depth analysis. The time estimates of this proposal make allowance for what we believe to be a sufficient, but not excessive use of such verification techniques.

H. Work Performance Guidelines and Criteria

Liberty operates under a series of guidelines and criteria that apply to the work it performs in audits of this type:

- Recognize that the Staff is responsible for supervising the performance of the audit.
- Work closely with Staff in a manner that not only meets requirements, but also satisfies mutual expectations.
- Establish ongoing dialogue that will enable us to take advantage of the Staff's extensive knowledge of the utility.
- Follow generally-accepted standards and procedures applicable to regulatory proceedings for submitting data and interview requests, and conducting interviews.
- Submit draft work products to Staff for review in advance of procedural due dates wherever possible.
- Include in audit reports the background necessary to give readers a clear understanding of the issues identified and any problems that may have been discovered.
- Present a clear discussion of those issues and problems, and conclusions and recommendations supported by appropriate analyses and work papers.
- Source findings, conclusions, and recommendations to work papers under the assumption that it will be necessary to explain and defend audit work in proceedings before the Commission.
- Maintain a set of working papers that will allow the Staff to follow the work that Liberty performed in making findings and in reaching conclusions and recommendations; make those work papers available immediately upon Staff request.
- Maintain a database (web-based if desired by Staff) that will track all documents requested and received.
- Encourage the provision in all cases where feasible of data electronically by the company being audited.
- Maintain electronic copies of such data and of interview notes as part of working papers.
- Make Staff aware of tentative findings and conclusions as they emerge.
- Conduct work per standards generally applicable to evaluations of the type at issue.
- Apply, except where specified otherwise by the client, the National Association of Regulatory Utility Commissioners' *Consultant Standards and Ethics for Performance of Management Analysis*.

I. Staff Participation

Liberty fully understands that Staff's project manager or designees are its contact persons with the Commission for the audit, and that the work is being performed for the Commission, who is the client. Liberty is completely comfortable with this reporting structure, having performed literally dozens of audits using this approach. Liberty's study methods and its extensive experience in working for public service commissions make clear the firm's commitment to full Staff participation in this project. Such involvement provides an important contributor to the necessary high-quality final report that Liberty is to provide.

Beyond this clear commitment, Liberty welcomes Staff participation in any other project activity. Liberty has no concerns about confidentiality regarding the Staff, even to the point of taking Staff personnel on as team members if it fits the operational or training objectives of the Commission. Liberty's work methods ensure that the Staff's project manager or designee(s) knows at all times exactly where the project stands. This timely knowledge permits the client to track results and progress from quality, cost, and schedule perspectives. It also allows Staff to design whatever level of its own participation it deems appropriate.

J. Client and Study Team Communications

Liberty promotes continuous and close communication with the Staff. We support that goal with a series of measures:

- Encourage frequent, informal communications between the audit team and Staff.
- On a weekly basis, Liberty will report to Staff on the interviews and site visits that are scheduled for the following two weeks and on any problems encountered during the conduct of the audit.
- Provide monthly written status reports to Staff, listing the schedule for planned work, work accomplished, and any preliminary findings. These reports will provide a narrative description of the progress to date and the reasons for any differences between the project schedule and actual progress. They will also include quantitative information regarding the hours recorded by consultants, costs incurred, and the relationship of those hours and costs to the audit plan. The Staff project manager will receive the report within five working days of the end of the month that is the subject of the report.
- Invoice monthly, and include reports on consultant time and expenses in a form satisfactory to Staff, showing information needed to relate costs to work done and to work plans.
- Use project management, scheduling, and reporting systems capable of scheduling, providing status reporting, and performing document tracking and retrieval.
- Use a report cross-referencing system that will enable users of the report to quickly and easily trace back statements of fact, findings, conclusions, and recommendations to supporting documentation, such as interview notes and company-provided documents.
- Make the final report, where possible and consistent with client requirements and expectations, as much a stand-alone document as is practicable. Liberty's approach is to present as much supporting analyses in our report, in the text or in appendices, so that users of the analyses do not have to refer to other documents to see supporting analysis.
- Require all Liberty personnel to use common word-processing and spread-sheet software that facilitates the creation of endnotes or footnotes, or reference notes for charts and

graphs, so that sources such as responses to document requests or interview notes are clearly displayed in reports.

- Engage regularly with Staff and management in the performance of Cost Benefit Analyses, which we will support by dedicating a senior level, Albany-area-based employee to coordination among the three parties.

Close coordination and communication will also exist among Liberty's team members. Our engagement director and project manager, Liberty's president and a founder of the firm nearly thirty years ago, will also lead the examination of many of the audits' Task Areas. He will be working with team members he has been part of for many years, for decades in many instances. He will work closely with them throughout the audit, through:

- Weekly conferences (on site when in the field) team members to address the audit's substantive and administrative matters
- Virtually daily contact with members on substantive matters
- Joint participation with them on areas relevant to his direct audit work
- Efforts to coordinate schedules to maximize the amount of field time he can spend together with other team members
- Periodic participation with them in areas of emerging importance or uncertainty
- Monthly review of schedule and cost status against established targets, and periodic checks during the month on any areas where schedule or cost jeopardy exist or arise
- Review of data and interview requests prior to issuance
- Review of responses and participation in key interviews by other team members
- Working sessions to review hypotheses, discuss emerging, tentative conclusions and recommendations
- Direct and active oversight of the Customer Benefit Analysis process, to ensure common approaches and based data and to drive the process to timely and informed completion.

K. Work Products and Working Papers

Liberty's deliverables for this engagement will include:

- Interview Logs showing all interviews requested and conducted, updated weekly to list interviews and site visits scheduled for the ensuing following week, listing interviewee, interviewer, subjects, date, time and location.
- Data Request Logs showing all documents requested, due dates, date received, and overdue, updated weekly to show status and to highlight requests issued since the last log issuance.
- Interview summaries identifying interviewee, interviewer, title and organization of the interviewee, documents requested, and items discussed.
- Monthly progress reports that: (a) identify for the most recent month, cumulative, and versus-budget person-days (number and percent) by activity in each task area, (b) show original, current, and to-complete schedule, and (c) show audit work percentage complete.
- An initial and a final detailed work plan, developed in consultation with and modified after comments from Staff; these plans will detail by audit area the specific scope (issues and areas to be examined), objectives, management and operations performance criteria, team members responsible for each audit work assignment, specific inquiries to be posed in

applying those criteria, and specific data gathering and analytical steps and activities to be undertaken, organization of the interviewee, documents requested and items discussed.

- A regularly updated database containing documents other than trade secrets.
- Detailed project schedules accompanying the initial and final work plan submissions.
- Regular briefings to Staff on the progress of the audit, including identification of emerging issues as work progresses.
- Monthly progress reports to the Staff providing a narrative of work performed and status, with an explanation of any variances from plans and budgets, and schedule progress charts.
- Issue Summaries: Liberty will prepare and submit written summaries of issues as they emerge, but not later than the midpoint of the audit; dialogue with Staff about these summaries will help to guide field work completion and to structure the draft report.
- A Midpoint Briefing with Staff to present and discuss tentative findings, preliminary assessments and potential conclusions.
- A series of draft reports
  - A first addressing the full scope of the audit and all elements of the final work plan
  - A second reflecting changes made because of comments from Staff
  - A third, reflecting changes made (to the draft approved by Staff for presentation to NMPC, KEDLI, and KEDNY) because of company review for factual accuracy
  - A fourth, reflecting the final work product with confidential material redacted.
- The draft report in August 2019 documenting Liberty's findings, conclusions, and recommendations for each element of audit scope in the RFP and as listed in the approved detailed work plan.
- Access by Staff to a complete set of work papers accompanied by an annotated report presenting detailed cross-references to the supporting work papers.
- As described in Section IV of this proposal, a Customer Benefit Analysis for each audit recommendation, which takes into account potential benefits, potential risks, one-time and ongoing costs, and potential savings or efficiencies thorough consideration of expected benefits and anticipated costs.
- Participative workshops on mutually selected topics for dialog with and knowledge transfer to Staff on key areas.
- Testimony, as may be requested by the Commission or Staff at standard rates for consulting services and including travel and out-of-pocket expenses.

Liberty's final audit report will present audit results comprehensively, will be written for an audience consisting of interested parties, Commissioners, Staff and company management, and will define technical terms and acronyms. The report will describe and support in detail any recommendations for improvements

L. Work Methods

This section identifies the work steps that are applicable to each audit module, and describes the methods that Liberty will use to conduct the audit. The logical flow of these activities is illustrated in the preliminary work timeline in Section VI.

1. Initial Data Request

The audit team's first activities will be geared to the prompt completion of detailed work plans for each of the Task Areas aligned under the audit's 12 Elements. Liberty's first data-gathering steps support this goal, designed to collect basic information that addresses the subjects of this engagement's scope. This information provides essential background for generating interview plans and focused data requests. Liberty will provide the companies an initial request for documents that will include fundamental background information, such as the following:

- Mission, goals, and objectives
- A listing of all "key controls"
- Flow charts and associated narratives for "key controls" associated with the audit topics
- Charters for the boards and their committees
- Board and committee minutes for meetings in the last three years in which budgeting (capital or O&M) or resource allocation was discussed
- Management compensation policies
- Organization charts
- Payroll and staffing levels by department, budget versus actual
- Corporate planning guidelines
- Descriptions, functions, resources of common service providers
- Summary of transaction paths (qualitative and dollar amounts) among affiliates as they affect NMPC, KEDLI, and KEDNY directly and indirectly
- Affiliate transaction and cost assignment and allocation methods, factors, and controls
- Descriptions of systems used to manage cost assignment and allocation
- Annual load forecasts for the last five years
- Contribution of demand side initiatives to capacity requirements
- Policies and procedures for load forecasting
- Reports describing the load research process and results
- Flow charts depicting the load forecasting process
- Load levels currently embedded in rates
- Risk management policies and procedures
- System design standards
- Planning policies and procedures
- Economic guidelines for planning studies
- Reliability goals – target and actual for past five years
- Repair / replace criteria including age limitations for facilities and equipment
- Studies or analyses linking expenditures to reliability
- Operating budget policies and procedures
- Capital budget policies and procedures
- Formal capital and operating budget packages as reviewed and approved by the boards
- Comparison of operating costs versus budget and versus rate assumptions for the last five years
- Description of the program for management of capital projects
- Policies on application of in-house versus contractor labor
- Sample project management reports for large projects

- Sample project plan for large projects including organization, scope, estimates, schedule, budget, organization, accountabilities, cost management program, reporting requirements, staffing levels, key assumptions (productivity, escalation, etc.)
- QA and or QC policies applicable to large projects
- Workforce effectiveness and productivity measurements
- Standard measures of work and unit rates
- Policies and procedures for management of labor
- Typical structures for management of work, including supervision, technical support and planning
- Work planning and work assignment procedures
- Labor agreements governing physical workers
- Regular management information and control reports
- Company-prepared or secured benchmarking data
- Results of any recent performance studies.

2. Orientation

This essential early step acquaints the Liberty Engagement Director and key team members with the Staff and NMPC, KEDLI, KEDNY, and NGUSA personnel who will play key roles during the audit. This step will provide an opportunity to begin the interchange that will lead to common understandings of the details of Liberty's work methods, and of the full extent of the Staff's intended participation in study activities. In addition, this step provides an early opportunity to begin the interchange with the Utilities, so that Staff and Liberty can make their expectations known.

Where Staff identifies (a) areas where it will actively participate, or (b) specific matters of interest, Liberty will incorporate them into its diagnostic, and subsequent detailed work planning. Liberty's team leadership also realizes that, at a later stage of the project, Staff may identify additional areas where its active participation in the study has become appropriate.

This study step will also establish the necessary protocols for communications between Liberty's auditors, Staff, and the Utilities, including those for document exchange, advance notice of particular task steps, and other similar activities. Liberty expects that the Utilities' coordinators will advise Liberty about their preferred protocols for requesting interviews and documents, the treatment of information that the utility deems proprietary, and notice requirements.

The Liberty team will require support from Utilities' resources. This will include access to documents, facilities, and employees. To effectively address these requirements, without unduly disrupting normal business, Staff expects, and from Liberty's experience we concur, that the utility is likely to favor an organized system of contact for the study.

Logistically, we propose to kick off this orientation with a conference call with the Utilities and Staff at the very start of the work. This would be followed with formal meetings with NMPC, KEDLI, and KEDNY about two weeks later. A preparatory meeting will be held with Staff before the this meeting with management.

At the NMPC, KEDLI, and KEDNY meeting, we will expect a presentation from them on the basics of the Utilities and how they see the audit. We will then provide a formal presentation on the scope of the audit and how it will be conducted.

3. Initial Document Reviews

We described earlier the extensive list of policy and regulatory documentation that we will seek to understand in some depth. We will review that list with Staff, and seek to identify and secure access to the appropriate documentation. We will do the same for other policy and regulatory "touch points" important to understand at the outset of our work. The appropriate team members will review the documentation and we will conduct a session at which the most logical Liberty team "owners" of what those documents convey for our purposes make the entire team aware of key policy and regulatory underpinnings of the audit Task Areas. As appropriate, we will schedule an individual or multiple (if required) sessions with Staff to further our understanding of how the documentation will contribute to our factual inquiries.

A parallel document review effort will commence as soon as management provides responses to a substantial enough portion of the initial request for documents. Our team members will begin to familiarize themselves with baseline information in their respective areas. Document review will remain an ongoing and fundamental activity throughout the engagement. A mutually-agreeable timeframe for responses (our standard is two weeks, shorter for already existing documents and subject to negotiation if any special studies or detailed data assembly is necessary) will be set.

4. Introductory / Planning Interviews

Liberty will use the information acquired in response to the initial data requests to determine its requests for initial interviews. In addition to providing substantive information, these interviews will be used to learn about the logistics and availability of records and reports. These diagnostic interviews are designed to build on the information that comes from the initial data requests. We envision beginning these interviews in the same week as the orientation meeting.

These interviews will involve levels of management most familiar with, for example:

- Overall corporate organization, structure, and common services
- Descriptions of major functions performed and current objectives for each
- Detailed financial, accounting and cost information
- Status or REV initiatives, organization and staffing changes, and related developments
- Energy supply planning and activities
- Major new or planned investments
- Staffing trends and programs
- Cost trends
- Operational changes resulting from centralization, from field-operations consolidation, or from other initiatives
- Persistent service problems
- High risk areas
- Apparent problems or gaps in organizational focus or management systems and tools
- Current budget and projected budgetary changes for operations

- Major areas of current management emphasis and concern.

5. Detailed Work Plans

Liberty will complete the process of establishing the detailed work plans that the audit team will use to manage, steer, and measure project work. Liberty will present for Staff review a draft of its proposed detailed work plans that:

- Summarize facts and issues learned and emerging from work to date
- List and describe the areas within each of the 72 RFP-specified Task Areas and the several we have added, organized under the audit's 12 Elements that will be subjected to examination and evaluation
- Establish by area within each element the specific performance criteria to be applied in making such evaluations
- Listing the key questions that must be answered in order to lay a foundation for applying those criteria
- Identifying the work tasks that will be performed to provide the factual and analytical basis for answering those questions
- Identifying the individuals responsible, the time requirements for, and the schedule for completing those work tasks
- Specifying particular interviews to be conducted, documents to be examined, and visits to be conducted in completing those tasks.

Liberty will invite written Staff comment on and discussion of this draft, in order to facilitate the development of a mutual understanding of issues and areas to be examined and evaluated. Liberty will then prepare a final set of plans for Staff approval.

6. Data Gathering

This step will help to promote the assembly of a broadly based factual record from which to development hypotheses about the engagement's task areas, and to support overall conclusions and recommendations. Data gathering will include many steps, as appropriate to the circumstances. Typical activities in this stage include: (a) detailed document reviews and analyses, (b) in-depth interviews of a cross-section of management and line personnel in major functional areas, and (c) team meetings for detailed analysis of the likely areas requiring change and sharing of information.

7. Testing and Sampling of Construction Programs and Projects

This audit will examine the controls applicable to shared service costs. Such an examination may require transaction testing to assure that transactions are: (a) traceable to source documents in a reasonably-transparent manner, (b) governed by methods and factors that provide for a fair apportionment of costs among cost-causing and benefitting entities, and (c) faithfully carried out in accord with governing methods, factors, and guidance.

As Liberty has done in many relevant projects, we will perform an assessment of a representative sample of construction projects that the Utilities have either completed or are in the process of completing.

8. Issues Review and Mid-Point Meeting

As the project mid-point approaches, Liberty will conduct a focused series of reviews of emerging issues with Staff. They will actually begin on an informal basis as Liberty's team management and subject matter experts interact routinely with Staff during the course of work. Liberty invites substantive discussion of substantive matters as part of the ongoing dialogue with Staff about project status. Liberty also welcomes the establishment of direct relationships that will allow individual Staff members to discuss on a more detailed basis any particular management and operations areas or issues of interest or concern to Staff. We repeat here our welcoming of Staff involvement in our processes of identifying and pursuing needed factual information, conducting analyses, and forming conclusions. We fully understand the knowledge-transfer objectives of the RFP, and, even without them, consider it beneficial to keep Staff as informed and involved in audit processes as desired.

Our experience has been that keeping Staff informed during the course of the work promotes that exercise when there is a mutual understanding of roles and of the benefits of dialogue. In making its commitment to support such involvement as Staff considers appropriate, and in having met it routinely in our past work, Liberty nevertheless understands that: (a) the conclusions and recommendations it will form must result from the exercise of our audit team's judgment, and (b) we will need to be prepared to stand behind and fully support those conclusions and recommendations. Staff does, however, have an important role in verifying that Liberty's conclusions and recommendations are complete. This step sets a first, important milestone in that verification process. It comes with sufficient remaining project budget and schedule to permit any course corrections that may be needed to assure completeness.

Liberty anticipates formally commencing this Issues Review step with a series of topically based presentations by the team members responsible for each topic to be addressed. Liberty will provide for Staff review a proposed schedule for these sessions. Liberty will then prepare for Staff review prior to each session the slide deck that will guide the presentations. To the extent possible at this project juncture, these slide decks will follow the general format proposed for the presentation of the background and factual findings portions of the final report. This approach will help the team to focus remaining work and to allow Staff to verify that work is addressing all required management and operations areas and activities.

In some cases, team members are likely to have already developed at least initial hypotheses (see the discussion of the next step) that initiate the conclusion and recommendation development process. In those cases, the presentation will include them. In areas where that is not the case, the presentation will describe the issues to be addressed in the conclusions, relying primarily on two factors: (a) the specific management and operations performance criteria that the detailed work plans will include, and (b) any particular matters of concern or interest disclosed by audit field work to date. As these matters have arisen during field work, Liberty anticipates that regular interaction with Staff will have already disclosed them. Thus, Liberty does not expect that the presentations will for the first time expose issues to the Staff. Instead, the presentations will provide a forum for more extended discussion of them, and context for assessing their significance in light of all the other facts, issues, and concerns being collected and formed.

Following a robust discussion of these facts, issues, and concerns at the sessions, Liberty will prepare written summaries, again generally in the form and structure anticipated for the final report.

9. Strawman Process

The incorporation of this step grows from our CECONY audit, which we understand to be the first use of the technique in New York, and which we continued in our and NYSEG/RG&E audit. The goal of the step is to engage the enterprise being audited in a manner that promotes "ownership" of the ultimate agenda for change. Forming that agenda thoroughly and effectively comprises a primary goal of engagements of this type. Where the people responsible for implementing change after auditors depart have truly bought into the root causes of the need underlying it and into the way to address those causes, change is far more likely to be real and lasting.

Active and engaged Utilities' participation with the right mindset is necessary to embody the concept with potential to increase audit benefits. Because management helps identify solutions, one would expect the implementation to proceed more smoothly and effectively. Our experience in the CECONY audit demonstrates that it takes high level support and participation to make this approach work. We proposed to potential for using the concept at the orientation step, and to work with senior management to identify specific activities, commitments, and schedules for making it work.

Should we gain full commitment to the process at the outset of the project and develop an effective approach for implementing it, specific steps in using the strawman approach will begin with our team's identification of potential major issues, proceed to participating in dialog with senior management on them, and culminate in working with management to develop mutually beneficial solutions. If we do not gain it, the audit will proceed through the normally applied steps.

We emphasize that a necessary precondition to engaging in the presentations and dialog with management is a thorough vetting ahead of time with Staff of the issues to be included in the strawman process. Staff participation in the ensuing dialog is also welcome at whatever level Staff deems it appropriate. Where the process succeeds fully on a particular issue, the conclusions and recommendations to which it relates should reflect nearly complete agreement between Liberty and management. Where it may fail even broadly, Liberty will still be able to reach its conclusions and form its recommendations under its normal audit steps.

We continue to believe, maximizing its chances for successful use of the strawman process takes certain specific steps, which we propose here:

- Gain early commitment by senior executive management to the concept, which requires clearly explaining its purpose and required steps, and discussing why it is to the Utilities' benefit to support it
- Keep open and use regular communication paths with senior management about the level of execution being demonstrated on that commitment as the audit progresses
- Assure that personnel are being directed to be open and forthcoming, not just in providing "answers" but in communicating their issues and concerns
- Assure that any training of interviewees and other audit participants is directed to helping them reach the goal of being open and forthcoming

- Identify early in the audit any areas where executive management feels that improvement areas may exist.

The most effective use of the strawman process is likely to center on matters of apparent high impact and necessity for executive level attention. The process would begin with Liberty's laying out of preliminary findings and conclusions in these areas (after reviewing them with Staff), and asking for a senior level evaluation and response to the Liberty "hypotheses" as presented. If appropriate, the next step would be to conduct the dialog necessary to better define the issues on as common a basis as possible, but recognizing that even just partial agreement, if substantial, can support the strawman process's application. Then the goal would be to continue the dialog in order to seek solutions mutually recognized as responsive to the underlying needs. As Liberty found in the CECONY audit, a "basket" of ten or so high-level issues proved most amenable to the process.

10. Conclusion and Recommendation Development

Conclusions and supporting findings will be developed for each of the project areas, and those that cross individual focus areas will be coordinated to assure completeness and consistency. Recommendations will take into consideration the full range of conclusions. Liberty will provide complete, accurate, and timely documentation of preliminary conclusions and recommendations for review by members of the study team and the Commission to ensure that the rationales that underlie the recommendations are thoroughly understood by all the parties.

Both qualitative and quantitative analyses will be performed in each task area. Where possible and appropriate, Liberty will quantify the expected changes that would result from each recommendation. For example, in the area of compliance with affiliate standards, Liberty will focus on identifying, supporting, and quantifying the effects of any non-compliance or cross-subsidization that may be found. This will mean preparing detailed descriptions of the results of analyses, so that users of Liberty's work will immediately understand how the conclusion was developed, and the analytical basis for the valuation of the conclusion, if appropriate.

In a project such as this, analytical activities must be performed during every stage of the work. This step, however, is specifically devoted to formulating hypotheses that will ultimately become the basis for recommendations and conclusions.

As data gathering progresses, Liberty will develop hypotheses to explore prospective changes in management, operations, affiliate relationships, and other areas where cost or service improvement opportunities may be discerned in the areas covered by the audits. These hypotheses will be objectively analyzed and tested using the information base that has been compiled, in conjunction with the Liberty team's collective experience.

In this context, Liberty draws an important distinction between hypotheses and conclusions. Hypotheses may or may not lead to conclusions, as determined by examining the facts and subsequent analyses. Some hypotheses fall by the wayside as work progresses; others are modified; and additional hypotheses are introduced as new information surfaces. Hypothesis formulation and proposition testing are processes that assure that matters warranting further review can be aired within budget and schedule constraints.

Hypotheses that survive preliminary screening will be followed up with focused data gathering and verification. Liberty's team sessions provide a forum for further group discussion of each hypothesis. Team members review separate but interrelated areas as part of the team-wide analytical process that can involve the use of role-playing or devil's advocacy techniques in subjecting the hypotheses to scrutiny and challenge.

Where appropriate, Liberty will meet with senior managers to test working hypotheses. Liberty will seek information on how prospective changes might affect operations, management processes, service levels, costs, etc. The Liberty team will consider these factors in validating concepts, determining the extent of changes that could be involved, assessing the degree of the underlying need, and exploring the range of alternatives. These sessions will provide an opportunity for management to comment on hypotheses in advance of Liberty's formulating conclusions and recommendations, and to assure that management's viewpoints will be understood and appreciated.

Conclusions (statements of judgment or opinion) and supporting findings (objective statements or facts) will be developed for each issue or area. Conclusions that cross multiple issues or areas will be coordinated to assure completeness and consistency.

11. Draft Report

Liberty will prepare a draft report for Staff review for adherence to RFP and detailed work plan requirements. The draft will contain all the sections that Liberty expects to include in the final report. This document will undergo Liberty's quality review to assure that it approaches the form, content, appearance and accuracy of the final version. This quality review will consist of critical readings of draft reports by consultants on the team who have not contributed to the writing of a chapter they review, but who understand the subject matter at hand. Their objective will be to examine what has been written to ensure that the conclusions and associated recommendations are well supported and clearly delineated.

This report will be designed as a self-contained description of the audit and its results. It will provide (a) an executive summary, (b) a description of the examination processes, (c) summary descriptions and an overall assessment of the Study Areas, and (d) a detailed list of all recommendations, focusing on the quantification of their benefits wherever practicable. To support the recommendations properly, the draft final report will specify (a) the audit's mission and objectives, (b) an explicit statement of the evaluation criteria applied, (c) a description of study approach and methods, (d) a delineation of data collection and analytical processes performed, (e) conclusions about performance and cost efficiency and effectiveness, and (f) opportunities for cost reduction or performance improvement.

Liberty will prepare a revised draft after receipt of Staff comments, following the completion, if and as necessary, of any field work closure activities (see the discussion of the next step).

As described in Section IV of this proposal, a Customer Benefit Analysis for each audit recommendation which takes into account potential benefits, potential risks, one-time and ongoing costs, and potential savings or efficiencies thorough consideration of expected benefits and anticipated costs.

12. Closure of Field Work

Liberty will conclude the fact-finding necessary to resolve comments on the task reports, finish analyses, and refine quantification calculations and implementation requirements.

By this time, the essential final report elements will have already reached an advanced stage, permitting ongoing Staff involvement in, and awareness of, study progress. It also helps to keep efforts throughout the project focused on the primary final product, a comprehensive examination. It also avoids the degradation in quality that becomes inevitable where inadequate budget remains at the end of the fieldwork to support a large writing effort. Finally, Staff's involvement provides an unmatched tool for evaluating the progress of the study on a real-time basis.

13. Final Report

Following Staff review of the revised draft and any changes that Liberty makes in response to Staff comments, management will have the opportunity to review the draft for factual content and accuracy. NMPC, KEDLI, and KEDNY will also be required to identify any report contents it believes should secure confidential treatment. Liberty will provide a report copy showing management's proposed redactions for the report's publicly available version. This copy will allow NMPC, KEDLI, and KEDNY to verify that all proposed redactions have been properly made and it will allow Staff to determine whether it has any concerns about those redactions. Liberty will provide to Staff its input on any proposed redactions questioned by the Staff.

Meetings with Staff and Utilities' audit coordinators to discuss management's comments and any redaction issues will be scheduled as necessary. Upon Staff approval, Liberty will prepare and issue the final report, including both public and confidential versions if required. Liberty will be available for final report briefings for Staff/Commissioners, as well as boards of directors, if directed by Staff.

M. Testimony

Liberty's personnel have extensive experience in preparing formal reports for eventual use in administrative proceedings requiring pre-filed testimony and hearings. Liberty will produce a final report that meets applicable requirements for admissibility. As with all its work products, Liberty will stand behind its results if questioned in any public forum or proceedings. Any testimony that may be required shall be provided at then-standard Liberty rates for service.

IV. Customer Benefit Analysis

A. Making Customer Benefit Analysis Work Effectively

A paramount goal of this audit is to produce tangible improvements in management and operations effectiveness and efficiency. That goal is important in ensuring that the audit will have lasting, tangible, and measurable benefits. Customer Benefit Analysis provides a means for validating the propriety of recommendations. Customer Benefit Analysis will form an important vehicle for measuring the levels of improvement to be expected. We have significant experience with the use of this vehicle, having performed it perhaps for the first time in a New York management audit by an outside firm - - our engagement involving CECONY. We followed that with the RG&E/NYSEG audit, where we also employed the technique.

We were then and remain committed to making the process work. An open and iterative process with management should be an important contributor to producing good recommendations and to ensuring common understanding about the scope and depth involved in implementing them. This benefit is material whether or not perfect agreement on the ultimate magnitude of costs and benefits results.

Important considerations in making such analysis work efficiently and effectively include:

- Addressing innate management concern about creating "rate case" exposure, thus generating a reluctance to "come to the table" openly and candidly in discussing potential costs and benefits
- Finding a way to implement sound Customer Benefit Analysis in a manner synchronized well with audit field work and conclusion formation, without causing undue impact to overall schedule.

We have found ways to make the process find some success in the NYSEG/RG&E audit. We propose to begin the process early, beginning during with Step 10 described in the previous proposal section (Conclusion and Recommendation Development) and continuing through final report completion. For each recommendation, we will present a completed Customer Benefit Analysis, structured and populated as described below, as an appendix to the final report.

We therefore propose the approach describe below, which follows in many respects the approach we sought to use in the RG&E/NYSEG audit. We propose to initiate discussions about enhancing this proposed approach among Liberty, Staff, and management, recognizing that adjustments may prove critical to supporting audit schedule and to allowing sufficient management participation, particularly in providing detailed cost information. An open dialogue, conducted in an atmosphere of respect for the goal of the process should produce a successful approach tailored to the circumstances at issue here, provided that such an approach does not compromise the need for clear, complete, and quantified (costs and benefits) recommendations, supported by documentation of the analysis underlying them.

Our goal will be to reach consensus on the approach, methods, tools, and results for inclusion in the detailed work plans. Failing such consensus, we nevertheless plan to include a definitive

approach in those plans. In the meantime, the following description presents our thinking on how to proceed at present.

B. The Dimensions of Customer Benefit Analyses

In all cases where audit conclusions identify a gap between current performance and performance that should be sought, a recommendation will succinctly state the change contemplated, supported by an explanation of how the change is expected to improve performance, and the actions needed to implement the change. Not all recommendations will be designed to increase efficiency (*i.e.*, lower costs). Some will be designed to improve effectiveness (achievement of identifiable objectives), improve transparency, or ensure more appropriate control over areas that impose risk. The recommendations will clearly identify the type of improvement (cost or otherwise) that the recommendation seeks.

It is typical for a number of recommendations to require only nominal costs to implement. Nevertheless, for each recommendation, Liberty will identify the: (a) one-time costs of implementation, (b) ongoing costs to sustain the anticipated level of improved performance, and (c) any change in continuing costs (compared to current levels) expected to be occasioned by implementing the recommendation and sustaining the level of performance contemplated. For recommendations expected to require substantial, lengthy implementation steps, Liberty will also set forth a schedule outlining major milestones.

Where increased efficiency is the goal, the recommendation will compare before and after costs, including consideration of the costs to implement. Where the recommendation seeks other forms of improvement, such a cost comparison will still be provided. It will be accompanied by a discussion of how pre- and post-implementation performance are expected to compare. In cases where improvements that seek other than efficiency gain and that would result in a material increase in costs, the recommendation will seek to demonstrate why the improvement(s) to be gained justify the costs.

Liberty has found (less formally in our CECONY audit, and more so in our recent audit of RG&E/NYSEG) that management engagement in cost and benefit analysis is important. We anticipate (as we found in both those prior engagements) that the Utilities' knowledge of their resources and costs will be useful. Therefore, we propose an approach similar to that used in the RG&E/NYSEG audit, which includes a formal Customer Benefit Analysis (CBA) step.

As tentative recommendations begin to form, Liberty's consultants will informally seek information that will help to provide an initial estimate of costs. This early step will help the conclusion and recommendation formation process by gauging how likely it will be to find cost-effective ways to address change. As potential recommendations take shape, Liberty will prepare a form that summarizes the recommendation, its main elements, the potential improvement levels, and costs (one-time and recurring, and pre- and post-implementation). We will undertake frequent, detailed dialogue seeking management input and contribution, which we will take into account in final recommendation formulation, description, justification, and cost analysis. Liberty will also solicit management input on the required activities, expected schedule, barriers, and risks associated with the implementation of recommendations expected to take significant resources and consume significant amounts of time.

There will certainly be cases where precise cost estimation is not practicable, and where considerable judgment is required to provide estimates. The CBA process will ensure, particularly for those cases, that the best information available from the utility is considered before recommendations are made, justified, and quantified.

We include below the form we propose as a starting point for discussion among Liberty, Staff, and management. The goal of these discussions will be to formulate, as part of the detailed work plans a final process and supporting forms and processes for producing high-quality CBAs.

Click here to enter text.

Initial ID:	Click here to enter text.	**Revision:**		**Recommendation:**	Click here to enter text.
Consultant:	Use Drop Box	**Element:**	Use Drop Box		
CBA Category:	Use Drop Box				
Title:	Click here to enter text.				
Recommendation:	Click here to enter text.				

Categories of Benefits (indicate all that apply):

- ☐ Cost Savings
  - ☐ Capital
  - ☐ Expense
  - ☐ Pass through (Fuel/Supply)
- ☐ Reliability
  - ☐ To customers
  - ☐ Of supply
- ☐ Safety
  - ☐ Public
  - ☐ Employees
- ☐ Regulatory Relations
- ☐ PSC
  - ☐ Environmental
  - ☐ FERC
  - ☐ Other
- ☐ Service Quality / Public Relations

Implementation

- **Period:** Click here to enter text.

Major Cost Components

Expense:	
☐ Labor (Internal)	$Click here to enter text.
☐ Materials	$Click here to enter text.
☐ Outside Services (including external labor)	$Click here to enter text.
☐ Fuel/Supply	$Click here to enter text.
☐ Other	$Click here to enter text.
Total	$Click here to enter text.
Capital:	
☐ Labor (Internal)	$Click here to enter text.
☐ Materials	$Click here to enter text.
☐ Outside Services (including external labor)	$Click here to enter text.
☐ Fuel/Supply	$Click here to enter text.
☐ Other	$Click here to enter text.
Total	$Click here to enter text.

Benefits

- **Savings Period:** Click here to enter text.

Quantifications of Savings

☐ Labor (Internal)	$Click here to enter text.
☐ Materials	$Click here to enter text.
☐ Outside Services (including external labor)	$Click here to enter text.
☐ Fuel/Supply	$Click here to enter text.
☐ Other	$Click here to enter text.
Total	$Click here to enter text.

Economic Justification

- Payback Period
- Time frame of savings
  - ☐ One time
  - ☐ Annual Click here to enter text.

Other

- ☐ Safety
- ☐ Reliability
- ☐ Regulatory Mandate

Notes:

Click here to enter text.

Supporting details are required and should be attached as appropriate.

C. Specific CBA Guidelines

We will employ the following guidelines for finalizing the Customer Benefit Analyses:

- Consider NMPC, KEDLI, and KEDNY circumstances likely to affect implementation requirements, barriers, and estimated benefits following implementation.

- Employ current, company-specific cost data, market information.
- For recommendations expected to have quantifiable dollar benefits, define known cost and benefit components and quantify as many as feasible.
- For recommendations that seek other than quantifiable benefits (*e.g.*, improved performance, risk mitigation, transparency), define all cost components and qualitative benefits.
- Define as many benefit and cost components as feasible to permit subsequent quantification as more information becomes available.
- Consider at least the following cost components:
    - Labor, materials, equipment, systems, training and development, etc.
    - One-time and/or recurring costs
    - Operation & Maintenance (O&M) expenses and capital costs
    - Estimated implementation durations (months or years) and quantified dollar benefit and cost streams, as appropriate.
- Consider at least the following benefit components:
    - Increased efficiencies and/or productivity
    - Improved reliability
    - Reduced expenses
    - Reduced capital requirements
    - Reduced full-time equivalents (FTEs)
    - Improved practices and processes
    - Improved schedule adherence
    - Improved work quality
    - Optimized organizational structures.

V. Proposed Project Team

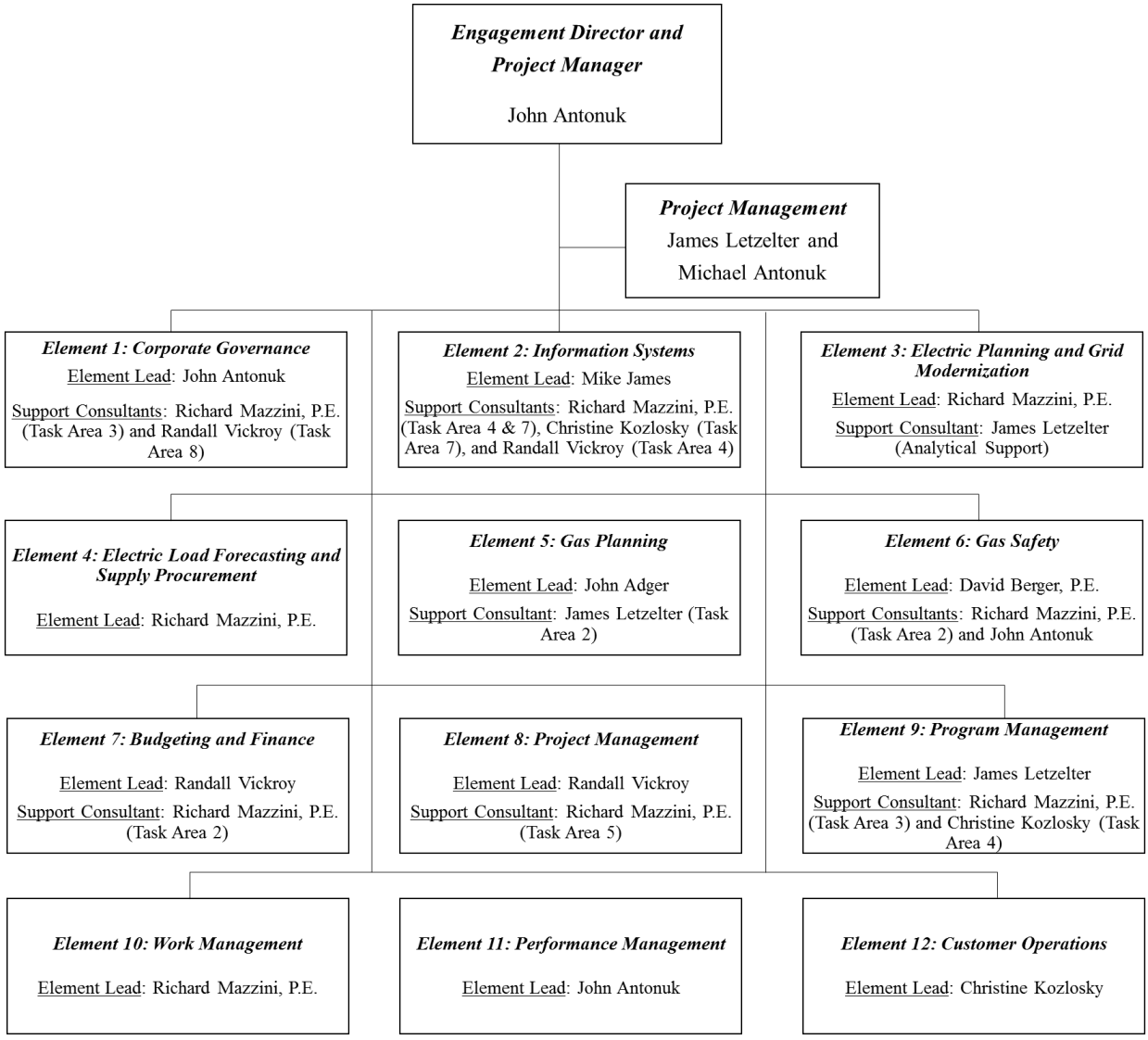
A. The Proposed Team

Liberty has assembled a project team having the depth and breadth to meet the substantial challenges of this audit. The ability of this team to apply the benefits and lessons learned from the successful conduct of our CECONY and NYSEG/RG&E management audits and our recent study of utility staffing put Liberty in a unique position. The team for this engagement will bring substantial carry-over from work on those engagements. In fact, most of the team members have been working together at Liberty for many years - - decades for the most part.

Our recent work with management of the Utilities in the conduct of the staffing study will also provide significant benefit. One of those benefits will arise from continuation of what proved to be a sound working relationship dealing with issues that have material connections to many that this engagement will address. Our work there demonstrated the ability to work cooperatively while maintaining an arms'-length relationship with management.

B. Project Organization

The following chart shows the team organization for this engagement. This chart identifies the individuals assigned to lead each of the twelve Elements and to support work in each of the 72 RFP-derived Task Areas and the several others we have added to provide context for review of certain those 72.



C. Audit Project Management

Liberty's president, John Antonuk, will serve as Engagement Director. He will provide substantive direction to the work of the leads in each of the 12 audit Elements. He will also provide oversight of audit work cost and schedule control, and will assure the quality of all audit deliverables, including the final report. We have assigned John to lead work in Element 1: Corporate Governance and Element 11: Performance Management. He will also provide overall direction to the Customer Benefit Analysis process, particularly:

- Focusing on producing the streamed (rather than batched approach) that we consider important in giving sufficient time and attention to that important element or our work in this engagement
- Providing quality assurance of the processes performed and the analyses to be included in the final report.

James Letzelter will have direct responsibility for managing Customer Benefit Analysis. Dr. Letzelter's exceptional analytical capabilities and Albany-area location will ensure that our team leads carry out Customer Benefit Analysis activities in a rigorous manner, employing the templates established, employing provided and appropriately vetted Utilities' input, and supporting transparency and real-time involvement by Staff. Jim will also track project and report cost and schedule, and provide a real-time, close-at-hand source of communication with Staff.

Michael Antonuk will serve as the primary interface for planning, documenting, scheduling, and tracking interview requests, data requests, work location visits and observations, and sampling activities. He will also provide data management, structuring, analysis, and depiction as directed by the Element leads.

D. Personnel and Resumes

Highlights of the senior team members' experiences and capabilities follow in Section VIII. Appendix A to this proposal sets forth detailed resumes for all members of Liberty's proposed team. The following table shows that Liberty's core team has long experience with the firm. They average more than 17 years of work and 60+ projects with Liberty. They also average 30 years of experience in the industry. A number of Liberty's team members have worked on Liberty's management and operations audits of CECONY, RG&E, and NYSEG, and the operations audit of staffing levels of all New York electric and gas utilities. Several team members have also participated in our two management audits of the New York Power Authority for the state controller's office, and in a review of CECONY's affiliate operating nearby, in the state of New Jersey. Two team members are registered engineers (Dave Berger and Rich Mazzini).

Team Experience with Liberty

Consultant	Tenure	Projects
J. Antonuk	31 years	300+
R. Vickroy	21 years	46
C. Kozlosky	20 years	29
J. Adger	21 years	78
M. Antonuk	15 years	200+
R. Mazzini	10 years	47
D. Berger	11 years	16
J. Letzelter	7 years	43

E. Experience Matrix

We have selected a number of projects performed over the last five years or so to show the degree of team member commonality and continuity that characterizes our approach to major, broadly-scoped engagements. The next table shows examples of commonality in recent work by members of the team proposed for this engagement.

Consultant	ACE Management Audit *Current*	WGL PROJECT*pipes* *Current*	Newfoundland Power & Hydro *2017*	NY Staffing Study *2017*	Peoples Gas AMRP *2017*	Pepco Management Audit *2014*	IPL Management Audit *2012*	RG&E/NYSEG Management Audit *2012*
J. Antonuk	X	X	X	X	X	X	X	X
R. Mazzini	X	X	X	X	X		X	X
R. Vickroy	X		X		X	X	X	X
C. Kozlosky	X		X		X	X	X	X
D. Berger		X			X		X	X
J. Adger		X			X		X	
J. Letzelter	X			X		X		
M. Antonuk	X	X	X	X	X	X	X	X

F. Preliminary Hours Assignments

The following chart shows Liberty's preliminary assignment of hours by task and by person for this assignment.

Preliminary Hours Assignments

Task Area	J. Antonuk	R. Mazzini	R. Vickroy	D. Berger	C. Kozlosky	J. Letzetler	J. Adger	M. James	M. Antonuk	Total
Element										
Corporate Governance	504	40	220							764
Information Systems		110	40		90			540		780
Electric Planning and Grid Modernization		480				300				780
Electric Load Forecasting and Supply Procurement		280								280
Gas Planning						120	420			540
Gas Safety	120	80		600						800
Budgeting and Finance		80	520							600
Project Management		80	300							380
Program Management		80			60	160				300
Work Management		200								200
Performance Management	280									280
Customer Operations					600					600
Sub-total	*904*	*1,430*	*1,080*	*600*	*750*	*580*	*420*	*540*	*0*	*6,304*
Project Management	160					200				360
Customer Benefits Analysis Process Management	140					280				420
Analytical Support									700	700
Total Hours	*1,204*	*1,430*	*1,080*	*600*	*750*	*1,060*	*420*	*540*	*700*	*7,784*

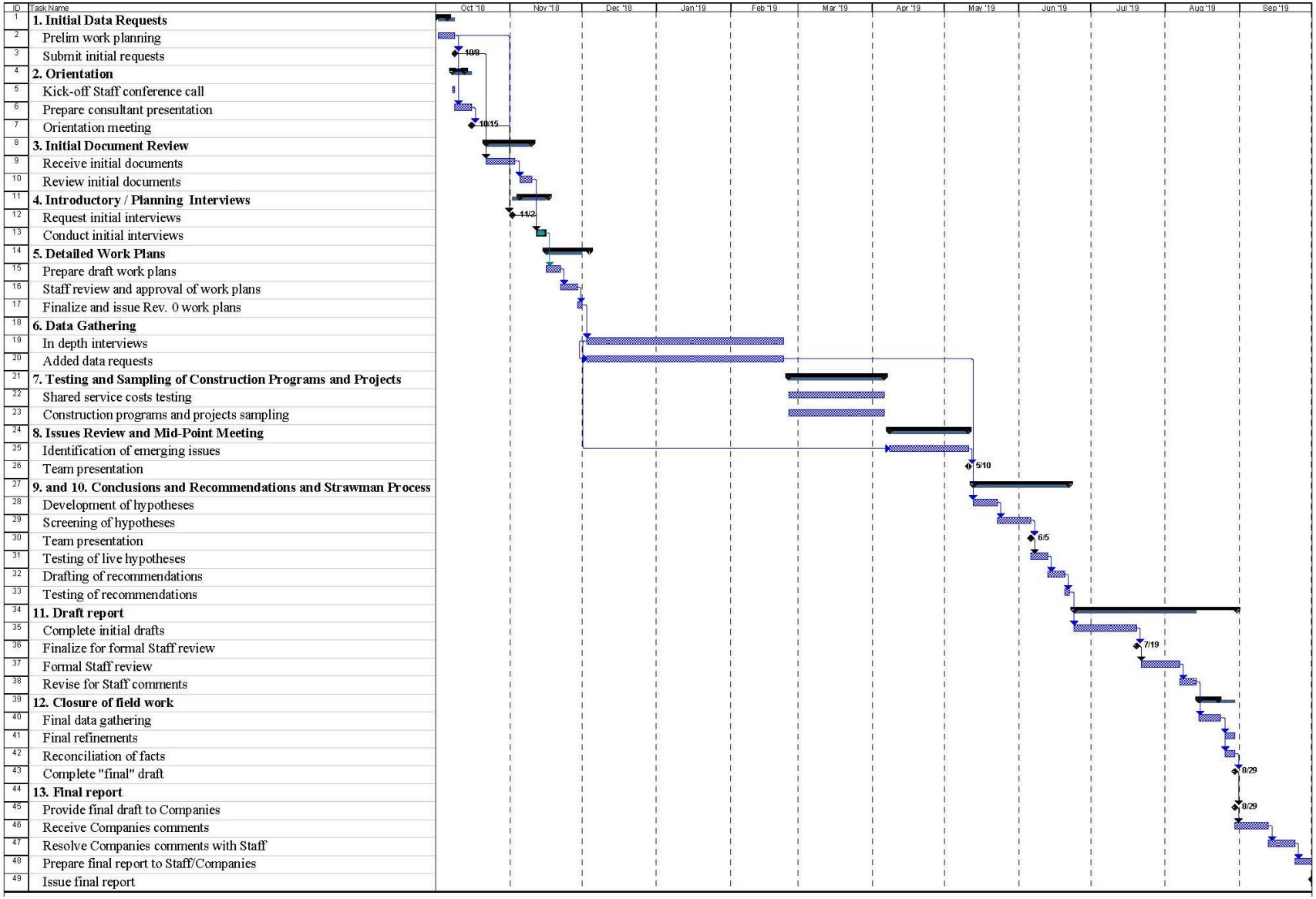
VI. Work Timeline

The following preliminary schedule coincides with the work steps outlined in section II of this proposal, and with the Key Events timeline established in section 1.4 of the RFP:

- Orientation Meeting: October 2018
- Initial Work Plan: November 2018
- Draft Final Report: August 2019
- Final Report: September 2019.

The preliminary schedule does not show the regular reporting from Liberty to Staff, but we commit to providing it through formal monthly reporting and in frequent informal conversations and meetings, which we consider a key part of conducting this audit. Assigning a senior, Albany-area based Liberty employee to project management and to Customer Benefit Analysis oversight roles underscores our intent to keep Staff closely involved and well-informed. Section III of this proposal details this approach, and how Liberty will successfully implement it. Following discussions with Staff at project outset (to identify Staff's resources engaged, information and involvement objectives, scheduling and other constraints, for example), we will incorporate a communications module into our proposed detailed work plans. Those proposed plans will also address and as required flesh out the project work plan to reflect any adjustments or revisions to the preliminary schedule proposed below.

We have prepared this preliminary schedule using as a baseline the anticipated project commencement of October 1, 2018. Should that date come sooner or later, we will make appropriate adjustments. In addition to the work steps laid out below, we commit to final audit briefings for Commissioners or Utilities' boards of directors as requested by and at the convenience of the Commissioners and Senior Staff. The Liberty team meetings to be held at the project orientation and mid-point meetings noted below, as well as at strategic moments during audit field work and conclusion and recommendation development will be open to Staff participation as requested.


ID
Task Name
1 1. Initial Data Requests
2 Prelim work planning
3 Submit initial requests
4 2. Orientation
5 Kick-off Staff conference call
6 Prepare consultant presentation
7 Orientation meeting
8 3. Initial Document Review
9 Receive initial documents
10 Review initial documents
11 4. Introductory / Planning Interviews
12 Request initial interviews
13 Conduct initial interviews
14 5. Detailed Work Plans
15 Prepare draft work plans
16 Staff review and approval of work plans
17 Finalize and issue Rev. 0 work plans
18 6. Data Gathering
19 In depth interviews
20 Added data requests
21 7. Testing and Sampling of Construction Programs and Projects
22 Shared service costs testing
23 Construction programs and projects sampling
24 8. Issues Review and Mid-Point Meeting
25 Identification of emerging issues
26 Team presentation
27 9. and 10. Conclusions and Recommendations and Strawman Process
28 Development of hypotheses
29 Screening of hypotheses
30 Team presentation
31 Testing of live hypotheses
32 Drafting of recommendations
33 Testing of recommendations
34 11. Draft report
35 Complete initial drafts
36 Finalize for formal Staff review
37 Formal Staff review
38 Revise for Staff comments
39 12. Closure of field work
40 Final data gathering
41 Final refinements
42 Reconciliation of facts
43 Complete "final" draft
44 13. Final report
45 Provide final draft to Companies
46 Receive Companies comments
47 Resolve Companies comments with Staff
48 Prepare final report to Staff/Companies
49 Issue final report
Oct '18
Nov '18
Dec '18
Jan '19
Feb '19
Mar '19
Apr '19
May '19
Jun '19
Jul '19
Aug '19
Sep '19
10/8
10/15
11/2
5/10
6/5
7/19
8/29
8/29

VII. Individual Experience and Qualifications

A. John Antonuk

John Antonuk will serve as Engagement Director. He will provide substantive direction over the 12 audit Elements, oversight of cost and schedule control of Liberty's work on this engagement, quality assurance for all audit deliverables, and oversight of the Customer Benefit Analysis process. He will also lead work in Element 1: Corporate Governance and Element 11: Performance Management.

John has had overall responsibility for nearly all of Liberty's management examinations for public service commissions, conducted over a period of 30 years. He has managed or directed:

- More than 20 general management and operations audits for utility regulators, which have included reviews of governance, executive management, and key technical, operations, and support areas
- More than 40 focused audits, which have addressed affiliate relationships, engineering, operations, fuel and energy management, customer service, or other areas.

Highlights of John's work within the past five years include Liberty's current management and operations audit of Atlantic City Electric, where John is serving as Liberty Engagement Director, and leading several key audit Task Areas. These include our review of Corporate Governance and Executive Management, where John has overall responsibility for our examination of the management and governance of Atlantic City Electric's New Jersey operations, and how those activities are performed for ACE by its parent company, PHI, its ultimate parent, Exelon Corporation, and how utility services are supported by holding companies at both the PHI and Exelon level. John is leading Liberty's team in its performance of a management audit of WGL's PROJECT*pipes* gas main replacement program for the DC PSC. He is also leading our review of Liberty Utilities New Hampshire' Gas Planning described in Section I of this proposal. John also led Liberty's review of Peoples Gas Accelerated Main Replacement Program for the Illinois Commerce Commission. This project included detailed reviews of both the overall program design and management of the main replacement program, as well as the execution of replacement work by company and contractor crews. John also led or directed all of the other recent and relevant work summarized in Section I of this proposal, including our series of electric supply and reliability work in Newfoundland.

His work in New York includes overall direction of the staffing study performed for the Commission and involving all of the state's electric and gas utilities. He also directed and led a number of substantive task areas in Liberty's project management and operations audits of CECONY and of Iberdrola SA/Iberdrola USA/NYSEG/RG&E. Work on all three of the utilities involved gas and electric operations. He has also served as project manager on comprehensive management audits of the Iowa operations of a major Midwest electric and gas holding company (Alliant Energy), the District of Columbia's operations of a major Eastern holding company (PHI), Elizabethtown Gas (AGLR). Within the past year he also managed management and operations audits for utility regulators in New Hampshire (Liberty Utilities) and Maine (Emera). Highlights of John's work includes:

- Review of the governance, financial, and operating consequences of the more than $18 billion acquisition of the largest Texas electricity delivery utility (Oncor) by NextEra Energy
- Entergy Texas's exit from Entergy's multi-state, multi-operating company approach to system planning and operation, and systems planning changes needed to support stand-alone operation by Entergy Texas
- Review of Central Maine Power Company's assessment of the market competitiveness of services provided centrally within the Iberdrola USA structure
- Review of Pacific Gas & Electric's use of risk assessment to drive electricity safety expenditures; included a review of the basis for identifying required programs, initiatives, and resources (with safety broadly defined to include an extensive range of generation and distribution infrastructure design, operations, and maintenance needs)
- Connecticut Gas Expansion Program; included a review of the organizational and staffing challenges imposed by the state's program to produce a major expansion of natural gas availability and use by all three of its natural gas utilities
- Newfoundland electricity reliability and outages; included a review of organization and staffing of the separate generation/transmission and distribution entities that provide service across Newfoundland and Labrador
- Nova Scotia Power Fuel Adjustment Mechanism audits (three) and rate case; work included reviews of examinations of electric power purchases and sales, the procurement of coal, natural gas, and fuel oil used for generation, and management and operation of the Company's generating fleet.

John also served as project director for Liberty's project for NorthWestern Energy to formulate long-range integrated infrastructure plans for its multi-state natural gas and electricity distribution utilities and to establish metrics for monitoring progress and results. He also directed Liberty's comprehensive benchmarking (for the Arizona commission) of a very broad range of performance metrics (including staffing) at the state's (and one of the country's) largest energy utilities. He also directed Liberty's customer service review (included staffing) at Kentucky's two major electric utilities for the Commission.

John received a bachelor's degree from Dickinson College and a juris doctor degree from the Dickinson School of Law (both with honors). He has spoken on a variety of utility issues before a number of panels sponsored by NARUC's committees and regional associations, state bar associations, and as an invited panelist before the U.S. FERC commissioners on utility financial matters.

John Antonuk has testified many times in support of Liberty's work. The occasions include:

1. Arizona: APS fuel audit, base costs of fuel and power supply adjustor
2. Arizona: AEPCO Rate Case fuel audit, base costs of fuel and power supply adjustor
3. Arizona: UniSource acquisition
4. Florida: Transmission line construction necessity
5. Illinois: Prudence of fuel procurement by Central Illinois Power
6. Illinois: Cost and rate impacts of failure to meet good utility practice in T&D capital and O&M projects and activities of Commonwealth Edison
7. Maryland: Code of conduct issues involving Baltimore Gas & Electric

8. Maryland: Standard Offer Service Auction Monitoring of Four Maryland Electric Utilities
9. Maryland: Support of findings and conclusions of comprehensive management audit of Verizon predecessor (C&P Telephone)
10. Massachusetts: Affiliate transactions of NStar (formerly Boston Edison)
11. New Hampshire: For Commission Staff on restructuring of state's largest electric utility (Northeast Utilities subsidiary PSNH) including comprehensive valuation of generation assets (considering availability, costs, revenues)
12. New Hampshire: For the Governor in the proposed merger of Consolidated Edison and Northeast Utilities
13. New Hampshire: for Commission Staff on the financial, managerial, and technical capabilities of acquirer of the FairPoint Communications (the operator of the former Verizon land-line operations across Northern New England)
14. Nova Scotia: Cost and rate impacts of fuel and purchased power procurement and management in four base rate cases since 2004
15. Nova Scotia: For Board Staff, addressing propriety of adoption, readiness for, and design of a fuel adjustment mechanism
16. Oklahoma: UNE price proceedings
17. Oregon: Portland General Electric acquisition
18. Pennsylvania: Cost and rate impacts associated with findings of comprehensive management audit of West Penn Power Company
19. Tennessee: Support of findings and conclusions of comprehensive management audit
20. Texas: Acquisition of Oncor by Energy Futures Holdings
21. Texas: Acquisition of Oncor by NextEra Energy
22. Virginia: Pricing of unbundled telecommunications elements and terms of wholesale interconnection agreements
23. Virginia: Sale of the Virginia electric utility operations of Potomac Edison (an Allegheny Power System operating subsidiary) to two Virginia rural electric cooperatives
24. Numerous Qwest region state commissions: Before a number of state commissions in the Qwest region to address the status and results of Liberty's audit of performance measures and its reconciliation of the differences between Qwest and CLEC measurement of performance data
25. Proposed acquisition of Verizon wireline business in Vermont, New Hampshire and Maine by FairPoint Communications before the New Hampshire PUC.

B. Richard Mazzini, P.E.

Rich Mazzini will lead Liberty's examinations of Element 3: Electric Planning and Grid Modernization, Element 4: Electric Load Forecasting and Supply Procurement, and Element 10: Work Management. Rich will also undertake work in Task Area 3 in support of Element 1: Corporate Governance, Task Areas 4 and 7 in support of Element 2: Information Systems, Task Area 2 in support of Element 6: Gas Safety, Task Area 2 in support of Element 7: Budgeting and Finance, Task Area 5 in support of Element 8: Project Management, and Task Area 3 in support of Element 9 Program Management.

Rich has managed several large projects for Liberty including management audits of CECONY, National Grid and Iberdrola. Rich served as project manager for Liberty's review of staffing levels at New York's electric and natural gas utilities. He has more than 30 years of experience in the

energy industry and has served in executive positions with global consulting firms, including ABB, Navigant Consulting, and the Washington International Energy Group. He has assisted many utilities and other energy-related firms in the U.S., Canada, Europe, and the Caribbean. Prior to entering the consulting business in 1995, he had a long career in key management positions at Pennsylvania Power & Light Company. Rich's recent work for Liberty includes management roles in the following Liberty projects (noted under John Antonuk's qualifications above)

- Peoples Gas AMRP
- WGL PROJECT*pipes*
- Pacific Gas & Electric's risk assessment and safety expenditures
- Entergy Texas's exit from Entergy's multi-state, multi-operating company approach to system planning and operation
- Review of Pacific Gas & Electric use of risk assessment to drive electricity safety expenditures
- Newfoundland electricity reliability and outages
- EKPC Focused Management Audit: Focused reviews of Governance, Planning, Finance, and Budgeting
- Two Nova Scotia Power fuel audits.

Mr. Mazzini has expertise in all elements of the utility business and has consulted extensively in the areas of project management; cost management; utility planning and operations; power procurement including energy marketing, trading and risk management; system reliability; emergency management; and strategic business planning.

Rich led Liberty's efforts to address aging gas and electric distribution infrastructure at NorthWestern Energy, and those efforts resulted in an accelerated infrastructure improvement plan that gained regulatory approval and is now being implemented. He also served as a lead consultant in Liberty's review of Pacific Gas and Electric's safety and emergency planning measures in the wake of the San Bruno incident.

Rich has a B.E.E. (Electrical Engineering) degree from Villanova University and an M.S. degree in Nuclear Engineering from Columbia University. He is a Registered Professional Engineer in Pennsylvania and is a member of the American Nuclear Society and the Institute of Electrical and Electronic Engineers.

C. Randall Vickroy

Randy Vickroy will lead Liberty's examinations of Element 7: Budgeting and Finance and Element 8: Project Management. Randy will also undertake work in Task Area 8 in support of Element 1: Corporate Governance and Task Area 4 in support of Element 2: Information Systems.

Randy has worked for Liberty across a period of more than 20 years. He has had major roles in many of the directly relevant projects that Liberty has completed in the recent past, including having led the reviews of Finance, Budgeting, and Pension and OPEB issues on Liberty's management and operations audit of Pepco/PHI for the District of Columbia Public Service Commission. Randy led Liberty's review of executive management (senior officer and Board of

Director) oversight of Peoples Gas of Chicago's Accelerated Main Replacement Program, as part of a review for the Illinois Commerce Commission. Randy is currently leading Liberty's review of Financial Performance as part of our management and operations audit of Atlantic City Electric for the New Jersey Board of Public Utilities. In this role, Randy is responsible for a 10-year review designed to identify the root causes of a long period of utility underearnings, including the development of an innovative approach designed to identify causation factors over the course of this period, and to identify reasons for their occurrence and continuation. He is also leading additional audit Task Areas including Strategic Planning, and Finance and Cash Management.

His work with Liberty over the past year includes a review of capital program planning and budgeting in our audit of Liberty Utilities for the New Hampshire Public Utilities Commission, as well as a review of the governance, financial, and operating consequences of the more than $18 billion acquisition of the largest Texas electricity delivery utility (Oncor) by NextEra Energy

Randy's work is well known to the New York Staff; he led reviews of Electric Supply Procurement and Capital and O&M Budgeting on Liberty's management and operations audit for the New York Public Service Commission of Iberdrola SA/Iberdrola USA/NYSEG and RG&E, and for the Iowa Utilities Board in a management audit of Interstate Power. He has examined finance, planning, and budgeting on nearly all of Liberty's two dozen management and operations audits, including those cited above, and on Liberty's 2010 management and operations audit of Elizabethtown Gas. Randy led Liberty's review of Planning and Budgeting at East Kentucky Power Cooperative. He was the lead in Liberty's audit of affiliate relationships and transactions of Duke Energy Indiana and Duke Energy Kentucky, in addition to two audits of affiliate relationships and transactions, financial separation, merger conditions, and cash management of Duke Energy Carolinas.

For the Delaware Public Service Commission he also examined the circumstances surrounding and the costs of a debt issuance by Delmarva Power & Light at a time when its parent was under substantial financial distress and liquidity constraints due to performance by the parent's energy trading business. Randy has performed a significant number of utility rate case assignments, beginning with his work on revenue requirements and cost of capital as a financial manager for Public Service Company of Colorado (now Xcel Energy) in the 1980s.

Randy served as a lead consultant on the Liberty team that examined cost systems and financial issues in Liberty's examination of National Grid U.S. affiliate relationships and transactions. He focused on billing, calculation of finance related costs, and common service provider transactions involving financial organizations. He also supported the analysis of expatriate costs borne by U.S. utility affiliates. Randy performed the review of financial performance in Liberty's ten-year benchmarking study of Arizona Public Service, performed for the Staff of the Arizona Corporation Commission.

Randy brings over 30 years of utility finance and budgeting experience to the project, having served as Liberty's finance expert for nearly 20 years, and his previous experience as a Corporate Finance Manager at a large Midwest Utility.

Randy holds a B.A. in Business Administration from Monmouth College and an M.B.A. in Finance from the University of Denver.

D. Christine Kozlosky

Chris Kozlosky will lead Liberty's examination of Element 12: Customer Operations. Chris will also undertake work in Task Area 7 in support of Element 2: Information Systems and Task Area 4 in support of Element 9: Program Management.

Chris, a nationally recognized utility customer service expert, has worked with Liberty on many projects over a period of 19 years. Chris led Liberty's two most recent reviews of Customer Service, both in 2018, at Atlantic City Electric and Central Maine Power; these projects are being performed for the New Jersey Board of Public Utilities and the Maine Public Utilities Commission respectively. The review of Atlantic City Electric is a comprehensive review of the customer service functions while the review of Central Maine Power is focused on meter-to-bill functions, including sampling and testing billing and metering accuracy.

Chris led Customer Service reviews of Liberty Utilities New Hampshire and Emera Maine 2016 and 2017. She reviewed call center and telephony capacities and performance, web and IVR self-service response, social media and proactive customer communications, public relations and communications, Outage Management System performance, and Estimated Restoration Times effectiveness.

Prior to these engagements, but also within the past five years, Chris led Liberty reviews of Customer Service at Pepco and storm and outage related communications at Newfoundland Power and Newfoundland Hydro, all of which were completed in or after 2014.

Chris' work is known to the New York Staff though her work leading the review of gas system management and operations programs on Liberty's management and operations audit of Iberdrola SA/Iberdrola USA/NYSEG and RG&E. Chris also examined gas operations at six utilities, as part of Liberty teams, including our management and operations audits of Interstate Power and Light, New Jersey Natural Gas, and South Jersey Gas.

Chris has been providing customer service performance benchmarking and performance improvement consulting since the early 1990s, specializing in billing operations, call centers, credit and collection, field services, payment processing, business office operations, customer satisfaction measurement, and emergency response. Chris has also led best-practice surveys addressing customer services for multi-company groups, she has published newsletters addressing utility customer-service practices, and she is a recognized national expert in this field. Chris also has extensive experience in competitive, functional, and process-based benchmarking, both inter-company and multi-company performance comparisons.

Chris has a B.S. in Information & Computer Science from Georgia Institute of Technology.

E. David Berger, P.E.

Dave Berger will lead Liberty's examination of Element 6: Gas Safety.

Dave specializes in gas-infrastructure asset management, gas system operation, pipeline and system integrity management and security corrosion control. He is now leading Liberty's field

work performance and execution tasks on Liberty's team conducting a management audit of WGL's PROJECT*pipes* gas main replacement program for the DC PSC. Dave played a key role in Liberty's examination of Peoples Gas of Chicago's Accelerated Main Replacement Program, where he led reviews of system conditions and system operations, as well as supervising Liberty' field investigation team which has, to date, examined approximately 250 main replacement construction sites. Dave led Liberty's gas operations reviews on our previous management and operations audit of CECONY for the New York Public Service Commission. Dave also served in a similar role in Liberty's management and operations audit of Iberdrola SA/Iberdrola USA/NYSEG/RG&E.

Dave also served a lead role in Liberty's project on behalf the Connecticut Public Utility Regulatory Authority examining proposals for an expansion of the gas distribution system in the State. Dave led Liberty's review of Natural Gas System Operations during Liberty's 2010 management and operations audit of Elizabethtown Gas.

Before his consulting work, Mr. Berger served as Division Manager at KeySpan Energy, a large urban-suburban local gas distribution company. At KeySpan Energy, he managed programs in pipeline integrity (transmission system), system integrity (now known as distribution integrity), gas-metering operations, pressure regulation and gate stations, and corrosion control. While working in industry, Mr. Berger was the American Gas Association (AGA) representative on the joint industry-government task group that assisted the United States Department of Transportation (USDOT) in preparing the gas-transmission integrity-management rule. He was involved in writing the ECDA and ICDA industry standards through NACE (National Association of Corrosion Engineers) and GTI (Gas Technology Institute). He was also selected to be on a USDOT advisory panel for targeting federal grants to integrity and corrosion control research and development projects. He was Chairman of the AGA Integrity Task Force and the AGA Corrosion Control Committee for several years in the early 2000s and was named Distribution Engineer of the Year 2002.

Dave assisted the California PUC in reviewing and providing expert advice on two investigations of PG&E. One investigation examined of the integrity management of the pipeline that ruptured in San Bruno; the other reviewed the records keeping practices of PG&E. Dave assisted both staff members of the CPUC and the legal team in both of these investigations.

David also had a lead role in an earlier Liberty examination for the Illinois Commerce Commission of the pipeline infrastructure of Peoples Gas, the LDC serving the Chicago metropolitan area. He is the author and instructor at Transportation and Safety Institute (TSI) on training modules for a number of areas involving pipeline integrity. In addition to his teaching assignment for the USDOT Pipeline and Hazardous Material Safety Administration (PHMSA), he assists in audits of interstate pipeline for integrity management (IM) under the recently passed transmission IM regulations.

David received a B.S. Ch.E. in Chemical Engineering from New York University, and has completed 32+ credits of course work toward an M.S. in Environmental Engineering from the University of Delaware, and is a Registered Professional Engineer in New York.

F. John Adger

John Adger will lead Liberty's examination of Element 5: Gas Planning.

In his 24 years as a Liberty employee, John has performed many evaluations of energy procurement, optimization of utility natural gas portfolios (through off-system sales of commodity, transportation, storage, and financial assets), hedging, organization structure, and staffing, among other issues. He is currently serving as a member of a Liberty team assisting the Staff of the New Hampshire Public Service Commission in its consideration of facilities additions proposed by Liberty Utilities' gas distributor in that State, EnergyNorth Gas, Inc. John is one of Liberty's most senior consultants; he has 50 years of experience in the energy industries.

He has also been a member of Liberty teams evaluating gas-company construction programs. He led a team that assisted the Connecticut Public Utilities Regulatory Authority in its consideration of a massive Natural Gas Infrastructure Expansion Plan, proposed by that State's gas distributors as part of that State's 2013 Comprehensive Energy Strategy. He was also a member of the team that supported the Staff of the District of Columbia Public Service Commission in its evaluation and monitoring of Washington Gas Light Company's Vintage Couplings Remediation and Replacement Program, which has just concluded. He is now serving as a member of Liberty's team conducting an audit of WGL's PROJECT*pipes* accelerated gas main replacement program for the DC PSC. He was also a member of Liberty's team that evaluated Peoples Gas Light and Coke Company's Accelerated Main Replacement Program in 2014 and 2015 for the Illinois Commerce Commission.

John has reviewed the fuel-purchasing function at six electric utility companies and four combination electric and gas utility companies, as well as the gas-supply function at 19 gas utility companies. As a result, he is quite familiar with fuel-purchasing policies, processes and procedures, and with determinations of prudence.

John was also a principal contributor in Liberty's 14-year program of assistance to the Nova Scotia Utility and Review Board in its authorizing and then modifying a Fuel Adjustment Mechanism for Nova Scotia Power, Inc. Most recently, John led Liberty's assistance to the Board in considering changes proposed by Nova Scotia Power to the Plan of Administration for its FAM, and to the list of costs qualifying for recovery through the FAM.

John leads Liberty's work on natural gas and liquid-fuels matters, and he has particular expertise in gas procurement and portfolio management, and in affiliate gas-supply relationships. His experience includes examining these issues in Liberty's audits of Mississippi Power Company and Entergy Mississippi for the Mississippi Public Service Commission, and New Jersey Natural Gas Company, South Jersey Gas Company and Elizabethtown Gas Company for the New Jersey Board of Public Utilities. John performed similar roles in two audits for the Staff of the Arizona Corporation Commission of fuel, purchased-power, and plant operations policies, activities and costs of Arizona Electric Power Cooperative, Inc. He led Liberty's review for the Arizona Corporation Commission of Arizona Public Service Company's fuel-oil and natural-gas purchasing activities, including its hedging program.

Prior to his work for Liberty, John served as Director of the U.S. Federal Energy Regulatory Commission's Alaska Gas Project Office, where his duties included evaluating financing and tariff aspects of gas transportation system proposals. He was also responsible for policy development, managing FERC proceedings, representing the FERC to government and industry, and was liaison with counterpart officials in the Government of Canada. John previously served as Director of the U.S. Federal Energy Administration's Office of Energy Project Operations. This work included evaluating legislative and regulatory impediments to energy project development, recommending changes, and preparing testimony for presentation to the U. S. Congress.

John received B.S. degrees in Earth Sciences and in Chemical Physics (double major), and a M.S. in Geology and Geophysics, from The Massachusetts Institute of Technology.

John's testifying experience includes:

1. Nova Scotia Utilities and Review Board: Appearances as a member of Liberty panels presenting evidence regarding four audits of Nova Scotia Power's fuel-purchasing management and operations, seven general rate cases, one audit of its relationships with its unregulated energy affiliates, and other matters.
2. Mississippi Public Service Commission: Appearance as a member of a Liberty panel presenting testimony regarding an audit of Entergy Mississippi's fuel and power-purchasing activities and management.
3. New Hampshire Public Utilities Commission: Testimony for Staff in a proceeding to consider authorization of additional gas-supply facilities for KeySpan Energy Delivery New England, d/b/a EnergyNorth Natural Gas, Inc.
4. New Hampshire Public Utilities Commission: Testimony for Staff in a purchased-gas adjustment case for KeySpan Energy Delivery New England, d/b/a EnergyNorth Natural Gas, Inc.
5. New Hampshire Public Utilities Commission: Testimony for Staff in an investigation proceeding involving gas-supply management decisions by KeySpan Energy Delivery New England, d/b/a EnergyNorth Natural Gas, Inc.
6. Texas Railroad Commission: Testimony for intervenor Aligned Cities in a rate case for TXU Lone Star Pipeline Company.
7. Kansas Corporation Commission: Testimony on behalf of intervenor Kansas Pipeline Partnership in a purchased-gas adjustment case for Western Resources, Inc.
8. Missouri Public Service Commission: Testimony on behalf of intervenor Mid-Kansas Partnership/Riverside Pipeline Company in a purchased-gas adjustment case for Missouri Gas Energy.
9. Wyoming Public Service Commission: Testimony for Staff in a proceeding to consider proposals by K N Energy, Inc. to offer a small-volume customer gas transportation program.

G. Michael James

Mike James will lead Liberty's examinations of Element 2: Information Systems.

Mike is an Information Systems specialist with over 35 years of business and consulting experience, including significant experience directing the transformation of large and complex information systems organizations. Prior to forming his own firm (James Consulting Group,

L.L.C.), Mike was a Partner with Scott, Madden & Associates, a general management consulting firm. He was also a Partner with KPMG Peat Marwick LLP (now Bearing Point) in their Enabling Technologies consulting practice where he led the development of their methodologies addressing Strategic IT Planning and IT Transformation. Mike has been instrumental in helping companies address the transformation of their information technology organizations to that of a value added service provider and partner in solving business problems through the pragmatic use of technology and improved business processes. In the course of his career, he has performed and managed a wide variety of assignments in many different industries, including electric, gas and water utilities, telecommunications, energy, manufacturing, professional services, retail, transportation, distribution and high tech manufacturing and insurance. His primary focus has been in the areas of:

- Strategic IT and Business Planning
- IT Transformation
- Quality Assurance/Project Management
- Application Systems Delivery
- Process Improvement.

Mike was an officer with the Long Distance division of Sprint with responsibility for over 1,00 staff and contract personnel located in four states. At Sprint he had responsibilities for the development and maintenance of various billing, customer service, provisioning and marketing systems; He also performed the role of Divisional CIO for the Residential and Small Business Divisions of Sprint. Previously, Mike was an executive with Carolina Power & Light (now Progress Energy) with responsibility for their systems development and maintenance organization. In that capacity he led the turnaround of the applications systems area; his organizations were recognized via an independent, external assessment as having achieved World Class status in terms of quality of systems delivered, productivity, and management processes. He also worked with Shell Oil as an internal consultant responsible for strategic planning, with Price Waterhouse in their consulting group, and with IBM. Before joining the business community, he was a Naval Aviator flying jets.

Mike has directed and served as project leadership for a wide range of Information Systems assignments over his career. Listed below are samples of the assignments that provide a representative listing of his experience in Strategic IT and business planning, IT Transformation, Quality Assurance and Project Management, and Application Systems Delivery:

BC Hydro	*Hawaiian Electric Co.*	*Salt River Project*
BC Gas	*Jamaica Public Service*	*San Diego Gas & Electric*
Carolina P&L (now Duke)	*Lone Star Gas*	*Southern Company*
Cinergy	*Northwest Natural Gas*	*Southwest Gas Company*
Duke Energy	*ONEOK*	*Texas – New Mexico Power*
Energis	*Philadelphia Gas Works*	*Texas Utilities*
Garland Power & Light	*Public Service Elec. & Gas*	*Washington Gas*

A graduate of the U.S. Naval Academy, he also holds a Master of Science degree in Systems Management from the University of Southern California. He is a frequent speaker at industry conferences on IT organization, transformation, and management issues.

H. Dr. James Letzelter

Dr. James Letzelter will have clearly-defined project management and Customer Benefit Analysis roles, and serve as an Albany-area-based liaison with Staff. Jim will lead Liberty's examination in Element 9: Program Management. Jim will also provide Analytical Support in Element 3: Electric Planning and Grid Modernization, and will undertake work in support of Task Area 2 in Element 5: Gas Planning.

Jim has over 28 years of experience in the energy and utilities industry, having served as a management consultant, project manager and executive. He began his career with Resource Management International as an analyst, and worked as a senior consultant of Metzler & Associates. Jim was a Principal of Hagler Bailly Consulting, Managing Director of Platts Research & Consulting, and President of GenMetrix. Jim brings a valuable mix of technical expertise and strategic thinking. His expertise includes power generation market analysis, power plant valuation, ISO/RTO market strategy, production cost modeling and financial analysis. Jim has significant experience in examining power market modeling processes at multiple U.S. utility operations, at some of the country's largest utility operators such as Entergy, Arizona Public Service, and PSE&G.

Jim has lead multiple reviews of electric power supply and procurement for Liberty. This includes his current work leading Liberty's reviews of Procurement and Purchasing and Market Conditions as part of our management and operations audit of Atlantic City Electric for the New Jersey Board of Public Utilities. He lead similar reviews in our management and operations audit of Pepco for the District of Columbia Public Service Commission, and in audits of both Entergy Mississippi and Mississippi Power for the Mississippi Public Service Commission. Jim is currently serving as our lead consultant in in an audit of the New Jersey EDCs BGS auction process. He has served for five years as a lead consultant in our auction oversight of the Delaware SOS procurement process for the Delaware PSC, and for two years in a similar role as part of our work for the Maryland PSC in monitoring the SOS auctions there.

Jim has served in key roles in Liberty's work in Nova Scotia, including his work in leading Liberty's review of Load Forecasting and Dispatch in two FAM audits. This work included the Company's pilot cooperative dispatch project with New Brunswick Power. He reviewed similar issues in a 2016 Fuel Stability Plan and Base Cost of Fuel examination on Nova Scotia Power.

Jim plays a key role on assignments involving production cost modeling, transmission issues and general power analytics. Jim led Liberty's prudence review of Arizona Public Service's acquisition of Four Corners Units 4 and 5 for the Arizona Corporation Commission, and offered testimony in support of that work. Jim also led Liberty's review of dispatch and power purchases and sales at Mississippi Power. He served key roles in Liberty's work for the NHPUC evaluating the competitiveness of PSNH's fossil and hydro fleet, and Liberty's review for the Public Utility Commission of Texas concerning Entergy Texas' exit from the Entergy System Agreement. Jim provided comprehensive audit services of Entergy's production cost models and processes in

Liberty's fuel and purchased power audit. In this engagement, Jim assessed all of the models and processes associated with the Entergy's Monthly Energy Plan, the Weekly Procurement Process, and the Next- and Current-Day processes.

In auditing Entergy, Jim interviewed Entergy's management and staff, developed discovery questions, reviewed responses, model reports and documentation. His work uncovered a number of key areas and processes in need of improvement. His work focused on the need for implementation of analytical best practices for processes and models that are used for key operational and strategic decisions.

Jim played a key role in Liberty's Staffing Study for the New York DPS Staffing Study. He developed a Staffing Database to provide detailed analyses in support of all aspects of the staffing study.

Jim received a B.S. degree in Electrical Engineering from Clarkson University, an M.B.A. from the University at Albany, and a Doctorate in Law and Policy from Northeastern University.

I. Michael Antonuk

Michael Antonuk will serve as Project Coordinator and Senior Analyst to Liberty's team. Michael served in a similar role on Liberty's audits for the New York PSC of CECONY, NYSEG and RG&E, and of all New York electric and gas utilities as part of the recent staffing study. Michael's additional management and operations audit experience includes Liberty's audits of Atlantic City Electric, Pepco, AGLR, NJR, SJI, and NUI, and its EDECA audits of four New Jersey electric utilities. On these audits. Michael has been responsible for day-to-day project scheduling and management, and coordination of audit communications between Liberty's team, Staff project management, and company audit coordinators. He has also assisted Liberty's consultants in examinations of audit scope areas, most notably in natural gas supply and planning, finance and budgeting, compensation and benefits, customer service, and affiliate relationships.

Michael has participated in over 200 Liberty engagements in the gas, electric, water, and telecommunications sectors.

Michael holds a B.S. in finance from Lehigh University.

J. No Use of Subcontractors

We rarely use firm-to-firm subcontracting and we propose none for this engagement. All of our team members are employees or work under personal service contracts between them as individuals and Liberty.

VIII. Writing Samples

As noted in Section II, Liberty provides here a link to a work plan sample from our management and operations audit of NYSEG and RG&E for the New York Public Service Commission. Section II of this proposal reflects the perspectives, questions, and needs that Liberty will apply to work plan development. The link below demonstrations the type of very detailed work plans we use for all engagements like this one, and we propose to do so here. These plans provide a template for those that we propose here, which we will draft as informed by initial inquiries addressing the issues, questions, and factors described in Section II of this proposal. They can be viewed at:

http://libertyconsultinggroup.com/NYWorkPlanWritingSample

IX. Lack of Conflicts of Interest

A. Summary

Section 1.6 of the RFP requests the following disclosures or certifications from prospective bidders:

- Disclosure of all work by bidders or any contractors performed for the utilities subject to this audit.
- Disclosure of any work performed for other organizations associated with the utility industry in New York during the five years preceding the submission of this proposal.
- That neither the consulting firm, its personnel, nor any subcontractor shall offer or accept any gift, favor, or gratuity of any value, or make any offer of employment to any officer or employee of the Utilities or to any Commissioner or Department Staff.
- The consulting firm and any subcontractors must agree that neither it nor any of its affiliates or principals or employees will perform any work for the Utilities or their affiliates during the course of the audit.
- Compliance with Section 73(8)(a)(i) of the Public Officers Law prohibiting former employees of the Department of Public Service from appearing or practicing before the Department.

B. Liberty Statement on Lack of Conflicts

Neither Liberty nor any of its proposed team members has any real or potential conflict of interest. Neither Liberty, its personnel, nor any subcontractor shall offer any gift, favor, or gratuity of any value, or make any offer of employment to any officer or employee of the utilities or to any Commissioner or Department Staff. Liberty and all members of its proposed audit team agree that that neither it nor any of its affiliates or principals or employees will perform any work for the utilities or their affiliates during the course of the audits. No member of Liberty's proposed audit team is or was at any time an employee of the Department of Public Service.

C. Liberty and Team Member Previous Work Disclosure

Liberty performed in 2010-2011 an examination of affiliate relationships and transactions for National Grid, addressing operations in New York and New England. The company intended that Liberty conduct this audit under conditions, methods, and with the independence similar to what would apply to an audit of this type when conducted for utility regulators. We established these criteria as necessary for our performance of the work before agreeing to perform it. We performed the review with a high degree of transparency to staffs of all commissions involved, and established and executed scope, information requirement, access to management, investigation, evaluation, and reporting as we would have in a commission-sponsored audit of corresponding scope. Following completion of our report on this engagement (made available to the commissions), National Grid found itself facing a need to expedite responses to data requests in regulatory examinations covering areas in common with our prior work. For a brief period, Liberty provided a number of persons (knowledgeable about underlying issues and National Grid process and systems for providing information from our prior work) to staff teams established to review

response drafts for completeness and accuracy. We have not solicited or performed any work for any National Grid entity subsequent to that described above.

Liberty two management and operations audits of New York Power Authority (NYPA), on behalf of the Office of the State Comptroller. The most recent of these was completed in 2002.

In 2009, Liberty was selected by the Long Island Power Authority (LIPA) to conduct an independent evaluation of LIPA's recovery of costs through its Fuel and Purchased Power Cost Adjustment clause.

David Berger retired in July 2004 as the Division Manager, Asset Management, for KeySpan Energy (now part of National Grid). Dave draws a pension from his time at the Company.

Dave has worked for the City of New York on rate cases involving New York State utilities as follows:

- 2013 CECONY rate case on gas and steam system storm hardening.
- 2016 CECONY, KEDNY, and KEDLI rate cases on gas system infrastructure improvements and storm hardening.

X. References

The Liberty Consulting Group presents the following five references for recent and relevant work. Additional references for any of the other projects cited in this proposal can be provided upon request.

Reference 1	
Client	Public Utility Commission of Texas
Year	2013-2017
Project Description	1. Departure of the Texas Entergy operating utility (ETI) from the System Agreement, including the operating and economic consequences of ETI's exit from the System Agreement; governance, staffing, financial, and operating consequences of the acquisition of Texas's largest electric utility by an out-of-state holding company. 2. Two separate acquisition proceedings involving Oncor.
Contact Person	Margaret Pemberton
Email	margaret.pemberton@puc.texas.gov
Phone	512-936-7292

Reference 2	
Client	Illinois Commerce Commission
Year	2014-2017
Project Description	Investigation of Peoples Gas planning and implementation of its AMRP program.
Contact Person	Brett Seagle
Email	bseagle@icc.illinois.gov
Phone	217-785-5436

Reference 3	
Client	New Hampshire Public Utilities Commission
Year	2016
Project Description	1. Focused management audit of Liberty Utilities New Hampshire; follow up support in rate cases. 2. Evaluation of Integrated Resource Plan to determine the reasonableness of planning processes and analyses, addressing factors including load growth, system planning, and supply planning, and their use to justify significant capital expenditures for a new pipeline and a

	large LNG facility designed to increase the availability of capacity and supply.
Contact Person	Amanda Noonan
Email	amanda.noonan@puc.nh.gov
Phone	603-271-1164

Reference 4	
Client	Maine Public Utilities Commission
Year	2016
Project Description	Management audit focused on Emera Maine's Customer Service Function, Electric Transmission and Distribution Operation and Reliability, and Customer Information Systems Procurement and Implementation
Contact Person	Chuck Cohen
Email	chuck.cohen@maine.gov
Phone	207-287-1394

Reference 5	
Client	Newfoundland and Labrador Board of Commissioners of Public Utilities
Year	2014-Present
Project Description	Reviews of electricity reliability and outages, generation, and transmission issues associated with Newfoundland Power and Newfoundland Hydro. Follow up work on the prudence of costs associated with the Company's response to the supply situations that necessitated our original review; and a separate examination of a major, undersea ac/dc line linking Newfoundland to a major hydro generating station in Labrador.
Contact Person	Sam Banfield
Email	sbanfield@pub.nl.ca
Phone	709-726-1154

XI. Insurance Attestation

Liberty attests that it understands the mandatory insurance requirements state in the RFP, and will provide evidence of appropriate worker compensation and disability benefits insurance coverage to the Department if selected to perform this work.

XII. Minority- and Women-Owned Business Enterprises

The Liberty Consulting Group is neither a minority- or woman-owned business enterprise. One of Liberty's team members, Christine Kozlosky, is a certified Women-Owned Business in New York State (The Ascent Group).

Appendix A: Resumes

John Antonuk

Areas of Specialization

Executive management; management audits and assessments; service quality and reliability management and measurement, utility planning and operations; litigation strategy; management of legal departments; human resources; risk management; regulatory relations; affiliate transactions and relations; subsidiary operations; and testimony development and witness preparation.

Relevant Experience

Electricity

Engagement Director for Liberty's management and operations audit of Atlantic City Electric for the New Jersey Board of Public Utilities. Task Lead for Liberty's review of Executive Management and Corporate Governance, Human Resources (including Compensation and Benefits) and Compliance with Merger Conditions.

Project Manager for Liberty's forensic audit for the Maine Public Utility Commission seeking to identify the root causes of a customer billing complaints following conversion of its customer information system to a new platform.

Project Manager for Liberty's focused management audit of the Customer Service function of Liberty Utilities New Hampshire. This review included an extensive focus of all elements of this function, in addition to examinations of Information Technology and Corporate Support Services, Vendor Relationships, Accounting, Business Planning, and Capital and O&M Budgeting. Subsequent to the completion of this audit, Liberty performed follow-up assessments of Customer Service performance and Planning and Budgeting to assess the effectiveness of corrective actions implemented by the Company in response to Liberty's audit recommendations.

Engagement Director for Liberty's operational audit of utility staffing levels of each New York electric and gas utility for the New York Public Service Commission.

Project Manager and witness on audits of fuel (primarily coal and natural gas) procurement and management practices of Nova Scotia Power, a review of the merits and mechanics of a company-proposed automatic recovery method for energy costs, and an audit of affiliate relationships (including coal, electric power, and natural gas procurement activities) performed for the Nova Scotia Utility and Review Board. Liberty has assisted the Nova Scotia Utility and Review Board in other reviews of Nova Scotia Power regarding storm outage and response, in rate cases, and in various other proceedings.

Engagement Director for Liberty's review the prudence of management decisions and actions of Newfoundland and Labrador Hydro concerning Island outages experienced during the winters of 2013 and 2014. This project sought to determine the costs related to these decisions and actions.

Project Manager for Liberty's prudence review of Arizona Public Services' acquisition of Four Corners units 4 and 5 on behalf of the Arizona Commission. That review included an examination of short-and long-term planning issues including environmental risk, fuel economics, transmission system capability, and demand and usage growth. Liberty's review also evaluated the various rate and revenue requirement impacts resulting from the acquisition.

Engagement Director for two Liberty audits for the Mississippi Public Service Commission of Mississippi Power Company's management and operation of fuel and purchased-power procurement. Responsible for reviews of fuel-oil and natural-gas contracting and management, including price-risk management, and the functioning of the Company's Fuel Cost Recovery and Energy Cost Mechanisms.

Engagement Director for Liberty's integrated work with New Hampshire Commission Staff on an analysis of the competitiveness of the Public Service New Hampshire's generating fleet. This work provided a valuation of the power plants, addressing current and expected energy market conditions, the effects of increased cycling of units designed for baseload operations, potential costs associated with compliance with current and potentially increased environmental restrictions, impacts on the competitive market place, and other factors important for the Commission to consider in determining what future role might exist for utility-owned supply resources.

Engagement Director for Liberty's review of electric system infrastructure, supply, and generation at Newfoundland Power and Newfoundland Hydro for the Board of Commissioners of Public Utilities.

Project Director and lead consultant for Executive Management and Governance and Human Resources on Liberty's management and operations audit of Pepco for the District of Columbia Public Service Commission.

Engagement Director for Liberty's review of Entergy Texas's exit from Entergy's multi-state, multi-operating company approach to system planning and operation; and systems planning changes needed to support stand-alone operation by Entergy Texas for the PUCT.

Engagement Director for Liberty's review of Pacific Gas & Electric use of risk assessment to drive electricity safety expenditures; included a review of the basis for identifying required programs, initiatives, and resources for the California Public Utilities Commission.

Project Director and lead consultant for Corporate Planning on Liberty's management and operations audit of Iberdrola SA/Iberdrola USA/NYSEG and RG&E for the New York Public Service Commission.

Project Director and lead consultant for Governance and Senior Management on Liberty's management and operations audit of Interstate Power and Light for the Iowa Utilities Board.

Project Director and lead consultant on Liberty's management and operations audit of the electricity, natural gas, and steam operations of ConEd for the New York Public Service Commission.

Project Director on Liberty's benchmarking analysis of Arizona Public Service for the Arizona Corporation Commission. This study covered a ten-year audit period and benchmarked Arizona Public Service's performance with the following metrics: Operational Performance, Cost Performance, Financial Performance, Affiliate Expenses, and Hedging & Risk Management.

Project Manager for Liberty's comprehensive, detailed affiliate relationships and transactions audit of Duke Energy Carolinas for the North Carolina Utilities Commission staff.

Project Manager for the performance of Liberty's audit for the Delaware Public Service Commission of a diagnostic audit of the affiliate costs borne by Delmarva Power, a member of the multi-state holding company, PHI. This review included an examination of the central services organization structure and operations, the procedures and methods used to allocate and assign costs, and test work to verify that execution of methods and procedures conforms to company procedures and to good utility practice.

Project Manager for Liberty's work for NorthWestern Energy to formulate long-range integrated infrastructure plans for its multi-state electric and natural gas distribution utilities. This project includes consideration of how to incorporate "Smart Grid" technology into infrastructure plans in a manner that will enable the Company to roll out new capabilities and services as technology makes them available, without undue acceleration of capital spending as uncertainties in this new marketplace become resolved.

Project Manager for Liberty's audit of Arizona Electric Power Cooperative for the Arizona State Corporation Commission which included reviews of fuel procurement and management, bulk electricity purchases and sales, power plant management, operations and maintenance, energy clause design and operation, and other issues affecting the prudence, reasonableness, and accuracy of costs that pass through the fuel and energy clause.

Project Manager for Liberty's audit of Southwest Transmission Cooperative for the Arizona Commission, a companion examination of the transmission cooperative that is owned and operated in parallel with Arizona Electric Power Cooperative (a generation cooperative). Among the issues examined in this audit were line losses.

Project Manager for Liberty's audit of East Kentucky Power Cooperative, which included examinations of Governance, Planning, Finance, and Budgeting. Liberty performed for the Kentucky Public Service Commission an examination of governance at a generation and transmission cooperative serving 16 distribution cooperatives across the state. This study came in the wake of significant financial difficulties and also addressed planning, budgeting, financial, and risk functions and activities.

Project Manager for Liberty's audit for the Virginia State Corporation Staff of Potomac Edison Distribution System Transfer. Liberty examined the public interest questions associated with the transfer by an Allegheny Energy's utility operating subsidiary (Potomac Electric) of all of its electricity distribution operations business and facilities in Virginia to two rural electric cooperatives.

Project Manager for Liberty's audit of the fuel and purchased-power procurement practices and costs of Arizona Public Service Company for the Arizona Corporation Commission. Liberty completed audits relating to fuel procurement and management and on rate and regulatory accounting for related costs at Arizona Public Service Company for the Arizona Corporation Commission.

Project Manager for Liberty's audit of Duke Energy Carolinas for the North Carolina Utilities Commission. Scope included compliance with regulatory conditions and code of conduct imposed by the Commission after the merger with Cinergy, and affiliate transactions and cost allocation methods.

Project Manager for Liberty's audit of affiliate transactions of Nova Scotia Power on behalf of the Nova Scotia Utility and Review Board.

Project Manager for Liberty's audit for the New Jersey Board of Public Utilities of the competitive service offerings of the state's four major electric companies. Scope included corporate structure, governance, and separation, service company operations and charges, inter-affiliate cost allocations, arm's-length dealing with respect to a variety of code-of-conduct requirements, and protection of customer and competitor proprietary information.

Project Manager and witness for the staff of the Arizona Corporation Commission addressing the merits of the proposed acquisition of UniSource by a group of private investors.

Project Manager and witness before the Oregon Public Utility Commission addressing the merits of the proposed acquisition of Portland General Electric by a group of private investors.

Engagement Director for Liberty's provision of engineering and technical assistance to the Vermont Public Service Board in connection with review of public necessity and convenience related to the Northwest Reliability Project, which would add a major new 345kV transmission plan to provide an additional source of electricity to serve Vermont's major load growth in its northwest region. The project involved transmission reinforcements at lower voltages and significant substation upgrade work. The proceedings had numerous public, private, and government interveners, who raised issues regarding project need, available electrical alternatives, routing and design, and electromagnetic radiation.

Project Manager for Liberty's support for the New Hampshire Public Utilities Commission in its charge to oversee the divestiture of the Seabrook nuclear plant as part of a major restructuring settlement. The sale produced record high compensation for nuclear facilities in the country.

Project Manager and witness for Liberty's assessment of fuel procurement, affiliate transactions, and automatic adjustment clause implementation for the staff of the Nova Scotia Utility and Review Board in rate case of Nova Scotia Power.

Project Manager for Liberty's engagement on behalf of Boston Edison to examine the company's affiliate relations, including issues of the valuation of assets transferred to an affiliate. Testified in proceedings before the Massachusetts Department of Telecommunications and Energy (formerly the Department of Public Utilities) on several telecommunications issues, including: (a) development of competition, and legislative and regulatory-policy changes supporting it, (b) electric-utility entry into telecommunications markets, (c) costs, prices, and market value of network elements, (d) requirements of the Telecommunications Act of 1996, (e) assessment of compliance with commission orders, company procedures, and service agreements regarding limits on affiliate interactions, (f) inter-company loans, guarantees, and credit support among utilities and their affiliates, (g) accounting for affiliate transactions, (h) obligations to allow nondiscriminatory access to network infrastructure to third parties, and (i) cost pools, overhead factors, and allocation of common costs among utility and non-utility affiliate activities and entities.

Project Manager for Liberty's major consulting engagement for the New Hampshire Public Utilities Commission. Liberty examined management, operations, and costs at Public Service Company of New Hampshire/Northeast Utilities, which is engaged in the operational and cost-accounting separation of its network into segments, for the purposes of restructuring service offerings to allow competition in certain aspects of electric-energy supply. This engagement included an assessment of valuations of nuclear and fossil units, as well as supply contracts with independent-power producers. Liberty also assisted in efforts to settle rate case and restructuring disputes involving, among other issues, stranded costs associated with power plants. The scope of Liberty's work included the development of plans and protocols for power plant (fossil, hydro, and nuclear) and power supply contract assets, as well as the oversight of activities associated with asset auctions.

Engagement Director for Liberty's evaluation of corporate relations and affiliate arrangements of Dominion Resources, Inc. and Virginia Power for the Virginia State Corporation Commission. This project addressed all significant aspects of corporate governance, operating relationships, and affiliate arrangements between the two entities.

Project Director for all aspects of Liberty's comprehensive management and operations audit of West Penn Power Company for the Pennsylvania Public Utilities Commission. Managed focused reviews of the Company's affiliated costs, power dispatch and bulk power transactions, customer services, finance, and corporate services. Presented testimony before the PAPUC on behalf of the Office of Trial Staff regarding the results of the audit in West Penn's rate case.

Lead Consultant for affiliate relations for Liberty's assignment of providing assistance to Delmarva Power & Light Company in developing and implementing self-assessment and continuous-improvement processes.

Served as advisor to the administrative law judge of the Delaware PSC responsible for hearing cases regarding the implementation of the new law that restructures the electric-utility industry in Delaware.

Engagement Director for nuclear plant performance-improvement projects that Liberty conducted for Duquesne Light Company, Centerior Energy, Nebraska Public Power District, and Pennsylvania Power & Light Company (PP&L).

Engagement Director for a Liberty assignment for Florida Power Corporation, regarding a proposal by the Tampa Electric Company to construct transmission lines to serve the cities of Wauchula and Fort Meade, Florida. Liberty's testimony helped convince the Florida Public Service Commission that Tampa Electric Company's proposed line was uneconomic.

Directed Liberty's engagement to assist a regional electric generation and transmission cooperative, whose members' combined operations make it a major competitor in the state's electricity business, to conduct its first-ever comprehensive and formal strategic-planning process.

Natural Gas

Project Manager for Liberty's management and operations audit of Washington Gas Light's PROJECT*pipes* for the District of Columbia Public Service Commission.

Project Manager for Liberty's evaluation on behalf of the New Hampshire Public Utilities Commission of the Liberty Utilities' Integrated Resource Plan to determine the reasonableness of planning processes and analyses, addressing factors including load growth, system planning, and supply planning, and their use to justify significant capital expenditures for a new pipeline and a very large LNG facility designed to increase the availability of capacity and supply.

Project Manager for Liberty's investigation of Peoples Gas of Chicago's Accelerated Main Replacement Program for the Illinois Commerce Commission.

Project Manager for Liberty's review of Connecticut's program to produce a major expansion of natural gas availability and use by all three of its natural gas utilities for the PURA.

Project Manager for Liberty's examination of safety programs and activities of NiSource's Maine subsidiary Northern Utilities for the Maine Public Service Commission.

Project Manager for Liberty's focused and general management audits of NJR, New Jersey Natural Gas, and affiliates for the New Jersey Board of Public Utilities. This project included detailed examinations of affiliate relationships, governance, financing and utility ring-fencing, compliance with New Jersey EDECA requirements for affiliate separation, protection of confidential information, non-discrimination against third-party competitors with utility affiliates, and other code-of-conduct issues. Personally performed the reviews of governance, EDECA requirements compliance, and legal services.

Project Manager on a major focused audit of Peoples Gas/Integrys that Liberty performed for the Illinois Commerce Commission. Audit topics included natural gas forecasting, portfolio design

and implementation, gas purchase and sale transactions, controls, organization and staffing, asset management, off-system sales, storage optimization, and all other issues related to gas supply over a period of eight years.

Project Manager for Liberty's focused and general management audits of SJI, South Jersey Gas, and affiliates for the New Jersey Board of Public Utilities. This project included detailed examinations of affiliate relationships, governance, financing and utility ring-fencing, compliance with New Jersey EDECA requirements for affiliate separation, protection of confidential information, non-discrimination against third-party competitors with utility affiliates, and other code-of-conduct issues. Personally performed the reviews of governance, EDECA requirements compliance, and legal services.

Project Manager for Liberty's work with staff of the Virginia State Corporation Commission to evaluate the services of an affiliate providing gas portfolio management services under an asset management agreement with Virginia Natural Gas, an operating utility subsidiary of Atlanta-based AGLR.

Project Manager for Liberty's focused audit of NUI Corporation and NUI Utilities. This audit included a detailed examination of the reasons for poor financial performance of non-utility operations, downgrades of utility credit beneath investment grade, and retail and wholesale gas supply and trading operations. Also examined performance of telecommunications, engineering services, customer-information-system, environmental, and international affiliates. The audit included detailed examinations of financial results, sources and uses of funds, accounting systems and controls, credit intertwining, cash commingling, and affiliate transactions, among others. Liberty's examination included very detailed, transaction-level analyses of commodities trading undertaken by a utility affiliate both for its own account and for that of utility operations.
Project Manager for Liberty's comprehensive management audit of United Cities Gas Company for the Tennessee Public Service Commission. Responsible for the focused reviews of affiliate interests, executive management and corporate planning, and vehicle management.

Lead Consultant in Liberty's management audit of Connecticut Natural Gas Company for the Connecticut Department of Public Utility Control (DPUC). Responsible for reviews of organization and executive management and legal management.

Lead Consultant in Liberty's management audit of Southern Connecticut Gas Company for the DPUC. Responsible for organization and executive management, affiliates, and legal management. Included valuation of a major, rate-based LNG facility being offered for sale.

Other Companies

Set up and managed service and facilities section of the PP&L Regulatory Affairs Department. Counseled utility management on regulatory and legislative matters. Litigated rate related and facility construction proceedings before agencies and the courts.

Attorney for the PA PUC. Assigned as counsel to the Commission's Audit Bureau in developing a comprehensive management-audit system. Negotiated contracts for the first commission-ordered

management audits in Pennsylvania. Revised Commission organization and practice to conform to regulatory-reform legislation.

Testimony

Please see Team Member Biographies section of Liberty's proposal for a detailed list.

Education

J.D., with academic honors, Dickinson School of Law
B.A., cum laude, Dickinson College

Richard Mazzini

Areas of Specialization

Management and regulatory audits; utility operations, including nuclear and other power production; power marketing and risk management; strategic planning; organization analysis and competitive re-structuring; project management; cost management; and tariff design and management.

Relevant Experience

The Liberty Consulting Group

District of Columbia Public Service Commission – Lead Consultant for Liberty's management and operations audit of Washington Gas Light's PROJECT*pipes* for the District of Columbia Public Service Commission.

Public Service Commission of New York – Project Manager and Lead Consultant on an operations audit of the staffing levels of each electric and gas utility.

Illinois Commerce Commission – Technical Director for Program and Project Management, Schedule, and Cost, for Liberty's investigation of Peoples Gas of Chicago's Accelerated Main Replacement Program for the Illinois Commerce Commission.

Board of Commissioners of Public Utilities – Lead Consultant in Liberty's review of the prudence of management decisions and actions of Newfoundland and Labrador Hydro concerning Island outages experienced during the preceding two winters of 2013 and 2014. This project sought to determine the costs related to these decisions and actions.

Nova Scotia Utility and Review Board - Lead Consultant and witness on audits of procurement and management practices of Nova Scotia Power (leading reviews of power plant operations. Liberty has assisted the Nova Scotia Utility and Review Board in other reviews of Nova Scotia Power regarding storm outage and response, base cost of fuel cases, rate cases, and in various other proceedings.

Board of Commissioners of Public Utilities – Lead Consultant in Liberty's review of electric system infrastructure, supply, and generation at Newfoundland Power and Newfoundland Hydro.

Public Service Commission of New York – A management audit of Iberdrola SA/Iberdrola USA/NYSEG and RG&E. Assistant Project Manager for a 14-member Liberty consultant team.

Connecticut PURA – Lead Consultant for Liberty's work as Extension of Staff to the PURA in a rate case involving United Illuminating. Our assistance to the PURA involved drafting and issuing data requests to the company and its witnesses, reviewing responses, drafting cross-examination

questions for company witnesses, and supporting cross-examination of those witnesses at hearings. Rich headed the reviews of storm response expenses, budgeted capital expenditures, expenses associated with the company's new central facility, and econometric peak load and sales forecasting.

Public Service Commission of New York – A management audit of Con Edison. Assistant Project Manager for a 13-member Liberty consultant team.

Iowa Utilities Board – Lead Consultant for the reviews of Electric Operations and Emergency Planning for Liberty's management and operations audit of Interstate Power and Light.

Arizona Corporation Commission - Consultant on Liberty's benchmarking analysis of Arizona Public Service. This study covered a ten-year audit period and benchmarked Arizona Public Service's performance with the following metrics: Operational Performance, Cost Performance, Financial Performance, Affiliate Expenses, and Hedging & Risk Management.

Maine Public Utilities Commission – Lead Consultant for the review and analysis of proposed new transmission project, the Maine Power Reliability Project (MPRP). Lead Consultant for economic analysis.

Public Service Commission of Maryland – Lead Consultant supervising the various auctions for procurement of power for Maryland's standard offer service (SOS) customers and support for the PSC in their analysis of new approaches to SOS supply.

Lead Consultant for Gas and Electric Infrastructure Improvement on Liberty's work for NorthWestern Energy to formulate long-range integrated infrastructure plans for its multi-state electric and natural gas distribution utilities. This project includes consideration of how to incorporate "Smart Grid" technology into infrastructure plans in a manner that will enable the Company to roll out new capabilities and services as technology makes them available, without undue acceleration of capital spending as uncertainties in this new marketplace become resolved.

Lead Consultant for Liberty's audit of Arizona Electric Power Cooperative for the Arizona State Corporation Commission which included reviews of fuel procurement and management, bulk electricity purchases and sales, power plant management, operations and maintenance, energy clause design and operation, and other issues affecting the prudence, reasonableness, and accuracy of costs that passing through the fuel and energy clause.

Lead Consultant for Liberty's audit of East Kentucky Power Cooperative, which included examinations of Governance, Planning, Finance, and Budgeting. Liberty performed for the Kentucky Public Service Commission an examination of governance at a generation and transmission cooperative serving 16 distribution cooperatives across the state. This study came in the wake of significant financial difficulties and also addressed planning, budgeting, financial, and risk functions and activities.

Lead Consultant for Liberty's audit for the Virginia State Corporation Staff of Potomac Edison Distribution System Transfer. Liberty examined the public interest questions associated with the transfer by an Allegheny Energy's utility operating subsidiary (Potomac Electric) of all of its electricity distribution operations business and facilities in Virginia to two rural electric cooperatives.

Management Audits

Public Service Commission of New York – An operational audit of Con Edison's reliability and emergency response planning and processes. Lead Consultant for corporate strategy and priorities, emergency planning and organization.

Federal Energy Regulatory Commission (FERC) – A review of the California ISO. Examined governance issues, operating procedures, transmission planning and analysis, organizational issues, interfaces with stakeholders and recommendations for the restructuring of the California market.

City of Seattle (Washington) – Review of the City's utility, commissioned by City Council and the Office of City Auditor, to analyze financial strategies, power market and risk management strategies and governance schemes. Lead Consultant for risk management.

St. Vincent Electricity Services, Ltd. – A management audit commissioned by the Board of Directors. Scope included generation, transmission, distribution, organizational assessment, safety, procurement and fuel.

New Jersey Bureau of Public Utilities – Evaluation of the gas supply and hedging programs of the four New Jersey gas distribution companies.

New York Power Authority – Consulting support for an internally sponsored audit of energy risk management functions.

Strategic Business Planning

Barbados Light & Power Company – Project Manager and Lead Consultant for a strategic planning initiative. Major areas of attention included new generation options, regulatory strategies, competitive threats, tariff design, new business opportunities, human resource issues, and planning processes.

Barbados Light & Power Company – Project Manager and Lead Consultant for the development of a model for the risk analysis of various new generation investments.

Electricité de France – Provided business planning and analysis services in the furtherance of the utility's wholesale and retail businesses. The work included research and analysis of potential gas partnerships, trading alliances and development of new retail markets throughout Europe.

SaskPower (Saskatchewan) – Project Manager and Lead Consultant for development of a strategic plan for the Power Production Business Unit. The project included asset valuation and

optimization, transmission plans and strategies, efficiency improvement, market analysis and organizational options.

Omaha Public Power District – Project Manager and Lead Consultant for an extensive strategic business planning initiative. This multi-phase project spanned one year and included (1) asset evaluation, estimation of potential stranded costs and stranded cost mitigation strategies; (2) business growth strategies, including retail retention and expansion, new products and services, new utility businesses, wholesale marketing and bulk power trading; (3) corporate restructuring through the formation of four new business units; (4) organization design, including the creation of two new marketing organizations and a new trading floor; and (5) regulatory and legislative strategy development.

Omaha Public Power District – Project Manager and Lead Consultant for a follow-up analysis to the above project a year later to recommend added steps and course corrections. Provided new recommendations on organization design, customer service, stranded costs, energy marketing and trading initiatives, risk management, new business development, new products and services and strategic planning processes.

A large Canadian Provincial Electric Utility – Strategic planning and business support in the analysis of future generation and transmission options associated with a major new generation construction project.

Tennessee Valley Public Power Association - Project Manager and Lead Consultant for development of a comprehensive new business strategy that reinvented the Association for a competitive environment. Key elements of the plan included a new expanded focus on government relations and the influencing of public policy, as well as the creation of four newly created business units and business endeavors.

City Council of Los Angeles (California) - Advice to the Council on the strategic plans of its municipal electric utility. Conduct of a workshop for the Council and staff on restructuring and competitive issues. Review of power marketing alliance strategies.

Riverside Public Utilities (California) - Analysis of the potential to sell all or part of the utility. Development of a new business vision and strategy. Analysis of outsourcing and alliance possibilities. Development of a power supply alliance, including design of the venture, development of RFP, evaluation of bidders, selection of finalist and negotiations. Organizational design and implementation. Planning and project management support for activities leading to open access.

Lower Colorado River Authority – Consulting support for strategic review and development of alliance strategies. Facilitation of management workshop to develop strategic responses to key issues and to examine options for strategic alliances.

ElectriCities of North Carolina – Business simulations and strategic planning for the North Carolina Power Agencies.

ElectriCities of North Carolina – Analysis of the Carolina P&L – Florida Progress merger with resulting strategies and negotiations on behalf of ElectriCities.

4–County Electric Cooperative - Strategic planning support for the Chief Executive Officer and Board of Directors. Designed and facilitated a planning workshop for the Board of Directors and key managers. Followed up with subsequent action plan for the Board.

Project and Cost Management

Omaha Public Power District (OPPD) – Lead Consultant responsible for design and implementation of a cost management program for a major overhaul of the Fort Calhoun Station. This $400 million project involved replacement of the two steam generators, pressurizer and reactor vessel head.

Power Marketing, Procurement and Risk Management

Public Service Commission of Maryland – Consultant supervising the various auctions for procurement of power for Maryland's standard offer service (SOS) customers and support for the PSC in their analysis of new approaches to SOS supply.

Electricité de France – Supporting services for the implementation of a large trading and marketing alliance in Europe, including reporting and control processes and training workshops for employees.

SaskPower - Project Manager and Lead Consultant for the expansion of the bulk power marketing program and creation of an energy trading floor. Work included extensive recommendations on corporate structure, organization, trading and marketing strategies, trading floor characteristics, management controls, risk management strategies, training, alliance building and external interfaces.

Public Service Commission of Maryland – Provided consulting support to the PSC in the approval of the settlement agreement relating to Standard Offer Service (SOS).

New Businesses

BGE Corporation (Constellation Nuclear Services) – Project Manager and Lead Consultant for the business analysis, planning, design and startup of a new subsidiary business for the client. The business, provision of nuclear related services to U.S. and international utilities, was successfully started in July 1999.

Electricité de France – Provided support in the planning, analysis, structure and negotiation of a large international energy trading and marketing alliance (EDF Trading, based in London).

Tennessee Valley Public Power Association – Project Manager and Lead Consultant for a survey and analysis of the Association's more than 150 member utilities. Produced an analysis with recommendations for the products and services that can best serve the members in a deregulated environment.

Municipal Electric Association (Ontario) – Project Manager and Lead Consultant for the development of a definitive business plan for a new power procurement business on behalf of the Association's more than 250 municipal electric utilities. Work included initial feasibility assessments followed by a complete actionable plan for the creation of the new organization, including structure, organization, staffing, financing, market analysis, contingency plans, product offerings and promotional strategies. The resulting new company became a reality in late 1997.

ENERconnect (Ontario) – Served as interim Vice President of Marketing and Customer Service for the startup of this new power procurement and services company. Project Manager and Lead Consultant for the development of a detailed operational plan for startup. Assisted in all aspects of startup including organizational design, business strategies, product design and development and support to executive management and the Board.

ABB Energy Solution Partners – Consulting support for ESP-sponsored projects, including customer and project research, project structure, energy supply options, alliances and preparation of proposals. Included regulatory research and discussions in Nevada, Michigan, New Jersey and New York.

Ambient Corporation – Consulting support for strategic and tactical business planning for this startup firm specializing in power line communications (PLC), including development of commercialization plan and supporting management processes, support of business plan, product and service development, regulatory strategies and financing documentation.

PacifiCorp - Customer research with two groups of large industrial and commercial customers. Designed and managed interactive workshops to obtain their input, served as subject matter expert for the sessions, produced and presented comprehensive analyses of the results with strategic insights for the client's marketing initiatives.

T&D Support

Alberta Electric System Operator – Analysis of transmission loss methodologies for the Alberta market.

A large Canadian Provincial Electric Utility - Business planning support for the transmission business unit. Analysis of the business potential of new transmission opportunities. Analysis of U.S. transmission policies and their potential impact on a Canadian player in the U.S. markets.

Utility Management

Pennsylvania Power & Light Company - Served in a variety of management positions in a long career with the utility. Responsible for strategic business planning, rates, bulk power marketing, system operation, management of non-utility generation contracts, rate design, market research and contract negotiations with large customers. Key management roles in cost management, planning and scheduling for all Susquehanna nuclear station design, licensing, and startup activities including outage management.

Other Consulting Positions

Senior Vice President for ABB Energy Consulting, responsible for managing consulting engagements for a variety of U.S. and European energy firms.

Principal for Navigant Consulting, Inc., involved in numerous consulting engagements serving the electric utility industry in competitive initiatives.

Senior Vice President for the Washington International Energy Group, responsible for the firm's competitive positioning practice.

Education

M.S., Nuclear Engineering, Columbia University
B.E.E., cum laude, Villanova University

Registrations

Registered Professional Engineer – Pennsylvania

Memberships

Institute of Electrical and Electronics Engineers, American Nuclear Society

Randall Vickroy

Areas of Specialization

Mr. Vickroy has over 30 years of experience in the utility industry, including 20 years as a management consultant. He has managed and performed numerous high-level consulting assignments at companies and utility commissions in over 35 states. His areas of expertise include corporate finance and treasury, investment and liability management; capital markets and financing vehicles; utility industry restructuring; utility rates and pricing; holding company lines of business and utility insulation; strategy and planning issues; asset valuations and decision-making; energy supply procurement; energy supply economics; commodity risk management; capital and expense budgeting and forecasting; corporate resource allocation; and financial and economic analysis.

Relevant Experience

Management and Operations Audits

Lead Consultant for Liberty's management and operations audit of Atlantic City Electric for the New Jersey Board of Public Utilities. Task Lead for Liberty's review of Financial Performance, Finance, Cash Management, Strategic Planning, and Capital Allocation.

Lead Consultant on financial management, capital and expense budgeting, electrical energy and pension/OPEB on Liberty's management and operations audit of Pepco for the District of Columbia Public Service Commission.

Lead Consultant on financial management, strategic planning, capital and expense budgeting, electrical energy and capacity purchases and hedging on Liberty's management and operations audit of the electricity and natural gas businesses of Interstate Power and Light and Alliant Energy for the Iowa Utilities Board.

Lead Consultant on financial management, planning, capital and expense budgeting, electrical energy and capacity purchases and hedging on Liberty's management and operations audit of the electricity and natural gas businesses of Iberdrola SA/Iberdrola USA/NYSEG and RG&E for the New York Public Service Commission.

Lead Consultant on electrical energy and capacity purchases and sales, hedging policies and operations, and capital budgeting on Liberty's management and operations audit of the electricity, natural gas, and steam operations of Consolidated Edison for the New York Public Service Commission.

Lead Consultant for Liberty's audit of East Kentucky Power Cooperative, which included examinations of governance, planning, finance and budgeting. Liberty performed for the Kentucky Public Service Commission an examination of governance at the generation and transmission cooperative serving 16 distribution cooperatives across the state. This study came in the wake of significant financial difficulties and also assessed planning, budgeting, financial, and risk functions and activities.

Lead Consultant in Liberty's comprehensive analysis of the ratemaking implications of Commonwealth Edison's Chicago electric service outages for the Illinois Commerce Commission. Responsible for investigating and analyzing ComEd's capital budgeting, resource allocation, project management, expenditure levels and rate base impacts over 10 years for operations leading up to and in response to the outages.

Lead Consultant on capital expenditure and operating expense benchmarking, capital and expense budgeting, and financial projections included in the restructuring plan for Northwestern Energy – Montana. Liberty performed a management and operations review of the electric and natural gas businesses of Northwestern – Montana following the bankruptcy filing of the utility holding company.

Team leader for the review of the New York Power Authority's (NYPA) profitability, financial reporting, rate competitiveness, pricing policies, power plant economics and economic development programs in two separate management audits for the state of New York. NYPA is the largest generator and carrier of power in New York, providing over 25 percent of the electricity sold.

Led the review of finance, cash management, budgeting, and rates in a comprehensive management audit of Southern Connecticut Gas (SCG) for the Connecticut Department of Public Utility Control (DPUC). Responsibilities included operational audits of all finance, regulatory, pension and budgeting processes of SCG.

Led the review of the finance, cash management, budgets, pension, accounting and rate functions in a comprehensive management audit of Connecticut Natural Gas (CNG) for the Connecticut DPUC. Work also included a focus on the financial impacts of CNG's non-regulated businesses, which includes a large steam system in downtown Hartford.

Led the review of the finance, cash management, budgeting, pension, rates, and tax functions in a comprehensive management audit of Yankee Gas for the Connecticut DPUC. Evaluation included an in-depth analysis of the effectiveness of Yankee's capital and expense budgeting processes and the integration of market and competitive components into these processes.

Led the review of the finance, pension, regulatory and accounting functions in a management audit of United Cities Gas for the Tennessee Regulatory Authority. Responsibilities included a review of all financial functional areas, as well as a review of the impact of all affiliate transactions between the regulated and non-regulated businesses.

Consultant on Liberty's management audit of GTE South - Kentucky for the Kentucky Public Service Commission. Responsible for the analysis of the financial management of GTE as it relates to the operation of its GTE South subsidiary.

Lead Consultant in Liberty's management audit of Bell Atlantic - Pennsylvania and Bell Atlantic - District of Columbia for their respective commissions. Responsible for reviewing Bell Atlantic's capital structure, finance and controller functions, financial systems, and treasury operations.

Utility Financial Insulation/Ring Fencing

Lead Consultant for Liberty's two separate, comprehensive affiliate relationships and transactions reviews of Duke Energy Carolinas for the North Carolina Utilities Commission staff, and one review for the Indiana Utility Regulatory Commission. Responsibilities included the review of the Duke Energy/Cinergy merger costs to achieve and merger savings, and the separation of holding company and utility financing, cash management and pension plans.

Lead Consultant for the performance of Liberty's audit and testimony for the Delaware Public Service Commission of the affiliate financial costs and risks borne by Delmarva Power, a member of the multi-state holding company, PHI.

Lead Consultant for Liberty's comprehensive review of affiliate relationships, holding company cost allocation, transaction review, and regulatory reporting and rate recovery for a major Northeastern utility holding company. Responsibilities included the review of the holding company organization and management, transactions with its utilities, cost assignment, and capital recovery techniques.

Project Lead for Liberty's review of affiliate relationships, treasury operations and lines of credit, holding company cost allocation, transaction review, and regulatory reporting and rate recovery of Delmarva/PHI Holdings for the Delaware PSC. Responsibilities included the review of the holding company organization and management, all financing and intercompany transfers, the review of transactions with its utilities, cost allocations, and regulatory reporting.

Leader for all financial areas in the review of affiliate transactions among Public Service Electric and Gas, its holding company parent, and the extensive diversified businesses of the holding company. Responsible for evaluating PSE&G's consolidated finance functions to determine whether the financial integrity, flexibility, and cost of capital of the regulated utility had been adversely affected by the activities of diversified affiliates. Work included the review and analysis of the long-term financing, cash management, direct and indirect credit support mechanisms, investor relations, and all transactions between and among the affiliates.

Lead for examining all financial issues in a pre-rate case audit of affiliate relations at Nova Scotia Power Company for the Nova Scotia UARB. Responsibilities included the evaluation of financing vehicles, lines of credit, credit ratings, holding company structure, and financial impacts of the holding company on financing costs.

Led the review of financial impacts and the effectiveness of insulation of the utility from parent and non-utility finances on Liberty's management and affiliate transactions audit of Elizabethtown Gas (ETG), its new parent AGL Holdings and all affiliates for the New Jersey Board of Public Utilities. This project included detailed examinations of affiliate relationships, governance, holding company and financing and credit facilities and utility ring-fencing. Also reviewed were strategic planning, capital and expense budgeting and enterprise risk management.

Lead Consultant for examination of financing and utility insulation on Liberty's focused audit of NUI Corporation and NUI Utilities. This audit included a detailed examination of the reasons for poor financial performance of non-utility operations, effect of affiliate operations, including commodity trading on utility credit and finance, downgrades of utility credit beneath investment grade, and retail and wholesale gas supply and trading operations. The audit included detailed examinations of financial results, sources and uses of funds, accounting systems and controls, credit intertwining, cash commingling, and affiliate transactions, among others. Liberty's examination included very detailed, transaction-level analyses of commodities trading undertaken by a utility affiliate both for its own account and for that of utility operations.

Led the review of financial impacts and the effectiveness of insulation of the utility from parent and non-utility on Liberty's focused and general management audit of NJR, New Jersey Natural Gas and affiliates for the New Jersey Board of Public Utilities. This project included detailed examinations of affiliate relationships, governance, financing and utility ring-fencing, compliance with New Jersey EDECA requirements for affiliate separation, protection of confidential information, non-discrimination against third-party competitors with utility affiliates, and other code-of-conduct issues.

Led the review of financial impacts and effectiveness of insulation of the utility from parent and non-utility operations and finances on Liberty's focused and general management audits of SJI, South Jersey Gas, and affiliates for the New Jersey Board of Public Utilities. This project included detailed examinations of affiliate relationships, governance, financing and utility ring-fencing, compliance with New Jersey EDECA requirements for affiliate separation, protection of confidential information, non-discrimination against third-party competitors with utility affiliates, and other code-of-conduct issues.

Led the evaluation of the financial relationships between Hawaiian Electric Industries and Hawaiian Electric Company for the Hawaii Department of Commerce and Consumer Affairs. The focus of the review was the credit and financial support provided by the utility company to the holding company and its diversified businesses.

Led the review and analysis of corporate governance, financial relationships and affiliate transactions between Virginia Power and its parent, Dominion Resources for the Virginia State Corporation Commission. The review included an evaluation of all utility and non-utility financing, governance and economic impacts. The engagement was in response to a well-publicized dispute between the holding company and Virginia Power.

Mergers and Acquisitions

Lead Consultant for Liberty's audit for the Virginia State Corporation Staff of Potomac Edison's distribution system transfer to two cooperative systems. Liberty examined the public interest, financial, rates and energy supply questions associated with the transfer by Allegheny Energy's utility operating subsidiary (Potomac Electric) of all of its electricity distribution operations business and facilities in Virginia to two rural electric cooperatives.

Served as Liberty's lead consultant in evaluations and testimony regarding the acquisitions of TXU (Texas), UniSource (Arizona) and Portland General Electric (Oregon) by leveraged buyout entities. Responsible for assessments of utility financial insulation and ring fencing, holding company leverage levels and credit rating impacts, governance, service reliability, access to information, and community presence issues.

Lead Consultant for the New Hampshire Public Utilities Commission in the evaluation and negotiation of approval terms for the spin-off and merger of Verizon's New England wireline businesses with FairPoint Communications. Responsible for the review and evaluation of the merger transaction, the financial viability of the merged entity, financial forecasts, credit ratings, access to capital, debt covenant approval and tax implications.

Lead Consultant for financial issues in a focused review of the Exelon/PSEG merger for the New Jersey Board of Public Utilities (BPU). Responsible for defining and evaluating the financing, credit rating, liquidity facility, and market risk exposures of PSE&G's utility operations to risks of Exelon's nuclear generating business.

Fuel and Energy Supply

Lead Consultant in examining purchased power and off-system sales in Liberty's project fuel and purchased power audit of Mississippi Power Company for the Mississippi Public Service Commission.

Lead Consultant in examining purchased power, off-system sales and generation modeling in Liberty's project evaluating the fuel and power procurement and fuel recovery mechanisms of Arizona Public Service for the Arizona Corporation Commission. Responsibilities also included the preparation and submittal of testimony for the regulatory dockets on these issues.

Lead Consultant for evaluating the fuel forecasting models and methods utilized by Nova Scotia Power Company in the development of a fuel adjustment clause mechanism for the company, working for the Nova Scotia Utility and Review Board (UARB). Assessed NSPI's simulated production dispatch model and several ancillary models that include the impact on fuel expense of hedging and ancillary fuel costs.

Lead Consultant for evaluating the electric supply of Mississippi Power for the Mississippi Public Service Commission. Responsible for assessing the Southern Company intercompany interchange agreement, related system operations, power pool purchases and sales and pricing/billing.

Lead Consultant for evaluating the electric supply of Entergy-Mississippi for the Mississippi PSC. Responsible for assessing the Entergy interchange agreements, power pool purchases, electric supply solicitation processes and analysis and pricing/billing.

Lead Consultant for evaluating the economic dispatch operations, electric purchases and sales, Independent Power Producer contracts and power imports of Nova Scotia Power Company in a rate case context, working for the Nova Scotia UARB.

Prepared, filed and provided testimony regarding a large biomass purchased power agreement of Nova Scotia Power Company, working for the Nova Scotia UARB. Testimony included the evaluation of financial risks, credit rating impact, and contract terms as they would affect NSPI.
Provided in-depth analysis and direct counsel to Commissioners regarding proposals of merchant power companies to build 550 MW power plants and sell all electric output to Mid-American Energy, working for the Iowa Utilities Board. Evaluations included the assessment of financial risks, credit rating impact, economics versus company ownership and contract terms as they would affect Mid-American.

Led the consulting and monitoring of contracting for electric supply by Western Massachusetts Power following the sale of its generation assets under electric deregulation.
Project Leader for the evaluation of electric supply alternatives for Orlando Utilities. Responsible for evaluating electric generation economics, electric purchases and sales, independent power producer contracts, regional market opportunities and transmission paths available.

Rates and Regulatory

Prepared and filed Liberty's direct testimony addressing rate of return, cost of capital and target debt coverage rates in the 2010 rate cases of Arizona Electric Power Company and Southwest Transmission Company for the Arizona Corporation Commission.

Project Manager for the development and implementation of regulatory financial systems and models for deregulated ratemaking at Pacific Gas and Electric Company. The project involved developing regulatory strategy, California Public Utilities Commission earnings monitoring models, data bases, analytical models and reporting for all regulatory requirements of PG&E's regulated businesses.

Project Leader for Liberty's evaluation of cost of capital issues for a Yankee Gas rate case for the Connecticut DPUC. Scope of work included the analysis of the cost of equity and debt, capital structure, and short-term debt positions of all parties and participation in hearings and drafting of the Staff recommendations regarding Yankee's cost of capital.

Prepared and filed Liberty's direct testimony specifically addressing pension expense and prepaid pension assets in rate base in the 2011 gas rate case of Nova Scotia Power Company for the Nova Scotia UARB.

Prepared and filed direct testimony specifically addressing pension expense and prepaid pension assets in rate base in the 2011 gas rate case of Xcel Energy – Colorado for the Staff of the Public Utilities Commission of the State of Colorado.

Led Liberty's development of a framework and strategy to resolve all electric industry restructuring issues between the State of New Hampshire, Public Service Company of New Hampshire, and the New Hampshire Public Utilities Commission. Project included assessment and valuation of all key assets and development of a disposition strategy for all generation assets, contracts and obligations. The project also included the assessment of alternative rate paths; planning for the securitization and recovery of stranded costs; and the development of provisions for power supply purchases during a transition period.

Lead Consultant in Liberty's financial audit for ratemaking purposes of Verizon New Hampshire (VNH) for the New Hampshire Public Utilities Commission. Responsible for a broad and comprehensive analysis of the financial status of VNH, including an audit of the books and records of the Verizon parent, in order to assist the commission in determining rate base, rates of return and appropriate adjustments for the test year.

Lead Consultant in Liberty's review of the financial integrity and earnings of Verizon New Jersey's (VNJ) rate regulated and competitive businesses for the New Jersey BPU. Responsible for the financial evaluation of VNJ's earnings, capital structure, rates of return, dividend policies, credit ratings, financial reporting, SEC reporting, and BPU surveillance reports.

Team Leader in providing consulting assistance to Kentucky Utilities (KU) in preparing its initial application for implementing an environmental surcharge. Responsibilities included analyzing legislation, analysis of capital expenditures, analysis of KU's Clean Air Act compliance plan, analysis of costs recoverable under the surcharge, and developing testimony, exhibits, special accounting systems, and rate tariffs.

Project Leader for providing consulting assistance to Big Rivers Electric in preparing its initial application for implementing an environmental surcharge. Responsibilities included a review and evaluation of the economics of a major investment in a flue gas scrubber, analysis of Big Rivers' Clean Air Act compliance plan, evaluating cost recoverable under the surcharge, and developing surcharge testimony, exhibits, accounting systems and rate tariffs.

Other

Led the review and evaluation of the financial management practices of a major utility holding company. Engagement included an assessment of overall financial management and crisis-liquidity plans; strategic and business planning; asset valuations and their accounting impacts upon deregulation; independent power contract buy-downs; and rate reduction strategies.

Led the evaluation and recommendation of strategic lines of business for a major municipal utility facing industry deregulation.

Led the development of a strategic framework for the establishment and growth of non-regulated businesses for a major international electric holding company.

Led the development, analysis, and recommendation of alternative electric generation and power resource strategies for a regional generation and transmission company in preparation for electric deregulation.

Led the review and evaluation of all utility and non-utility financing, financial relationships, and affiliate transactions between a major utility holding company and its electric company subsidiary.

Leader for all financial areas in the evaluation of the diversified businesses of a major utility holding company. Engagement determined the impact on financial integrity, financial flexibility, credit mechanisms, and the cost of capital of the substantially diversified businesses of the holding company.

Led the development of an overall gas business strategy, capital asset allocation methods, financial analysis programs and gas main extension policy for a Midwestern combination utility.

Education

M.B.A., Finance, University of Denver
B.A., Business Administration, Monmouth.

David Berger

Areas of Specialization

Mr. Berger specializes in pipeline integrity management, corrosion control, gas-infrastructure asset management, and gas system operation and security.

Relevant Experience

Lead consultant for operations areas in Liberty's management audit of WGL's PROJECT*pipes* for the District of Columbia Public Service Commission.

Lead consultant for several operations areas in Liberty's investigation of Peoples Gas of Chicago's Accelerated Main Replacement Program. Responsible for review of system conditions and oversaw Liberty's team of field investigators who reviewed and reported on over 250 work sites.

Task area leader for the areas of corrosion control and emergency plans in Liberty's investigation of Peoples' Gas operational safety for the Illinois Commerce Commission. The audit reviewed and evaluated an LDC's overall operations and maintenance activities and its gas safety programs to determine the degree to which they are in compliance with federal and state regulations and conformance of those activities and program with industry best practices and the best practices determined by the ICC Staff in consultation with the LDC.

Lead Consultant for review Program and Project Planning and Management – Natural Gas, as part of Liberty's Management and Operations Audit of Iberdrola SA, Iberdrola USA, NYSEG, and RG&E for the New York Public Service Commission.

Lead Consultant for review Program and Project Planning and Management – Natural Gas, as part of Liberty's Management and Operations Audit of Consolidated Edison for the New York Public Service Commission.

Lead Consultant for Liberty's project for the District of Columbia Public Service Commission to examine the usage and cost recovery of a hexane injection strategy used by Washington Gas Light.

Lead Consultant for reviews of Contractor Performance and of System Operations and Maintenance as part of Liberty's Management and Operations Audit of Elizabethtown Gas for the New Jersey Board of Public Utilities.

Retained by the California Public Utilities Commission to assist in an investigation of an incident on a transmission pipeline in northern California. He has assisted commission staff with preparing relevant documents and reviewed and commented on documents provide by the utility.

Mr. Berger is under contract to United States Department of Transportation (USDOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) to assist in developing and

implementing a gas and liquid pipeline integrity management program and to assist in inspecting operators of pipelines through Cycla Corporation. He is the author and instructor at Transportation and Safety Institute (TSI) on direct assessment training modules for External Corrosion Direct Assessment (ECDA) (including a new course on ECDA indirect inspection techniques) Internal Corrosion Direct Assessment (ICDA), Stress Corrosion Cracking Direct Assessment (SCCDA), and Confirmatory Direct Assessment (CDA). In addition, he is a consultant to PHMSA on integrity management notifications and corrosion control issues.

Consulted with the Washington Utilities and Transportation Commission for corrosion control issues and provided expert testimony after an incident that resulted in a house explosion and death. Technical consultant for a risk model regarding distribution integrity issues with the LDC.

Mr. Berger is the lead author of a primer on corrosion control and cathodic protection for upper level U.S. DOT administrators.

Until July 2004, Mr. Berger was the Division Manager, Asset Management, for KeySpan Energy. In this capacity, he managed a group of engineers, clerks, technician assistants, supervisors, and field labor to maintain and improve the asset management of the gas infrastructure and the cathodic protection systems on all KeySpan Energy gas and electric facilities (Long Island, New York City, New England). He was the process owner of KSE's gas transmission system and directed the overall integrity management program for all KSE assets (gas, electric, electric generation). He provided guidance to corporate security on gas operation security issues and implemented security plans for the gas infrastructure in all service areas. He was a developer of the direct assessment method of determining gas pipeline integrity.

Also while at KeySpan, he provided strategic direction to reduce costs while improving the overall effectiveness of corrosion control to facilities. Dave was instrumental in reducing the hand- offs in constructing corrosion control repairs and improvements by bringing construction activities under one group from the several previously involved. He developed and implemented the complete rebuilding of the gas shop test equipment and data acquisition systems and updated them from 1960s technology to the most technologically advanced in New York State. Mr. Berger also directed the improvement and streamlining of the work methods and planning of the Regulator and Instrumentation group. He started computerization of the division by instituting the reporting of field test results via laptop computers for routine and periodic testing. Dave designed and instituted the installation of AMR (Automated Meter Reading) systems for large gas and electric account gas meters to more closely monitor gas usage during curtailment periods and to provide special billing to customers.

In the position of section head of the Environmental Engineering Department for KeySpan, Mr. Berger managed a group of engineers that was responsible for all of the hazardous waste, industrial waste and petroleum storage facilities for the company. He negotiated permits and compliance schedules with all levels of regulatory officials (local, county, state and federal). He prepared and submitted all superfund and other legal notifications. He provided support to operating organizations, legal, and fuel management personnel for environmental matters.

Prior to his employment at KeySpan, Mr. Berger was the Director of Operations for Russell Plastics Technology Inc. and a Plant Manager for ICI Americas, Inc. - Aerospace Division.

Education

University of Delaware, course work (32+ credits) for M.S. in Environmental Engineering
New York University, B. Ch.E. (Chemical Engineering)

Other Honors, Societies, and Papers

Member A.I. Ch. E.
Member AWMA
Author and co-author of papers in WPCF, AGA, NACE
AGA Corrosion Control Committee Chairperson
AGA Distribution Engineer of the Year, 2002
CIS, PCM and ACVG Corrosion Tools
AGA Achievement Awards, 2003, 2004
Bass Trigon Corrosion Control Data Base
Numerous papers in various pipeline technical journals and NACE publications

Christine Kozlosky

Areas of Specialization

Ms. Kozlosky has 30 years of consulting experience with regulated industries. Her areas of expertise include customer-service operations, performance measurement and benchmarking, innovation and best-practice discovery, business-process re-engineering, and information-systems management.

Relevant Experience

Lead Consultant for Liberty's management and operations audit of Atlantic City Electric for the New Jersey Board of Public Utilities. Task Lead for Liberty's review of Customer Service and Contractor Performance.

Lead Consultant for Liberty's forensic audit for the Maine Public Utility Commission seeking to identify the root causes of a customer billing complaints following conversion of its customer information system to a new platform.

Lead Consultant for Liberty's focused Management Audit of Liberty Utilities for the New Hampshire Public Service Commission. This audit is addressing a broad scope of customer service matters, including a review of the Company's CIS systems capabilities and performance, all customer service operations, including: 1) account initiation and management, 2) meter data management, 3) billing, 4) payments and collections, 5) call center, 6) account creation and management, 7) meter data management, and 8) an evaluation of the effectiveness and efficiency of staffing to support these customer service functions. The audit also includes a review of Information Technology and Corporate Support Services, Vendor Relationships, Accounting, Business Planning, and Capital and O&M Budgeting.

Lead Consultant for Liberty's management and operations audit of the customer service function of KU/LG&E for the Kentucky Public Service Commission. This audit included the following focus areas: Customer Service, Operation and Maintenance Expenditures, Capital Budgeting, Strategic Planning, and Customer Information Systems Support. Liberty specifically examined the management and operations of customer service functions (including call center, outage location, and emergency response) during major outages.

Task Area Leader of Liberty's investigation of Ameren-Illinois storm response in the areas of communications, outage management systems, and call center performance. Performed verification of the implementation of recommendations resulting from that investigation.

Lead Consultant responsible for customer operations issues on Liberty's investigation of Peoples Gas of Chicago's Accelerated Main Replacement Program for the Illinois Commerce Commission.

Lead Consultant, responsible for customer service and customer communications, on Liberty's review of electric system infrastructure, supply, and generation at Newfoundland Power and Newfoundland Hydro.

Lead Consultant on Liberty's management review of outage communications at CL&P for the Public Utilities Regulatory Authority (PURA). This review examined CL&P's storm response and communications during two major storms in 2011. Reviewed call center and telephony capacities and performance, web and IVR self-service response, social media and proactive customer communications, public relations and communications, Outage Management System performance, and Estimated Restoration Times effectiveness.

Completed a follow-up review of outage communication improvements at Nova Scotia Power. This review followed a management study conducted in 2006 that examined Nova Scotia Power's storm response and communications during a major ice storm. Ms. Kozlosky assisted the utility in the implementation of recommendations, including upgrades to the Customer Information System and Outage Management System, the addition of a third-party overflow service to handle peak calling periods, and changes to the Customer Service storm communications response plan.

Lead Consultant in Liberty's management and operations audit of Interstate Power & Light for the Iowa Utilities Board. Led reviews of customer service and gas operations, including Distribution Operations, Distribution Engineering, Meter Reading, Call Center, Billing, Credit & Collection, Theft of Service, Field Service, Underground Locating, and Business Office Operations.

Lead Consultant for review of customer service on Liberty's focused and general management audit of New Jersey Natural Gas, and affiliates for the New Jersey Board of Public Utilities. This project included detailed examinations of affiliate relationships, governance, financing and utility ring-fencing, compliance with New Jersey EDECA requirements for affiliate separation, protection of confidential information, non-discrimination against third-party competitors with utility affiliates, and other code-of-conduct issues.

Lead Consultant for a management review of customer service operations of Elizabethtown Gas Company, a subsidiary of AGL Resources. This review, as part of a commission-mandated audit, examined the management and operations of all functions within customer service, including: Meter Reading, Call Center Operations, Billing, Credit & Collection, Field Service, Revenue Protection, and Business Office Operations. As part of this review, Ms. Kozlosky reviewed the operations and performance of the off-shore outsourcing company that was handling the majority of customer service calls for the utility; including the decision to outsource, review of the service contract, service level performance, costs, and impact to the natural gas company's overall service delivery and customer satisfaction. Additionally, Ms. Kozlosky reviewed the subsequent decision to bring these capabilities back in-house, as well as the establishment and start-up of a New Jersey-based call center later this year.

Task Area Leader for review of customer service on Liberty's focused and general management audits of SJI, South Jersey Gas, and affiliates for the New Jersey Board of Public Utilities. This project included detailed examinations of affiliate relationships, governance, financing and utility ring-fencing, compliance with New Jersey EDECA requirements for affiliate separation,

protection of confidential information, non-discrimination against third-party competitors with utility affiliates, and other code-of-conduct issues.

Conducted an Electronic Payment Processing Assessment for Greater Cincinnati Water Works. The purpose of the Electronic Payment Processing (EPP) project is to help GCWW quickly define a knowledgeable path forward related to outsourcing of credit/debit card processing, including defining outsourcing options, identifying the impact of outsourcing on GCWW's business processes and customers, and developing a recommended path forward. As part of this project, Ms. Kozlosky conducted a diagnostic review of GCWW's payment processing capabilities and conducting industry market and benchmarking research of payment processing options and practices.

Assisted Macon Water Authority with the implementation of an automated field order processing system. Mobile laptops with 3G broadband capabilities have been deployed in the field, allowing technicians access to service orders as well as customer account information. Orders status is updated in real-time as orders are worked in the field. Ms. Kozlosky worked closely with field personnel to adapt MWA's business process to maximize effectiveness.

Revised credit and collection policies and procedures for the City of Denton's Customer Service organization. As part of a prior management review, Ms. Kozlosky recommended improvement in the City of Denton's collection practices, including risk-based treatment of delinquent accounts, revised credit requirements, a more condensed collection timeline, writing off bad debt, and metrics to track performance. Part of this effort included evaluating payment channels available to customers, including the acceptance of credit/debit cards, e-payment through website and kiosk, and other forms of electronic payment. The city investigated whether to continue accepting credit/debit card payments through its third-party vendor and the implications on accepting payments in person, over the phone, IVR, and web. The City of Denton proceeded with many of the changes and pursued City Council approval for those impacting the City Ordinance.

Assisted Macon Water Authority with the implementation of a new check imaging remittance-processing solution. Following recommendations from a prior Customer Service diagnostic review conducted by the Ascent Group, Macon Water Authority replaced its outdated check processing equipment with a solution that provides accounts receivables conversion (ARC) to ACH. The new solution will improve cash flow, reduce banking fees, and streamline cash processing. In-person payments by check will also be converted on-the-spot to ACH, thereby increasing same-day fund availability and eliminating paper check handling and processing.

Assisted Motion Picture Industry Pension and Health Plans with the consolidation of three call centers into one. While multiple call centers were providing specialized services for plan members and providers, they were creating barriers and confusion for customers, leading to a high number of transferred calls, longer wait times, increased repeat calls, disjointed customer service, and caller dissatisfaction. In phase one of the assignment, Ms. Kozlosky conducted an As-Is Evaluation of MPIPHP's call center practices and performance. Recommendations were then presented to merge the centers and implement practices to improve member and provider satisfaction, achieve higher first call resolution, and increase contact quality. Implementation of these recommendations proceeded throughout 2010.

Reviewed First Contact Resolution strategies for AT&T to identify best practices and techniques to measure and improve first contact resolution. Ms. Kozlosky also benchmarked AT&T's National Consumer Sales organization's performance against a panel of similar companies. Recommendations were presented to improve AT&T's first contact resolution performance as well as the internal processes supporting the achievement of first contact resolution.

Conducted a management review of outage communications at Nova Scotia Power for the Utility and Review Board of Nova Scotia. This review examined Nova Scotia Power's storm response and communications. Numerous recommendations were made to improve call center performance and overall outage communications, including a framework for early ETRs (Estimated Time of Restoration), more proactive communication with customers during the storm, third-party call overflow handling, and the staging of customer service representatives. Ms. Kozlosky also testified in a public hearing in regard to this review.

Completed a review of Washington D.C. Metro Area Transit Authority people processes for its front-line customer service employees—train operators and bus drivers. Ms. Kozlosky benchmarked WMATA's practices against "best in industry" in the areas of hiring, training, and performance. Ms. Kozlosky presented findings and recommendations for improvement to WMATA's CEO and upper management.

Conducted a study of customer service performance for the American Water Works Association Research Foundation (AWWARF). This study developed and deployed a customer service benchmark framework for 1,000 member utilities. As part of the study, an interactive web-based benchmarking tool was developed to collect benchmark data and disseminate benchmark results. Additionally, a customer satisfaction survey was deployed to measure satisfaction among the member utilities. These tools were then handed over to the AWWARF for ongoing benchmark comparisons and continuous improvement of its member utilities.

Project Manager for a study funded by the Cooperative Finance Network of the National Rural Electric Cooperative Association (NRECA) to identify e-commerce initiatives and solutions for utilities and telecommunications firms. Ms. Kozlosky identified more than 400 initiatives involving utilities and use of the Internet for both business-to-business and business-to-consumer products and services. Ms. Kozlosky designed a database and published the study results on a web site designed exclusively for use by NRECA member cooperatives.

Lead Consultant for a research study of billing operations for more than a dozen utilities. The study focused on how companies are looking to new billing products and services as the industry moves to deregulation and competition. Companies were interviewed to understand how quickly services like Internet bill presentation and payment and "weatherized" bills are being adopted and implemented.

Interviewed and researched "best in industry" leaders to document call center and customer care best practices and lessons learned. Companies included in the review were Southwest Airlines, FedEx, Tesco, First Direct, The Ritz-Carlton, USAA, Southern Company, State Farm, Dell, Lexus, and Yellow Freight.

Assisted Jacksonville Electric Authority's customer service reengineering team in the identification and presentation of recommendations to improve JEA's customer service delivery. JEA had identified a goal of being the best service provider in the U.S. by 2007. Recommendations were provided to reorganize around key business processes, implement new technologies, change existing processes to be more efficient and effective, implement additional training and development, and empowerment of front-line employees. JEA will implement the recommendations concurrently with the selection and implementation of a new Customer Information System.

Project Manager and Lead Facilitator for a "best in class" benchmarking study of Entergy's Retail Operating Support organization. Ms. Kozlosky was responsible for directing the benchmarking efforts of four company teams. Areas studied in detail included: telephone center operations, meter reading, billing, remittance processing, credit and collections, and payment agency operation. The study focused on Entergy's performance in a competitive environment.

Assisted a start-up Internet company with the design and development of a data acquisition and publication system for selling and syndicating content over the Internet. Ms. Kozlosky was responsible for designing the input mechanism and developing specifications for the development of the Internet knowledge-base distribution mechanism.

Conducted a competitive assessment of the many ways in which utility companies are acquiring new products and services to prepare for the competitive marketplace. Examined the utility and telecommunications industries to understand the range of competencies that are being acquired through joint ventures, partnerships, acquisitions, and alliances. The research was conducted for Entergy's Marketing organization.

Project Manager for a benchmarking study of Integrated Voice Response Technology within ten industries. The study was commissioned by Illinois Power Company. Ms. Kozlosky was responsible for securing participation from companies and interviewing participants about their IVR strategy and deployment. The study examined how companies are deploying the technology, how it comes into play from a customer perspective, and how it fits into an overall customer service strategy.

Lead Consultant for customer service areas in Liberty's comprehensive examination of transmission and distribution (T&D) for the Illinois Commerce Commission following concerns about Commonwealth Edison's (ComEd's) performance in meeting its public service responsibilities. Evaluated ComEd's customer service performance, organization, staffing levels, and organizational effectiveness. Examined costs associated with customer service and communications contained as part of Liberty's investigation of ComEd rate filing.

Lead Consultant in Liberty's management audit of Bell Atlantic-Pennsylvania and Bell Atlantic-District of Columbia for their respective commissions. Responsible for review of customer service, including sales, service and support organization, credit and collections, billing, remittance, and staff support. Also included in the study was the review of the information systems supporting customer service, billing, and collections.

Consultant for Liberty's audit of Ameritech-Ohio policies, procedures and compliance with service quality performance requirements under Ohio's Minimum Telephone Service Standards (MTSS).
Lead Consultant in Liberty's management audit of Southern Connecticut Gas Company, conducted for the Connecticut Department of Public Utility Control. Responsible for reviewing the company's customer-service organization, including planning, credit and collections, billing, remittance, telephone operations, business offices, and staff support. Also included in the study was the review of the information systems supporting customer service, billing, and collections.

Lead Consultant for the review of the work-management and manpower-planning processes of Rochester Telephone Company, performed for the New York State Public Service Commission. Provided recommendations to improve existing and planned work-management and manpower-planning processes in the engineering, operations, and customer service functions.

Project Manager for the design and pilot implementation of an automated work force management and manpower planning system for New York Telephone Company, in an engagement for the New York State Public Service Commission. Responsible for ensuring that previous audit recommendations were fulfilled, as well as providing functional design guidance.

Consultant in Liberty's management audit of Yankee Gas Services Company, conducted for the Connecticut Department of Public Utility Control. Responsible for detailed analysis of selected customer-service issues.

Lead Consultant for a research study of billing operations for more than a dozen utilities. The study focused on how companies are looking to new billing products and services as the industry moves to deregulation and competition. Companies were interviewed to understand how quickly services like Internet bill presentation and payment and "weatherized" bills are being adopted and implemented.

Conducted market research for a large underground facilities locating firm based in Atlanta, Georgia. The research determined market size and potential for locating services throughout the United States.

Worked with a team to design and implement call center technology for the Electricidad de Caracas in Venezuela. Ms. Kozlosky provided assistance with procedural and systems development as well as best practice implementation.

Project Manager for a study of business office operations within five utilities that still operate full-service, walk-in customer service centers. The study focused on how these offices fit into an overall customer service strategy and how they impact customer satisfaction. Ms. Kozlosky also looked at the future of face-to-face customer service. The study was conducted for Entergy.

Lead Consultant on Liberty's study for Colorado Springs Utilities to assist this utility in addressing the organizational impacts associated with a transition to automated meter reading (AMR).

Liberty's work included a survey of the experiences and lessons learned from 25 utilities that had already experienced the transition to AMR.

Project Manager for a multi-company meter-reading comparative-practices study. Detailed review of the meter-reading organization, practices, policies, and management of more than 20 electric, gas, and water utilities located across the U.S., Canada, and the U.K. Areas researched include: emerging technologies used in route optimization and meter automation, staffing strategies, training, performance-incentive programs, and approaches to resolve inaccessible meters, reduce off-cycle reads, address high-read-cost meters. Study findings were presented at a National Meter Reading Conference.

Project Manager for a study to determine the cost of service for the appliance-repair activities of Providence Gas Company.

Lead Consultant in a study that helped a large western electric utility's Distribution Business Unit develop its strategic plan. Tasks included identifying information-systems needs to prepare for deregulation and open access, support new product/service offerings, and improve customer service. This involved identification of new, strategic systems as well as modifications and enhancements to existing legacy systems. Also provided financial analysis to support strategic action items.

Lead Consultant for the review of performance-reporting systems for the distribution operations of a southwestern electric utility. Led a client team in the design and implementation of a Crew Performance Reporting System to track regional performance of T&D line crews. The system provided information on crew productivity, job backlog, work flow, and job-completion status. Modified an existing Field Service Management system to better measure and track serviceman performance. Detailed action plans were developed to facilitate a successful implementation of recommendations.

Project Manager for an internal benchmarking performance study of Delmarva Power & Light's twelve district customer-services offices. Identified opportunities for improvement within the customer-call center, business-office operations, remittance processing, meter reading, field services, credit and collection, and customer accounting. Activity based analysis provided the foundation for a more balanced allocation of resources to the operating districts.

Project Manager for a diagnostic assessment of Detroit Edison's Customer Service operating performance compared against an industry benchmarking panel of more than 25 electric utilities. Presented findings to all levels of management in the Customer Service organization, conducted focus-group reviews for: business-office operations, remittance processing, meter reading, field services, credit and collection, and customer accounting. Recommended practices for improvement teams to evaluate for implementation.

Lead Consultant for the review of the human-resource functions and work-management /manpower-planning processes of Washington Gas Light Company for the Maryland Public Service Commission. Provided observations and recommendations to improve existing and planned work-management and manpower-planning processes and human-resource processes and

systems. Areas reviewed included: customer contact, meter reading, billing, collections, servicemen and appliance repair, and public affairs and community relations.

Project Manager and Lead Facilitator for the development of an executive-level conceptual design of a customer-response system for Boston Edison Company. The project developed an integrated vision for responding to customer inquiries that optimizes the use of information systems and technology. Facilitated an inter-departmental team in the design of the response system, drawing together industry best practices, process-mapping findings, and technology expertise.

Project Manager for a study to analyze and redesign Boston Edison Company's collection and customer-service correspondence. Recommendations were made to eliminate unnecessary correspondence and all remaining correspondence was rewritten to be more professional and more customer sensitive.

Project Manager for a study of customer expectations at Nashville Electric Service (NES). The study developed a baseline understanding of NES's customer and employee expectations and satisfaction. At the same time, an internal diagnostic of NES's business processes and practices identified areas of improvement opportunity as well as potential weaknesses in delivering customer service. The project then matched customer expectations and satisfaction feedback to the internal process-review results to delineate specific areas for improvement or process realignment. The customer-measurement process used to gather mail-survey, telephone-survey, and focus-group feedback was also established so that customer feedback can be obtained and reviewed by NES staff on an on-going basis.

Conducted and published the 1993-94 Electronic Data Interchange Billing Practices Utility Industry Study. This research study surveyed more than 160 electric, gas, water, and telecommunications companies to identify the use of Electronic Data Interchange for producing customer bills. Companies using this technology were profiled in detail, including: length of time that the service has been in place, participation level by customer segment, software and hardware specs required to offer service, marketing plans, and plans for expansion.

Project Manager for a custom-tailored assessment of Empire District Electric's Customer Service operating performance as compared to an industry benchmarking panel of more than 25 electric utilities. Presented findings to senior management as well as the entire customer-service management team.

Project Manager for a diagnostic assessment of Southern California Edison's Customer Service operating performance as compared to an industry panel of more than 35 utilities. Presented findings to all levels of management and staff through a series of focused review sessions. Areas evaluated included: telephone-center and business-office operations, meter reading, field services, credit and collection, and customer accounting.

Project Manager for an annual multi-company benchmarking study of customer service in the electric utility industry, for three years. Functions benchmarked by the study included: front- office operations, meter reading, customer accounting, field and meter services, telephone- center operations, remittance processing, and credit and collections. Designed, developed, and provided

detailed industry comparison of operating-company expenditures, productivity measures, and key service-level indicators. Analysis highlighted the best performers in each function and detailed interviews were conducted with these companies to identify innovative practices.
Lead Consultant for a cost-reduction study of customer-service operations at General Public Utilities. Analyzed remittance processing, billing, customer-service operations, energy programs, and meter-reading work practices and procedures. Encompassed in the study was a detailed industry comparison of operating-company operation and maintenance expenditures and key service-level indicators. Identified significant manpower and dollar savings.

Engagement Director for focus-group research conducted with call-center customer-service representatives, collectors, and meter readers at Boston Edison, Sierra Pacific Power, Northeast Utilities, Duke Power, and Illinois Power. Focus groups were conducted to ascertain perceptions and effects of changes in the utility industry, including mergers and acquisitions, work group consolidation, office closings, and corporate re-engineering and downsizing.

Project Manager for the review of customer payment processing capabilities of Central Power & Light. Led a client team in a feasibility study to determine the cost/benefit of centralizing the payment processing facilities. Recommended remittance processing equipment, staffing, and processing procedures. Detailed action plans were developed to facilitate a successful implementation of recommendations.

Project Manager for a benchmarking study of integrated-voice-response technology for Illinois Power Company. Responsible for securing participation of companies from many industries and interviewing participants about their IVR strategy and deployment.

Project Manager for a study to uncover innovative products and services for the electric and gas utility industry. Coordinated a multi-client survey and investigation to detail the range of products and services offered; directed an intense literature search to document innovative products and services outside the industry that could be applied to the client; and developed a framework for assessing new products and services that fit with the client's business strategy. The results from this study have been used to focus and enhance the product and service development efforts of Pacific Gas & Electric.

Education & Certifications

B.S. Information & Computer Science, Georgia Institute of Technology.

Certified Female Business Enterprise: State of Illinois, Commonwealth of Pennsylvania, State of New York, and the City of Philadelphia.

Publications

The Ascent Group has conducted significant research into customer care best practices, process improvement, and performance benchmarking and maintains an extensive database of customer service metrics from companies in all industries. Additionally, The Ascent Group offers an online

benchmarking service to assist companies in ongoing performance measurement and best practice discovery.

The Ascent Group's publications include:

- Call Center Strategies
- Call Quality Improvement
- Credit & Collections Practices
- Achieving First Call Resolution
- IVR Improvement Strategies
- Reward & Recognition Program Profiles & Best Practices
- Improving Front-line Recruitment & Hiring
- Improving Front-line Training
- Improving Front-line Performance
- Billing & Payment Profiles & Best Practices
- Meter Reading Profiles & Best Practice

Jim Letzelter

Areas of Specialization

Utility planning and operations; production cost modeling; financial analysis; energy market assessment; transmission system and ISO analysis; power market strategy; asset valuation; management audits and assessments; litigation support; risk analysis and risk management.

Relevant Experience

The Liberty Consulting Group

Engagement Director for Liberty's management and operations audit of Atlantic City Electric for the New Jersey Board of Public Utilities. Task Lead for Liberty's review of Market Conditions and Procurement and Purchasing.

Lead Consultant for Liberty's auction monitoring and oversight for the Maryland Public Service Commission of the four Maryland Electric Utilities' Standard Offer Service procurement process.

Served as Lead Consultant in two Liberty audits for the Nova Scotia Utility and Review Board of Nova Scotia Power Inc.'s management and operation of fuel and purchased-power procurement. Responsible for reviews of load forecasting, economic dispatch, and cooperative dispatch.

Lead Consultant for Liberty's two fuel and purchased power audit of Mississippi Power providing comprehensive audit services of the Company's production cost models and processes for the Mississippi Public Service Commission. Assessed Load Forecasting and Economic Dispatch

Led Liberty's prudence review of Arizona Public Services' acquisition of Four Corners Units 4 and 5 on behalf of the Arizona Corporate Commission. That review included an examination of short-and long-term planning issues including environmental risk, fuel economics, transmission system capability, and demand and usage growth.

Lead Consultant for Liberty's integrated work with New Hampshire Commission Staff on an analysis of the competitiveness of the Public Service New Hampshire's generating fleet. This work provided a valuation of the power plants, addressing current and expected energy market conditions, the effects of increased cycling of units designed for baseload operations, potential costs associated with compliance with current and potentially increased environmental restrictions, impacts on the competitive market place, and other factors important for the Commission to consider in determining what future role might exist for utility-owned supply resources.

Lead Consultant on Liberty's review for the Public Utility Commission of Texas concerning Entergy Texas' exit for the Entergy System Agreement.

Lead Consultant for Liberty's fuel and purchased power audit of Entergy Mississippi providing comprehensive audit services of Entergy's production cost models and processes for the

Mississippi Public Service Commission. Assessed all of the models and processes associated with the Entergy's Monthly Energy Plan, the Weekly Procurement Process, and the Next- and Current-Day processes.

Lead Consultant for Liberty's work as Technical Consultant for the Delaware Public Service Commission in 2013, 2014, 2015, and 2016 auctions SOS auction monitoring. Liberty provided pre-bid monitoring included monitoring of announcements, bidder communication, bidder certification, bid system training, and bid system performance and market assessment. Bid day monitoring included live monitoring of the auction on-site, verification of bids, notification of winners, and contract signing.

Lead Consultant on Liberty's management and operations audit of Pepco for the District of Columbia Public Service Commission. Led Liberty's review of Power Supply.

Generation & Transmission Operations

Provided a renewable power developer with consulting support on placement of assets with respect to transmission topography. Study used to select connection points and predict bus-level power prices.

Performed an assessment of transmission constraints for a merchant generator for use in an asset valuation study. Used transmission constraint information to predict long-term power price implications, and the ability to move power to alternative markets.

Developed a power market price model based on dispatch costs, including transmission constraints and costs for a merchant power generation company.

Risk Analysis & Asset Portfolio Assessment

For a renewable energy development company, developed a sophisticated financial risk analysis model used by the client to bid on power project RFPs and to acquire capital from equity investors. Provided ongoing risk modeling and overall financial and market intelligence support.

For a power trading organization, developed a custom market intelligence tool to extract data from an industry standard forecasting package to meet the specific needs of energy traders.

Performed efficient frontier analyses incorporating probabilistic market forecasts for a wholesale generator. Potential generator additions were analyzed including expected means, standard deviations and the corresponding correlations of key inputs such as fuel price and demand. These forecasts were then utilized to determine the expected revenues and variance of the revenues to determine both existing system risk profile and the resulting risk profile for each addition.

For a merchant generating company, developed and deployed asset valuation tools utilizing correlated probabilistic market information. This provides a measure of intrinsic and extrinsic value to potential acquisition/development projects.

For a public power authority, performed a comprehensive risk analysis on the issue of nuclear plant life extension (NUPLEX) for the client's asset. Developed a risk management simulation tool to manage data and produce projections of future plant profitability under varying market, cost and regulatory scenarios. The work product was successfully employed by the client to make an informed decision on a major investment.

For a merchant generating company, developed and implemented a risk analysis and risk management tool for dealing with the uncertainty of emissions regulations. Implemented the model for the client and successfully led the organization through the maze of issues, including capital allocations, plant operations and investments that they faced.

Power Price Forecasting & Market Assessment

For an investment bank syndicate, provided critical power market assessments for use in a major energy bankruptcy case. On behalf of the official creditor's committee, provided power price forecasts, power market assessments, fuel market reviews and power plant financial assessments. Work product was successfully used in litigation.

For a merchant generating company, led the power market price forecasting initiatives related to power plant acquisition and development. Guided the analytical team in development of scenarios, model and data validation, and overall quality of results to be used for major investment and financing decisions in the U.S.

For a turbine manufacturer, performed power market assessments for a major turbine manufacturer. Developed forecasts of energy, capacity, and ancillary service prices to be used to define the place in the market for an emerging turbine technology.

For a European investment bank consortium, provided a detailed, comprehensive market assessment of global power markets to review the market for power generation turbines. With substantial investment in turbine manufacturers, the consortium relied on the expertise to make changes to their investment portfolios and shore up risk-plagued securities.

For a merchant generating company, provided market price forecasts to be utilized in the development and acquisition of power plants. Included forecasts of energy, capacity and ancillary services prices.

Asset Valuation, Acquisition & Development Support

For a merchant generating company, provided comprehensive power plant acquisition support. Managed market assessment process, provided asset valuations, defined acquisition price and assisted in property tax negotiations. Also highlighted the value of the asset with respect to asset re-powering opportunities.

For a merchant generating company, led the analytical efforts behind the acquisition of portions of three nuclear power plants. Included market comparables assessment, decommissioning fund valuation, and materials and supplies inventory valuation.

For a merchant generating company, provided a comprehensive financial and market analysis of re-powering opportunities for the client's older asset base. Included detailed assessment of market conditions and expected returns for various re-powering opportunities.

For a merchant generating company, successfully developed and deployed software to determine generating asset intrinsic and extrinsic value. Program utilizes probabilistic market price output from Aurora. Program also develops equilibrium market pricing for long-term time frame.

For a G&T co-op, provided a thorough asset valuation study to assess the impact of market uncertainties and financing parameters on the organization's asset values. Successfully provided the client with recommendations for potential divestiture and regulatory initiatives.

For a merchant generating company, provided a massive market assessment in support of a corporate power plant acquisition initiative. Included development of a detailed financial and valuation model for the client to use in future asset acquisition studies.

For a turbine manufacturer, provided a power market assessment and financial analysis to assess the viability of a new class of combined cycle units for the U.S. power markets. Included a comprehensive scenario analysis of fuel prices, load growth, emissions regulations and transmission constraints.

Model Implementation, Validation & Development

For a power market model vendor, provided support mapping generator assets in the client's proprietary model to generators in PowerWorld in order to enable locational marginal price assessment.

For an energy trading company, developed a custom interface for the AURORA electric power market model to seamlessly integrate within the client's analytical framework. Included data development and model validation, and custom report development.

For a merchant generating company, managed the overall process for transitioning the resource planning and forecasting department to AURORA. Included full data development, training, interface development, testing and validation. Successfully converted the business process to an AURORA-based system.

For an energy data provider, performed full audit review and validation of the client's power price forecasting processes. Reviewed input and output parameters for all national power price forecasts to improve the organizations accuracy and credibility.

For a merchant generating company, developed a customized power price forecasting tool to provide acquisition and development support, restructuring support and general corporate financial forecasts. Developed data sets for the model and provided training and validation.

For a regulated utility, developed a customized power price forecasting tool to provide acquisition and development support, restructuring support and general corporate financial forecasts. Developed data sets for the model and provided training and validation.

Emissions Analysis

For a merchant generating company, developed an enterprise-wide strategy for managing emissions constraints for the generating asset portfolio. Developed a probabilistic assessment model to consider plant operations, emission rates, control technology options, market forces and potential and existing emissions constraints. Deliverables resulted in a cohesive strategy and lobbying campaign for favorable regulations.

For a merchant generating company, performed a risk analysis of greenhouse gas regulation impacts on a potential fossil-fired asset portfolio acquisition. Deliverables included a detailed assessment of financial and asset value implications of various regulatory scenarios.

For a merchant generating company, provided an assessment of emissions regulations impacts on potential asset acquisitions. Included a market assessment of abatement technology costs and operating parameters, and a review of potential emissions regulations scenarios.

For an industrial chemical company, assessed the market for consumable chemicals to be used by emission control technologies. Client had an opportunity to take a position in supplying chemicals and needed an understanding of the regulatory and market conditions to support the investment.

Regulatory & Litigation Support

For a regulated electric & gas utility, provided regulatory and market analysis support in a contentious issue between competing utilities related to marketing and promotional practices. Assessed potential damages and rate impacts of regulatory decisions on the issue.

For a regulated electric & gas utility, performed a gas cost of service study to be use in a major rate case. Developed a proprietary model for cost allocation and financial implications.

For a regulated electric & gas utility, performed a massive cost of service study for a wholesale rate case brought before FERC. Implemented FERC's ECOS software and performed full study for a consortium of legal experts and consultants engaged in the case. The study led to a favorable resolution of issues.

For a regulated electric & gas utility, developed a custom ROE Calculation model to be used in rate-setting. The model captured highly complex algorithms into a manageable user interface. The model was approved by the state utility regulator and was successfully implemented.

For a regulated electric & gas utility, provided litigation support in a major utility restructuring proceeding. The project including development of exhibits, preparation of witnesses, developing testimony and cross-examination, and performing power market analyses.

Emerging Energy Technology Support

For a renewable energy development company, provided overall corporate development and supported the acquisition of investment capital.

For an emissions control technology company, provided comprehensive support for commercialization of a newly patented NOx control technology. The project included a detailed market assessment, development of a financial analysis tool for customer proposals, acquisition of venture capital and strategic planning for the company. All aspects of the project were highly successful.

For an energy technology company, provided market assessment and strategic support for an emerging energy conservation technology company. The company used advice to seek capital and market the products.

Publications & Presentations

"U.S. Power Markets Overview: An Issues Overview and Enhanced View of Eastern Markets," May 6, 2008, Gerson Lehman Group speaker sponsorship

"Economics of Coal-Fired Generation," March 2007, Goldman Sachs private speaker sponsorship

"Power Risk Management: Environmental Economics," 2007, Goldman Sachs private speaker sponsorship

"Predicting Long-Term Energy Prices with OptQuest: The GenMetric Model," May 3, 2006, Crystal Ball User Conference

"Using the Efficient Frontier," January 18, 2006, Internationally-broadcast Web Conference sponsored by Decisioneering

"Building the Perfect Generation Portfolio," September 2005, Public Utilities Fortnightly

"Finding the Efficient Frontier: Power Plant Portfolio Assessment," June 13, 2005, Crystal Ball User Conference

"The Efficient Frontier and Power Plant Portfolio Analysis," September 2004, EPIS Electric Market Forecasting Conference

"Power Asset Transactions: Regulatory Risks," June 24, 2004, Infocast Buying Selling & Investing in Energy Assets 2004

"Power Generation Asset Valuation," June 17, 2004, Crystal Ball User Conference

"Assessing Risk in a Changing Market," March 29, 2004, Platts Global Power Markets

"Our Energy Future," January 14, 2004, NET 2004 Conference

"Our Transmission Future," January 14, 2004, NET 2004 Conference

"Models Matter: The Art of LMP," November 6, 2003, Platts Electric Market Design Conference

"Risk Management Panel Discussion" Moderator, September 2002, EPIS Electric Market Forecasting Conference, Skamania, WA

"Venture Capital" Panel Moderator, December 3, 2001, Strategic Research Institute Energy Investor's Summit

"Leveraging AURORA: Modeling New Resource Development," November 13, 2001, EPIS Electric Market Forecasting Conference

"Optimizing Emissions Compliance: Emerging Technologies & Multi-Pollutant Regulation," July 26, 2001, Coal-GEN 2001

Letzelter, James C., Public Utilities Fortnightly, "The New Venture Capitalists: Utilities Go Shopping For Deals," December 2000

"Power Plant Emissions: Modeling Market Implications," September 22, 2000, EPIS Electric Market Forecasting Conference

"Emissions Modeling for Optimum Compliance," July 1999, Infocast SIP Call Conference

Letzelter, James C., Public Utilities Fortnightly, "Surviving the SIP Call: Fossil Plant Economics Under NOx Control," May 1, 1999

"Managing Emission Limit Changes: Challenges & Opportunities," January 29, 1999, CBI Merchant Plant Conference

Letzelter, James C., Power Finance & Risk, "The Impact of NOx Limits on U.S. Energy Markets," January 11, 1999

"Valuation of Electric Generating Assets," May 27, 1998, Gas Daily Conference

Letzelter, James C. and Axelrod, Howard A., Resource Magazine, "Risk Analysis in Resource Planning," Summer 1992 issue

Education

Doctorate in Law and Policy, Northeastern University
M.B.A., State University of New York at Albany
B.S.E.E., Clarkson University

John Adger

Areas of Specialization

Management studies for public utility commissions, and U.S. and Canadian gas industry regulation. Also, strategic analysis and business planning for the natural gas industry; natural gas supply and procurement strategy; natural gas marketing strategy.

Relevant Experience

Management Studies for Public Utility Commissions

Currently serving as a member of a Liberty team conducting a review of Washington Gas Light Company's PROJECT*pipes* gas main replacement project for the District of Columbia Public Service Commission. Primary responsibilities are assessing Program progress to date, and liaison with associated financial audit.

Served as a member of a Liberty team conducting a two-year review of The Peoples Gas Light & Coke Company's Accelerated Main Replacement Program for the Illinois Commerce Commission. The first year examined PGL's planning and implementation of the Program to date, and the second was intended to implement recommendations for improvement. Primary Adger responsibilities in Year One, assessing Program progress to that point.

Served as Lead Consultant in three Liberty audits for the Mississippi Public Service Commission of Mississippi Power Company's management and operation of fuel and purchased-power procurement. Responsible for reviews of fuel-oil and natural-gas contracting and management, including price-risk management, and the functioning of the Company's Fuel Cost Recovery and Energy Cost Mechanisms.

Served as Lead Consultant in Liberty's fourth audit for the Nova Scotia Utility and Review Board of Nova Scotia Power Inc.'s management and operation of fuel and purchased-power procurement. Responsible for reviews of forecasting and supply planning, and gas-supply planning, contracting and management. All four audits resulted in testimony to the Board in support of Liberty's findings, and work with Company and Board Staff to develop Action Plans for implementation of audit recommendations.

Served as Lead Consultant in two audits of the prudence of Arizona Electric Power Cooperative, Inc.'s fuel and purchased-power policies, activities and costs, and one such audit of Arizona Public Service Company, for the Arizona Corporation Commission. Responsible for reviews of fuel oil and natural gas purchasing, and fuel and purchased-power hedging.

Served as a Consultant in a management audit of Interstate Power and Light Company for the Iowa Utilities Board. Responsible for reviewing gas-supply activities, including price-risk management.

Served as Lead Consultant in two audits of the procurement practices for fuel and purchased power of Entergy Mississippi, Inc. for the Mississippi Public Service Commission. Responsible for reviews of fuel oil and natural gas purchasing and management, including price-risk management, and of power purchases and sales. Appeared before the Commission in support of Liberty's findings.

Served as Lead Consultant in a prudence review of the fuel and purchased-power activities of Southwestern Public Service Company for the New Mexico Public Regulation Commission. Responsible for reviews of fuel-oil and natural-gas contracting and management; price-risk management; and contracting for renewable energy.

Served as Lead Consultant in a management audit of Elizabethtown Gas Company, and in an earlier focused audit of affiliate transactions, both for the New Jersey Board of Public Utilities. Responsible for reviews of gas procurement, system operations and maintenance, manufactured gas plant remediation, and affiliate transactions.

Served as Lead Consultant in a general management and operations audit of the electric, gas and steam operations of Consolidated Edison Company of New York, Inc. for the New York Public Service Commission. Responsible for reviews of gas demand forecasting, gas procurement and supply management, and gas distribution system planning.

Served as a Team Leader for a focused management audit of the gas-supply procurement and supply-management practices of The Peoples Gas Light and Coke Company and North Shore Gas Company for the Illinois Commerce Commission. Responsible for reviews of affiliate relationships; load forecasting and gas-supply planning; procurement, sales and portfolio optimization; and storage and hub operations.

Served as Leader of the Gas Procurement Analysis Team in focused audits of affiliate transactions and general management audits of New Jersey Natural Gas Company and South Jersey Gas Company for the New Jersey Board of Public Utilities. Responsible for all reviews in the focused audits, and for the review of system operations in the general management audits.

Served as Lead Consultant in an audit of the affiliate relationships and transactions of Nova Scotia Power, Inc. for the Nova Scotia Utility and Review Board. Responsible for reviews of oil, gas and electric power relationships and transactions with affiliates.

For the State Corporation Commission of Virginia, served as a Consultant for an assessment of Virginia Natural Gas Company's asset-management agreement with its affiliate, Sequent Energy Management Company. Responsible for reviews of Sequent/VNG/AGLS roles and responsibilities in gas supply operations, and for transaction analysis.

Served as Project Manager for a review of the supply planning and asset-management agreements of EnergyNorth Natural Gas, Inc. for the New Hampshire Public Utilities Commission. Presented testimony to the Commission in the Company's Winter 2004/2005 Cost of Gas proceeding, and in a special proceeding convened to consider the results of the review.

Served as Consultant to an operations audit of the electric and gas transmission and distribution systems of NorthWestern Energy Company – Montana Division. Responsible for reviews of gas-system load forecasting and system design.

Lead Consultant in Liberty's management audit of the gas-purchasing function at the five largest gas distribution companies in Kentucky (Columbia Gas of Kentucky, Delta Natural Gas Company, Louisville Gas & Electric Company, Union Light, Heat and Power Company, and Western Kentucky Gas Company) for the Kentucky Public Service Commission. Responsible for reviews in gas supply planning, supply management, gas transportation services and system balancing.

Lead Consultant in Liberty's examination of cost allocation issues at Arkansas Western Gas Company for the Arkansas Public Service Commission. Responsible for the review of staffing levels.

Lead Consultant in Liberty's management audits of The Southern Connecticut Gas Company, Connecticut Natural Gas Corporation and Yankee Gas Services Company, for the Connecticut Department of Public Utility Control (now Connecticut's Public Utility Regulatory Authority). Responsible for reviews of gas supply and marketing activities, and manufactured gas plant remediation activities.

Managed Liberty's audit of the gas purchasing and supply management policies and practices of K N Energy, Inc. for the Wyoming Public Service Commission. Responsible for the reviews of gas acquisition, gas transportation and storage, relationships with affiliates, and response to regulatory change. Conducted supplemental evaluations in response to Liberty's initial findings, and presented testimony to the Commission in the proceeding to consider K N's pilot program for unbundling its services in Wyoming.

Consultant in Liberty's management audit of the Tennessee operations of United Cities Gas Company for the Tennessee Public Service Commission (now the Tennessee Regulatory Authority). Responsible for reviews in system operations, marketing, and affiliate relationships.

Lead Consultant in Liberty's audit of gas-purchasing policies and practices at Pike Natural Gas Company and Eastern Natural Gas Company for the Public Utilities Commission of Ohio. Responsible for the reviews of gas acquisition, gas transportation services, and response to regulatory change.

Consultant in Liberty's audit of the affiliate relationships of Public Service Enterprise Group (holding company for Public Service Electric & Gas Company) for the New Jersey Board of Regulatory Commissioners. Responsible for reviews of systems and processes, affiliate relationships, and transaction analysis with regard to (a) the purchase of gas from the Group's gas-producing subsidiary, (b) the purchase of electric power from the Group's IPP subsidiary, and c) the Group's real estate subsidiary.

Led the evaluation of gas-supply activities as part of Liberty's management audit of New York State Electric & Gas Corporation for the New York Public Service Commission.

U.S. and Canadian Gas Industry Regulation

Currently serving as a member of a Liberty team assisting the Staff of the New Hampshire Public Utility Commission in its evaluation of EnergyNorth Natural Gas, Inc.'s Integrated Resource Plan, and of its proposals for a new supply pipeline and a new liquefied natural gas manufacturing and storage facility.

Currently serving as a member of Liberty teams supervising power-supply auctions for standard offer service to customers of Baltimore Gas & Electric Company, Potomac Electric Power Company, Delmarva Power Company, and Potomac Edison.

Assisted the Staff of the Nova Scotia Utility and Review Board in the Board's consideration of revisions to the fuel adjustment (rate) mechanism for Nova Scotia Power Inc. Revisions included updates to the Plan of Administration, definition of costs eligible for recovery through the mechanism, and refinement of the mechanisms for collecting unrecovered balances. Previously assisted the Staff in considering adoption of the mechanism. Assistance included examination of Company proposals, comparison with similar mechanisms in other jurisdictions, and recommendations for changes as appropriate.

For a multi-client group that included the company and its stakeholders, served as a member of a Liberty team that analyzed the costs and benefits of a series of utility and non-utility investments in natural gas storage by Northwest Natural Gas Company. The team also evaluated the sharing arrangements for proceeds from asset-management agreements involving the storage facilities plus the company's upstream assets, comparing them to similar arrangements in other parts of the U. S. and Canada.

Served as a member of a Liberty team evaluating for the Counsel to the Nova Scotia Utility and Review Board a rate increase proposal by Nova Scotia Power, Inc. covering 2017 through 2019. Responsibilities included fuel oil and natural gas costs, and purchased-power expenses. Previously evaluated the same company's fuel-oil and natural-gas supply activities for the Board Counsel, presenting testimony in the Company's 2005, 2006, 2007, 2009, 2012, and 2013-2014 rate cases. After the 2005 rate case, assisted the Board in monitoring Company implementation of Liberty recommendations for improvements in fuel-supply management practices.

Served as a member of a Liberty team assisting the Staff of the Texas Public Utility Commission in its examination of Entergy Texas' exit from the Entergy System Agreement. Assisted evaluation of responsibility for a natural gas storage facility.

Served as a member of a Liberty team assisting the Staff of the Arizona Corporation Commission in its evaluation of Arizona Public Service Company's proposal to purchase Units 4 and 5 at the Four Corners Power Generating Station. Responsible for evaluating APS's assumptions about future natural gas prices.

Led a Liberty team assisting the Staff of Connecticut's Public Utility Regulatory Authority in evaluating a Natural Gas Infrastructure Expansion Plan. The Plan, developed as part of Connecticut's 2013 Comprehensive Energy Strategy, envisions increasing the number of gas

customers in the State by almost 50 percent over a 10-year period, while maintaining progress on the State's cast-iron main replacement program, and on other distribution-system safety-enhancement programs.

Served as a member of a Liberty team that assisted the Staff of the Nova Scotia Utility and Review Board in its evaluation of a proposal by an affiliate of Nova Scotia Power to install a high-voltage undersea cable to connect Nova Scotia to Newfoundland. The proposal was part of a much larger project involving hydroelectric generation in Labrador, plus high-voltage transmission from Labrador to Newfoundland, and Newfoundland to Nova Scotia. Responsible for evaluation of fuel-price assumptions used in comparative analysis.

Assisted the Staff of the District of Columbia Public Service Commission in monitoring the progress of a distribution-pipe repair program to address persistent leaks. Assistance included evaluation of project definition, examining the use of leak data in project prioritization, and evaluation of program progress.

Served as a member of a Liberty team that assisted the Staff of the New Hampshire Public Service Commission in evaluating the economic viability of Public Service Company of New Hampshire's fossil-fired generation.

Served as a member of a Liberty team that assisted the Staff of the Nova Scotia Utility and Review Board in its evaluation of a proposed biomass-fueled cogeneration project. Responsible for review of the operating agreement with the host facility.

Assisted the Staff of the District of Columbia Public Service Commission in its review of proposals to deal with the introduction of re-vaporized liquefied natural gas into Washington Gas Light Company's gas distribution system. Assistance included preparing advisory memoranda for the commissioners, briefing the Commission on issues, attending hearings, preparing detailed recommendations for issue resolution, and for monitoring WGL's system-repair program.

Assisted the Staff of the New Hampshire Public Utilities Commission in its consideration of peak-period gas-supply alternatives for EnergyNorth Natural Gas, Inc. Reviewed filed materials, independently analyzed key alternatives, and presented expert testimony to the Commission regarding Liberty's findings.

Served for several years as an extension of the Staff of the Connecticut Department of Public Utility Control. Projects included

- Five general rate cases for the gas distribution companies operating in the State
- Two facilities-certification proceedings, including evaluation of a proposed liquefied natural gas production and storage facility
- Consideration of incentive rate plans for all three gas distribution companies, and a special system-extension rate mechanism for one of them
- Consideration of purchased-gas adjustment filings for all three gas distribution companies
- Consideration of proposed asset-management agreements for two of the companies, including renewals of those agreements
- Consideration of a third-party audit of the affiliate relationships of one of the gas distribution companies

- Consideration of Consolidated Edison Company's proposed acquisition of Northeast Utilities.

For a regional marketer of gas and electricity, directed an analysis of the role of the purchased-gas-cost adjustment mechanism in forming retail prices for natural gas in Ohio.

Presented expert witness testimony on FERC rate-design policy to a pipeline-rates proceeding before the Texas Railroad Commission.

For the staff of a regulatory commission in the northeast U.S., evaluated a gas-service and capacity-release project that was proposed by a jurisdictional utility.

Directed Liberty's analysis for the Georgia Public Service Commission of the impacts of FERC's Order 636 on gas rate structures in Georgia.

Other Experience

Strategic Analysis and Business Planning

Served as a member of a Liberty team assisting the Staff of the Nova Scotia Utility and Review Board in its participation in development of Nova Scotia Power, Inc.'s 2014 Integrated Resource Plan. Assistance primarily in the areas of fuel price assumptions and sensitivity analysis. Previously assisted Board Staff in the 2009 Update of a comprehensive IRP prepared in 2007.
Served as a member of a Liberty team that conducted an extensive review of operating-cost structure and cost allocation for National Grid USA. Supported reviews in business unit structure and interactions, and in service-cost management.

For an offshore supplier of liquefied natural gas, advised on strategic and market factors affecting alternative locations for entering the U. S. gas market.

Consultant on a merger-benefits study performed for an electric distribution cooperative and a local farmers' cooperative.

Lead consultant on a business-enhancement project for a Rocky-Mountain-area electric cooperative. Responsible for diversification-planning task.

For an investment banking group, identified themes for enhancing the value of gas distribution and transmission/storage business segments through acquisitions, and used those themes to develop criteria for acquisitions.

Co-directed a project to develop a comprehensive unbundling strategy for a gas distributor with operations in 12 states.

Directed a project to assist an electric utility in exploring opportunities in related businesses. Options considered included gas pipeline and storage projects; distribution of other fuels including natural gas, propane and heating oil; and ventures in telecommunications.

For a combination electric and gas utility company in the Midwest U.S., participated in a major re-evaluation of its strategy for its gas business unit.

For a major Canadian pipeline company, prepared an analysis of strategic factors in U.S. pipeline industry mergers. Subsequently presented findings of the study to the company's Corporate Strategy and Policy Committee.

Natural Gas Supply Strategy

For two municipal electric power systems, directed an evaluation of capacity availability on a pipeline-system segment serving a large number of gas-fired electricity-generating facilities. The results of that evaluation were used to develop alternative approaches to gas-supply contracting for a generating facility owned by the cities.

For Kansas Pipeline Operating Company, evaluated certain gas supply contracts entered into by Western Resources' KPL Gas Service Company, and Southern Union's Missouri Gas Energy. Presented testimony to the Kansas Corporation Commission, and to the Missouri Public Service Commission.

Performed gas supply evaluations as part of a general work process improvement study for a power-supply cooperative in the southeast U. S.

For a steam utility in Pennsylvania, solicited offers for gas supply, and helped evaluate the responses.

For the Potomac Electric Power Company, assisted in the development of comprehensive policies and procedures for fuels procurement. Responsible for gas acquisition policies and procedures.

Directed development of a gas supply strategy for a power-supply cooperative's first combustion turbines. (Coop's generation previously all coal-fired.)

For Delmarva Power & Light Company, assisted an internal review of gas supply planning for electric power generation.

Natural Gas Marketing Strategy

Assisted a production-area storage developer in identifying prospective users of a proposed gas storage facility, and in marketing interests in the project.

For National Fuel Gas Supply Corporation, analyzed potential markets for gas storage and pipeline capacity in particular sectors and particular geographic areas. Also recommended opportunities in electric utility industry restructuring for consideration by NFGS management.

Prior Experience

1983-1987: ICF, Incorporated: consulting projects for firms in all segments of the oil and gas industries in the U. S. and Canada
1974-1982: U. S. Government: policy analysis for and regulation of all segments of the oil and gas industries in the U. S. and Canada
1969-1973: Mobil Oil Corporation: oil and gas exploration activities in Libya and Indonesia

Education

The Massachusetts Institute of Technology: M.S., Geology and Geophysics; B.S., Earth Sciences and Chemical Physics (double major)

Michael James

Areas of Specialization

Information Systems specialist with over 35 years of business and consulting experience, including significant experience directing the transformation of large and complex information systems organizations. Particular areas of expertise and emphasis include Strategic IT and Business Planning, IT Transformation, Quality Assurance/Project Management, Application Systems Delivery, and Process Improvement.

Relevant Experience

Founded in 1993, James Consulting Group, Inc. is a Management Consulting firm dedicated to providing management advice and service regarding the effective use of Information Technology in business. Prior to forming his own firm (James Consulting Group, L.L.C.), Mike was a Partner with Scott, Madden & Associates, a general management consulting firm. He was also a Partner with KPMG Peat Marwick LLP (now Bearing Point) in their Enabling Technologies consulting practice where he led the development of their methodologies addressing Strategic IT Planning and IT Transformation. Mike has been instrumental in helping companies address the transformation of their information technology organizations to that of a value added service provider and partner in solving business problems through the pragmatic use of technology and improved business processes. In the course of his career, he has performed and managed a wide variety of assignments in many different industries, including electric, gas and water utilities, telecommunications, energy, manufacturing, professional services, retail, transportation, distribution and high tech manufacturing and insurance.

Mike was an officer with the Long Distance division of Sprint with responsibility for over 1,00 staff and contract personnel located in four states. At Sprint he had responsibilities for the development and maintenance of various billing, customer service, provisioning and marketing systems; He also performed the role of Divisional CIO for the Residential and Small Business Divisions of Sprint. Previously, Mike was an executive with Carolina Power & Light (now Progress Energy) with responsibility for their systems development and maintenance organization. In that capacity he led the turnaround of the applications systems area; his organizations were recognized via an independent, external assessment as having achieved World Class status in terms of quality of systems delivered, productivity, and management processes. He also worked with Shell Oil as an internal consultant responsible for strategic planning, with Price Waterhouse in their consulting group, and with IBM. Before joining the business community, he was a Naval Aviator flying jets.

Mike has directed and served as project leadership for a wide range of Information Systems assignments over his career. Listed below are samples of the assignments that provide a representative listing of his experience in Strategic IT and business planning, IT Transformation, Quality Assurance and Project Management, and Application Systems Delivery:

- BC Hydro
- Hawaiian Electric Company
- Salt River Project
- BC Gas
- Jamaica Public Service
- San Diego Gas & Electric
- Carolina Power & Light
- (now Duke Energy)
- Lone Star Gas
- Southern Company
- Cinergy
- Northwest Natural Gas
- Southwest Gas Company
- Duke Energy
- ONEOK
- Texas – New Mexico Power
- Energis
- Philadelphia Gas Works
- Texas Utilities
- Garland Power & Light
- Public Service Electric & Gas
- Washington Gas

Education

Graduate of the U.S. Naval Academy and has a Masters of Science degree in Systems Management from the University of Southern California.

Michael Antonuk

Areas of Specialization

Energy and telecommunications data system analysis and research, project management and business planning.

Relevant Experience

Senior Analyst and project coordinator on the following Liberty management and operations audit, providing project management support, analytical support, as well as assisting in several audit task areas:

- Management and Operations audit of Atlantic City Electric for the New Jersey Board of Public Utilities.
- Staffing Study of all New York electric and gas utilities for the New York Public Service Commission.
- Investigation of Peoples Gas of Chicago's Advanced Main Replacement Program for the Illinois Commerce Commission.
- Management and operations audit of Pepco for the District of Columbia Public Service Commission.
- Management and operations audit of Alliant Energy for the Iowa Utilities Board.
- Management and operations audit of the electricity, natural gas, and steam operations of Iberdrola SA/Iberdrola USA/NYSEG and RG&E for the New York Public Service Commission.
- Management and operations audit of the electricity, natural gas, and steam operations of ConEd for the New York Public Service Commission.
- Management and operations audits for the New Jersey Board of Public utilities of Elizabethtown Gas/AGLR, New Jersey Natural Gas/NJR, South Jersey Gas/SJR, and Elizabethtown Gas/ETG.

Senior Analyst on Liberty's forensic audit for the Maine Public Utility Commission seeking to identify the root causes of a customer billing complaints following conversion of its customer information system to a new platform.

Senior Analyst on Liberty's management and operations audit of Washington Gas Light's PROJECT*pipes* for the District of Columbia Public Service Commission.

Senior Analyst on Liberty's evaluation on behalf of the New Hampshire Public Utilities Commission of the Liberty Utilities' Integrated Resource Plan to determine the reasonableness of planning processes and analyses, addressing factors including load growth, system planning, and supply planning, and their use to justify significant capital expenditures for a new pipeline and a very large LNG facility designed to increase the availability of capacity and supply.

Senior Analyst on three audits of fuel procurement and management practices of Nova Scotia Power, a review of the merits and mechanics of a company-proposed automatic recovery method for energy costs, and an audit of affiliate relationships (including coal, electric power, and natural gas procurement activities) performed for the Nova Scotia Utility and Review Board.

Senior Analyst for Liberty's management/performance audit and financial audit of coal procurement and management of Duke Energy Ohio for the Public Utilities Commission of Ohio (PUCO).

Senior Analyst in an audit of the fuel and purchased-power procurement practices and costs of Arizona Public Service Company for the Arizona Corporation Commission. Responsible for reviews of the gas and power transactions of the utility and a wholesale marketing affiliate.

Senior Analyst on Liberty's management and operations audit of Columbia Gas of Ohio for the Public Utilities Commission of Ohio.

Project Coordinator and Senior Analyst for Liberty's focused and general management audits of NJR, New Jersey Natural Gas, and affiliates for the New Jersey Board of Public Utilities. Personally performed the reviews of all gas transactions of the Utility and a wholesale gas marketing affiliate, assisted in the review of EDECA requirements compliance.

Project Coordinator and Senior Analyst on Liberty's focused management and affiliates audit of People's Energy/Integrys for the Illinois Commerce Commission. Responsible for reviews of natural gas transactions of two regulated utilities, a retail energy affiliate, and a wholesale marketing affiliate.

Analyst for Liberty's work with staff of the Virginia State Corporation Commission to evaluate the services of an affiliate providing gas portfolio management services under an asset management agreement with Virginia Natural Gas, an operating utility subsidiary of Atlanta-based AGLR. Analyzed commodity trade transaction and accounting information for gas purchases and sales by an affiliate conducting trades for utility and non-utility operations. Reviewed and assessed controls systems related to transactions and sharing of value between the utility and the affiliates.

Performed research and analysis as part of Liberty's audit of the competitive service offerings of New Jersey's four main electric companies on behalf of the New Jersey Board of Public Utilities, focusing on cost allocation issues and compliance with the separation guidelines within the New Jersey Energy Competition Standards.

Responsible for designing and implementing sample reviews and analysis of cost data sets as part of Liberty's transmission and distribution revenue requirements audit of Commonwealth Edison for the Illinois Commerce Commission. Performed extensive, detailed examinations of utility cost and operations data.

Education

B.S. in Business and Economics, Finance Major, Lehigh University