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STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION

DOCKET NO. DG 17-152

IN THE MATTER OF:

LIBERTY UTILITIES (ENERGYNORTH NATURAL GAS) CORP. d/b/a LIBERTY UTILITIES

LEAST COST INTEGRATED RESOURCE PLAN

DIRECT TESTIMONY OF

JOHN ANTONUK AND JOHN ADGER
OF
THE LIBERTY CONSULTING GROUP

SEPTEMBER 6, 2019

Introduction

Q. Please state your names and addresses.

A. My name is John Antonuk. I am President of The Liberty Consulting Group, and Engagement Director for our work in support of the Commission Staff in this matter.

My name is John Adger. I am a Senior Consultant for The Liberty Consulting Group.

Our business address is c/o The Liberty Consulting Group, 1451 Quentin Road, Suite 400 #343, Lebanon, PA 17042.

Q. What is the purpose of your testimony in this proceeding?

A. In October 2017, Liberty Utilities (EnergyNorth Natural Gas) Corp., d/b/a Liberty Utilities (EnergyNorth or the Company) filed a Least Cost Integrated Resource Plan (LCIRP or Plan). The Plan addresses EnergyNorth's demand forecast for the next five years (2017/2018 through 2021/2022), the planning standards for determining its resource requirements for that period, and an assessment of its gas-supply resource portfolio. EnergyNorth requested approval of its Plan. EnergyNorth reported its "conclusion"[1] that replacing its aging propane-based peaking facilities "is necessary and appropriate to maintain reliable service and achieve a best-cost portfolio."[2] Our testimony in Docket No. DG 17-198 addresses later statements by management describing such retirement in terms of a possibility, as opposed to a firm plan.

[1] See Liberty Utilities, "Least Cost Integrated Resource Plan," filed in Docket No. DG 17-152 on October 2, 2017, at page 48.
[2] *Ibid.*

In March of this year, the Commission directed EnergyNorth to make a supplemental filing to address certain statutory requirements not covered in its original filing.[3] Those requirements allow the Commission to assess "potential environmental, economic and health-related impacts" of the LCIRP. That filing was made on April 30, 2019. After a Technical Session held at the Commission's offices on June 20, the Company further supplemented its Plan with expert testimony regarding those impacts.[4]

We have reviewed the Company's filings and its responses to data requests, and we have participated in all of the Technical Sessions in this matter.

This testimony, however, addresses the subjects addressed by the original LCIRP; *i.e.*, demand forecasting, planning standards, and EnergyNorth's assessment of its resource portfolio. The particular questions that we address are as follows:

1. Is EnergyNorth's demand forecast reasonable, and does it provide an appropriate basis for assessing its supply requirements for the IRP forecast period?
2. Are EnergyNorth's planning standards (normal year, design year and design day) reasonable, and do they provide an appropriate basis for assessing its supply requirements for the IRP forecast period?
3. Is EnergyNorth's assessment of its resource portfolio reasonable?

[3] New Hampshire Public Utilities Commission, Order No. 26,225, "2017 Least Cost Integrated Resource Plan, Order Denying Motion to Dismiss," issued in Docket No. DG 17-152 on March 13, 2019
[4] "Direct Testimony of Paul J. Hibbard", "Direct Testimony of Sherrie Trefry" and "Direct Testimony of Eric M. Stanley", all filed in Docket No. DG 17-152 on June 28, 2019.

Our evaluation of these aspects of the LCIRP as filed has been informed by responses to many data requests and presentations from the Company, and discussions at Technical Sessions in this matter.

With respect to the statutory requirements that electric and gas LCIRPs must address, we have not addressed potential environmental, health-related, and broad socio-economic impacts of proposed aspects of the LCIRP, but we note that the Company has provided supplemental filings that discuss the Plan's integration of and impact on the State of New Hampshire. We do not address the adequacy of the Company's assertions made about those issues in its supplemental filings.

Q. Please provide summaries of your qualifications in this matter.

A. John Antonuk is a founder of The Liberty Consulting Group (Liberty Consulting), which has served more than 40 utility regulatory authorities and a similar number of energy utilities across more than thirty years of service. He has served as the firm's president for many years, managing over 200 Liberty Consulting projects. Most of those projects have examined utility management and operations, and dozens have addressed the areas of natural gas and electricity supply planning and energy acquisition. His work on behalf of this Commission and its Staff extends across more than two decades. It includes directing and testifying about the results of a recent examination of a range of Liberty Utilities and affiliate functions and activities, including program and project planning and execution.[5]

[5] See The Liberty Consulting Group, "Final Report on a Management and Operations Audit of the Customer Service and Accounting Functions of Liberty Utilities," presented to the New Hampshire Public Utility Commission, August 12, 2016. The Liberty Consulting team that produced that report filed testimony about its investigations on December 16, 2016, in Docket No. DE 16-383.

Mr. Adger has led the firm's Natural Gas Practice Area for two decades. Since leaving government service as an Office Director at the U. S. Federal Energy Regulatory Commission, he has served clients in all segments of the natural gas industry in the United States (U.S.) and Canada. He began his association with Liberty Consulting in 1991, joining the firm full-time in 1994.

He has extensive experience with natural gas in the Northeast U.S. and Maritimes Canada. From late 1999 through 2004, he served as an adjunct to the Staff of Connecticut's Department of Public Utility Control, predecessor to today's Public Utilities Regulatory Authority. He participated in a number of proceedings during that period, including that agency's consideration of an LNG facility proposed to be constructed by Yankee Gas Services Company in Waterbury, Connecticut. The facility was authorized, and Mr. Adger returned in 2007 to assist with the Staff's evaluation of its costs. In 2013, he returned as a member of a Liberty Consulting team to assist the Staff in evaluating the Connecticut gas distribution companies' Natural Gas Infrastructure Expansion Plans, which envisioned increasing the number of gas customers in Connecticut by almost 50 percent over 10 years.

Mr. Adger was also a member of Liberty Consulting's team that served Nova Scotia's Utility and Review Board for 14 years (2004-2018), examining Nova Scotia Power's fuel-supply

Members of that team conducted a review in 2017 to assess management's progress in implementing the audit's recommendations. See The Liberty Consulting Group, "Recommendations Verification of Liberty Utilities", presented to the New Hampshire Public Utility Commission on November 1, 2017, filed as attachment SPF-8 in the Direct Testimony of Steven P. Frink on November 30, 2017, in Docket No. DG-17-O48.

planning and management. His responsibilities included fuel-requirements forecasting and natural-gas supply planning, contracting, and management.

In New Hampshire, Mr. Adger led a Liberty Consulting team that evaluated EnergyNorth's supply planning and asset-management agreements in 2004 and 2005. That assignment included a review of EnergyNorth's then-current Integrated Resource Plan. The team returned in 2007 to assist the Commission Staff in its evaluation of EnergyNorth's proposal to enter a contract with the Tennessee Gas Pipeline Company (TGP) to expand the Concord Lateral. In early 2008, Mr. Adger and a colleague filed testimony in Docket No. DG 07-101 supporting the Company's proposal, which this Commission accepted. That expansion is covered by what EnergyNorth now refers to as its "Dracut 30" transportation contract with TGP.

Mr. Adger is currently serving as Lead Consultant for a comprehensive examination by Liberty Consulting of the natural gas supply procurement and management practices of the Maine Division of Northern Utilities, Inc. (Northern) for the Maine Public Utilities Commission. Northern also provides natural gas service in parts of New Hampshire. The personnel and processes used in Maine also support Northern's gas operations in New Hampshire.

Attachments 1 and 2 to this testimony present more complete descriptions of our backgrounds and experience.

Q. Please summarize your firm's experience in reviewing gas utility integrated resource plans.

A. We have reviewed gas-supply planning, management, and operations at many gas distribution companies and combination electric and gas utility companies over the firm's more than three decades of operation. A Liberty Consulting team evaluated EnergyNorth's 2004 LCIRP.

Demand Forecasts

Q. How does EnergyNorth forecast the demand that it needs to plan for?

A. The Company uses econometric models for forecasting, and then adjusts the results for factors that the models do not capture. The LCIRP modeled use-per-customer and numbers of customers. EnergyNorth calculated out-of-model adjustments for: (a) the effect of increased sales and marketing efforts, and (b) new customers resulting from expansion into new service territories. Management then reduced the adjusted volumetric results of its modeling for expected energy efficiency savings. These reductions and adjustments produced a forecast of net demand requirements.

The 2017 LCIRP filing combined EnergyNorth's 17 rate classes into four segments for sales and capacity-assigned transportation customers, and two segments for capacity-exempt customers. Monthly billing data for August 2010 through April 2017 then drove its models, which used regression analysis. For each segment, regression of a number of economic and demographic factors against numbers of customers produced the forecast equation for

numbers of customers in that segment. Regression of customer use in each segment against weather data produced the use-per-customer equation.

EnergyNorth based its out-of-model adjustments on annual customer addition estimates for each segment. Its Sales & Marketing Group provided those estimates. Where the estimates from the Sales & Marketing Group exceeded those of the econometric forecast for portions of the existing service territory, management adjusted customer additions by the difference between the two. EnergyNorth did not employ an econometric forecast for prospective new service territories. It instead employed annual estimates of customer additions by rate class, as provided by the Sales & Marketing Group and based on market survey data provided by a contractor. EnergyNorth then aggregated those estimates into the six customer segments and added them to the respective forecasts. EnergyNorth assumed use per customer for each segment in the prospective new service territories to equal the value applied for the existing service territory.[6]

Q. What is your opinion of EnergyNorth's forecast methods?

A. We found the methods and results of the numbers-of-customers and use-per-customer models reasonable. We found the form of the customer-number models similar to those of neighboring utilities, and the diagnostics for the regression equations satisfactory. All six segments showed slight to moderate declines in use per customer, which generally matches results in comparable areas. The reductions for energy-efficiency savings also appeared reasonable.

[6] LCRIP filing page 22 describes the Company's explanation of these methods.

However, we found the out-of-model adjustments for EnergyNorth's increased sales and marketing efforts aggressive. Those adjustments increased the demand forecasts for the IRP forecast period from a compound annual growth rate (CAGR) of 0.9 percent per year[7] to 2.7 percent per year.[8]

Q. Describe the Sales & Marketing adjustments in EnergyNorth's original filing.

A. The following table[9] shows the original forecast for customer additions across the IRP forecast period. The Sales & Marketing adjustments account for 19 percent more new customers than do the econometric models.

Forecasted Customer Additions

Year	*Econometric Forecast*	*Sales & Marketing Adjustment*	*Total Additions*
2018/19	1,253	1,183	2,436
2019/20	1,197	1,212	2,408
2020/21	1,122	1,600	2,722
2021/22	1,182	1,652	2,834

Q. Did EnergyNorth adjust its the Sales & Marketing **Group's forecasts of customer additions following the original filing?**

A. EnergyNorth has twice revised its forecasts for customer additions. The first revision followed the May 2018 Technical Session, in which it made several Sales & Marketing adjustment revisions, including the following:

- Moving Concord Steam Corporation forecasted customers additions in the existing service territory to an out-of-model adjustment

[7] From Table 20 at page 21
[8] From Table 23 at page 24
[9] Source: Attachment Staff 1-9.xlsx

- Moving customer additions in the new service territories of Windham and Pelham from forecasted additions in the existing service territory to an out-of-model adjustment
- Reducing several other customer-addition forecasts to reflect more recent information.[10]

The table below[11] shows the effect of those revisions.

First Revised Sales & Marketing Adjustment

Year	*Original Sales & Marketing Adjustment*	*Revised Sales & Marketing Adjustment*	*Revised Total Customer Additions*[12]
2018/19	1,183	707	1,961
2019/20	1,212	885	2,081
2020/21	1,600	1,060	2,182
2021/22	1,652	1,202	2,384

The revised forecast still adds substantially to the Econometric Forecast, yielding a CAGR of 2.1 percent in the number of customers.

The Supplemental Direct Testimony in Docket No. 17-198 of Messrs. DaFonte and Killeen identified the second revision. That testimony reported three adjustments to the revised demand forecast provided in Attachment Staff Tech 1-7.1.[13] Only one of those changes affected Sales & Marketing's out-of-model adjustments, however. That effect occurs after the LCIRP forecast period. The revisions did not affect the Normal Year, Design Year or Design Day estimates of required gas-supply capacity for the IRP forecast period.

[10] A report on these changes was provided in Attachment Staff Tech 1-7.1, "Detailed Review of EnergyNorth's Demand Forecast, Docket Nos. DG 17-152 and DG 17-198."
[11] Source of the revised adjustment: Attachment Staff 4-5.c.1.xlsx
[12] Includes Econometric Forecast of customer additions
[13] Supplemental Direct Testimony of Francisco C. DaFonte and William R. Killeen, filed in Docket No. DG 17-198 on March 15, 2019. See pages 47-49 (Bates 051-053)

Q. How do the Company's actual customer additions compare to its forecasts?

A. EnergyNorth has reported limited overlap between forecast and actual customer additions. The table below presents the available data, taken from responses to data requests in this proceeding and in Docket No. DG 17-198.

Forecasted versus Actual Customer Additions

Year	Forecasted[14]	Actual[15]
2014/15	1,750	1,483
2015/16	1,835	1,778
2016/17	2,110	1,790
2017/18		1,586
2018/19	1,961	1,501*
2019/20	2,081	
2020/21	2,182	
2021/22	2,384	

* Year-to-date and committed

Q. What do you conclude about likely customer additions across the forecast period?

A. The data show that EnergyNorth is adding customers, and doing so at a higher rate than it did before Liberty Utilities acquired the Company. Recent experience, however, suggests that EnergyNorth's Sales & Marketing Group is overly optimistic about the rate of customer additions. The rate is likely to be higher than the econometric forecast, but not as high as the forecasts suggest. Considering recent experience, we consider more appropriate a plan for adding about 1,600 to 1,800 customers per year for the balance of the IRP forecast period. A rate of 1,700 would produce a CAGR of 1.7 percent per year in number of customers for the

[14] Sources: response to DR No. Staff 4-10.d in Docket No. 17-152 for 2014/2015 through 2016/2017. The data in that response is for calendar years, rather than for the Forecast Years in the table, so we used the estimate with the most overlap with the Forecast Years in this table. For example, the entry for 2014/2015 is the number for 2015 in the DR response. The numbers for 2018/2019 through 2021/2022 are from Attachment Staff 4-5.c.1.xlsx in Docket No. DG 17-152.

[15] Source: response to DR No. Staff 8-2 in Docket No. DG 17-198

forecast period, down from the 2.1 percent per year that resulted from the Company's June 2018 revision.[16]

Q. Do you have any other observation about EnergyNorth's demand forecasts?

A. Yes; EnergyNorth adjusted its aggregate demand forecast for unaccounted-for gas and unbilled sales, and used regression analysis to develop forecasts of daily requirements. We found these typical and appropriate. EnergyNorth's application of them to the Net Demand numbers, however, produced a CAGR for the Normal Year Total Planning Load of 3.2 percent per year.[17] We view this rate as too high, because the forecast number of customers is too high, as discussed above. We do not have access to the necessary inputs for recalculating the Normal Year Total Planning Load, but we recommend that EnergyNorth recalculate it using the lower numbers for customer additions.

Q. How do EnergyNorth's forecasts compare with those of neighboring utilities?

A. Northern Utilities, Inc. (Northern) recently filed its IRP for the period 2019/2020 through 2023/2024.[18] That company's New Hampshire service territory is close geographically to EnergyNorth's. We looked at Northern's forecasts for its New Hampshire territory to see how they compare with EnergyNorth's.

Northern's New Hampshire Division (NUI-NH) has a smaller customer base than does EnergyNorth -- 32,990 customers in 2018[19] versus 99,466.[20] Its mix of customers parallels

[16] This is the revision reported in Attachment Staff Tech 1-7.1 in Docket No. DG 17-152.
[17] Source: Attachment Staff Tech 1-7.1 in Docket No. DG 17-152, at Table 1 on page 2
[18] Northern Utilities, Inc., 2019 Integrated Resource Plan, submitted jointly to the Maine Public Utilities Commission and the New Hampshire Public Utilities Commission, July 19, 2019
[19] Sum of Residential Customers for the 2017/2018 Gas Year from Table IV-19 on page IV-59 of Northern's IRP, plus C&I LLF from Table IV-23 on page IV-62, plus C&I HLF from Table IV-24 on page IV-63.
[20] Liberty Utilities (EnergyNorth Natural Gas) Inc., 2018 Annual Report to the New Hampshire Public Utilities Commission. See Page 31.

that of EnergyNorth -- 79.3 per cent residential/20.7 percent commercial and industrial (C&I) versus 86.3 percent residential/13.7 percent C&I for EnergyNorth. NUI-NH combines its Residential Heating and Non-Heating customers, producing use per customer of about 72 Dth/year. EnergyNorth calculates about 77 Dth/year for Residential Heating customers and about 23 Dth/year for Residential Non-Heating. Part of C&I use per customer is also similar: NUI-NH's use per customer for low-load-factor (LLF) customers is about 540 Dth per year, whereas EnergyNorth's for C&I heating customers falls just under 600. NUI-NH's use per customer in its high-load-factor C&I segment is higher than EnergyNorth's in its Non-Heating segment - - about 3,200 Dth/year compared to EnergyNorth's 1,200.

NUI-NH experienced a CAGR of 2.1 percent per year in its numbers of customers for years 2014/2015 through 2018/2019, but forecasts a slowing to 2.0 percent per year over the next five years. It forecasts net demand, after adjustment for energy efficiency savings, to grow by a CAGR of 1.4 percent per year,[21] considerably less than EnergyNorth's forecast rate of 2.7 percent per year.[22] NUI-NH's Net Demand is adjusted for Company Use, Lost and Unaccounted-For Gas and Energy Efficiency Savings to yield Normal Year Throughput, which appears to be roughly equivalent to EnergyNorth's Total Planning Load. NUI-NH's Normal Year Throughput is forecast to grow at a CAGR of 1.4 percent per year,[23] considerably less than EnergyNorth's 3.2 percent per year.

[21] NUI IRP, Table IV-28 at page IV-66
[22] EnergyNorth IRP, Table 24 at page 25
[23] NUI IRP, Table IV-35 at page IV-70

We attribute the difference in large part to the two companies' differing expectations for growth in their respective numbers of customers. NUI-NH's forecasts produce customer additions predicted by econometrics; EnergyNorth adds to its econometric forecasts out-of-model adjustments provided by its Sales & Marketing Group.

Planning Standards

Q. How did EnergyNorth develop its Normal Year planning standard?

A. EnergyNorth calculated the average annual number of heating degree-days (HDDs) using 30 years of HDD data for the Manchester weather station. It then replaced the 30-year average months with data-set actual months similar to the average HDD and standard deviation for each month. The results produced Normal Year HDD of 6,325, distributed through the year as shown in Table 27 of the LCIRP, at page 28 (Bates Page 32).

Q. How did the Company select a Design Year and a Design Day?

A. Management selected values of 71.4 HDD for the Design Day, and 6,869 HDD for the Design Year. The Company used a Monte Carlo analysis of 38 years of temperature data from the Manchester weather station (January 1, 1979 through December 31, 2016) to select its Design Year and Design Day. The Design Day calculation employed statistical analyses of the coldest day of each year; the Design Year calculation employed statistical analyses of the total HDDs in each calendar year. In both cases, management selected as its planning basis the average plus two standard deviations, which results in a probability of only about 2.5 percent that the selected value would be exceeded. EnergyNorth used monthly HDDs and standard deviations to distribute the HDDs through the year in a manner that would reflect daily and monthly variation.

Q. What is your opinion of this approach?

A. We found it acceptable. Use of Monte Carlo simulation to select these parameters is now industry best practice. Companies' methods for distributing the Design Year HDDs through the year can vary somewhat, but we found the EnergyNorth methods appropriate.

Q. So what do you conclude about EnergyNorth's planning standards?

A. We found no concerns with the methods that EnergyNorth used to determine its planning standards, neither the methods that the Company used nor the results that it obtained.

However, we did find the demand forecasts produced by applying the Company's choice of standards too high, because the numbers of customers used to produce those numbers are too high, as explained above. We do not have access to all of the inputs necessary to produce alternative values for Normal Year Demand, Design Year Demand and Design Day Demand, but we recommend that the Company recalculate those parameters using our lower estimates of customer additions.

Q. Do you have any other comments about EnergyNorth's discussion of its Planning Standards?

A. At the end of the LCIRP's discussion of Planning Standards, EnergyNorth added High Growth and Low Growth Scenarios. The High Growth Scenario adds 1.0 percent per year to the Base Case growth rate, which would yield a CAGR of 4.2 percent per year for the Normal Year Demand Forecast for the IRP forecast period, 4.1 percent per year for the Design Year Demand Forecast, and 3.6 percent per year for the Design Day Demand Forecast. The Low Growth Scenario subtracts 1.0 percent per year from the Base Case growth rate, yielding a CAGR of 2.2 percent per year for Normal Year Demand for the IRP

forecast period, 2.1 percent per year for Design Year Demand, and 1.6 percent per year for Design Day Demand. Again, we do not have access to the inputs necessary to recalculate these parameters for the lower rate of customer growth that we envision, but the Company's Low Growth Scenario would seem closer to our expectations than the Base Case and High Growth Scenarios.

Assessment of Resource Portfolio

Q. What do you understand to comprise EnergyNorth's Design-Day gas-supply resources?

A. The Company has 107,833 Dth/day of deliverability to its city-gate stations, via capacity on the Tennessee Gas Pipeline (TGP) and the Portland Natural Gas Transportation System (PNGTS). The PNGTS capacity brings supply from Canada; the TGP capacity brings supply from production and market areas in the U. S. and Canada and storage gas from facilities in Pennsylvania.

A number of other facilities complement these sources of upstream capacity. They include three LNG facilities, with a combined operational storage and vaporization capacity of 12,600 Dth/day[24] and three propane-air plants, with a combined design vaporization rate of 34,600 Dth/day.

EnergyNorth's pipeline, LNG, and propane-air facilities provide a combined available supply capacity of 155,033 Dth/day.

[24] The binding constraint for these plants is storage capacity. Vaporization capacity is about twice the storage capacity.

Q. What is EnergyNorth seeking as part of the LCIRP filing?

A. EnergyNorth notes that almost all of its legacy pipeline and storage capacity contracts will expire during this LCIRP's forecast period. The Company proposes renewal of those contracts, given its continuing need to provide reasonable assurances of its ability to deliver volumes required to serve its customers. The next table lists the contracts proposed by EnergyNorth for renewal.

Contracts Proposed for Renewal

Contract Entity	Rate Schedule	Contract Number	MDQ/MDWQ (Dth)	StorageMSQ (Dth)	Expiration Date
Pipeline Transportation					
Union Gas System	M12	M12200	4,092	-	10/31/2022
TCPL	FT	41232	4,047	-	10/31/2022
Iroquois	RTS	470-01	4,047	-	11/1/2022
PNGTS	FT	1999-001	1,000	-	10/31/2019
TGP	FT-A (one 5 to Zone 6	95346	4,000	-	11/30/2021
TGP	FT-A Zone 5 to Zone 6	2302	3,122	-	10/31/2020
TGP	FT-A Zones 0,1 to Zone 6	8587	25,407	-	10/31/2020
Underground Storage and Associated Pipeline Transportation					
TGP	FS-MA	523	21,844	1,560,391	10/31/2020
TGP	FT-A Zone 4 to Zone 6	632	15,265	-	10/31/2020
Honeoye	SS-NY	11234	1,957	245,280	3/31/2020
TGP	FT-A Zone 5 to Zone 6	11234	1,957	-	10/31/2020
Dominion	GSS	300076	934	102,700	3/31/2021
TGP	FT-A Zone 4 to Zone 6	11234	932	-	10/31/2020
National Fuel	FSS	O02357	6,098	670,800	3/31/2019
National Fuel	FST	N02358	6,098	-	3/31/2019
TGP	FT-A Zone 4 to Zone 6	11234	6,150	-	10/31/2020

Q. Describe further EnergyNorth's position with respect to its propane facilities.

A. The Company noted concern about its "aging propane facilities and the continued reliance on them to perform at peak capacity during the coldest days of the year."[25] Its LCIRP Report states that "that the replacement of these propane facilities is necessary and appropriate to maintain reliable service and achieve a best-cost portfolio."[26]

Statements in the related proceeding (Docket No. DG 17-198) frame the Company position somewhat differently. That proceeding addresses EnergyNorth's proposals for a liquefied natural gas (LNG) manufacturing and storage facility and a high-pressure pipeline to connect that facility to the Company's service territory.[27] Those statements describe retirement of the facilities as more an option than a necessity.[28] As we will describe in our testimony in that proceeding, we believe that the information available supports continuing value for the Company and customers in continuing operation of its existing facilities.

Q. What conclusions did EnergyNorth reach with respect to Resource Assessment, as addressed in LCIRP?

A. The Company notes that its demand forecast shows an increase in requirements over the LCIRP forecast horizon. Its filing presents the results of its consideration of gas supply options that it identified, which include:

- Supply delivered by ENGIE[29] to the Company's LNG facilities and city gates

[25] LCIRP Report, at page 48
[26] *Ibid.*
[27] NH PUC Docket No. DG 17-198, *In the Matter of: Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities, Petition to Approve Firm Supply, Transportation Agreements, and the Granite Bridge Project*
[28] See, *e.g.*, the Direct Testimony of Susan L. Fleck and Francisco C. DaFonte, filed on December 22, 2017, in Docket No. DG 17-198, at page 17 (Bates Page 021), lines 19-21.
[29] At the time that the LCIRP was prepared, ENGIE LLC owned the Everett, MA LNG receiving terminal, and provided gas-supply services out of that terminal. As a result of the acquisition of the Everett Facility, which transaction closed on October 1, 2018, Constellation became the assignee of the contract between ENGIE Gas &

- Supply delivered by Repsol to Dracut, MA
- Pipeline capacity from the Dawn Hub on the TransCanada PipeLines (TCPL) and PNGTS to Dracut, MA
- Increasing on-system LNG storage and vaporization capacity.

EnergyNorth presented the results of employing SENDOUT modeling to analyze its resource portfolio, incorporating the effects its alternatives would produce. The analysis showed that the addition of available resources (including the ENGIE supply, possible supply from Repsol, and potential pipeline-capacity contracts with TCPL/PNGTS) to its existing ones would sufficiently meet its requirements under Normal, Design Year and Design Day conditions. This result applied to both High- and Low-Growth Scenarios throughout the LCIRP forecast period.

Q. Has EnergyNorth acted on any of these options since preparation of the LCIRP?

At the time of LCIRP preparation, the Company reported that it had contracted with ENGIE for a combination liquid/vapor service for up to 7,000 Dth/day. Management considers this service useful in some combination of refilling its LNG storage tanks and delivering incremental supply to its city gates. EnergyNorth included this contract in its cost-of-gas filing in Docket No. DG 17-135, so we assume that it has started taking deliveries under the contract.

Q. What is your opinion of the Resource Assessment segment of the LCIRP?

LNG, LLC (ENGIE) and Liberty Utilities that is among the items under review by the Commission in Docket No. DG 17-198. Motion of Constellation LNG, LLC for Leave to Intervene Out-of-Time (12/13/18) at 1.

A. We found EnergyNorth's use of SENDOUT modeling to support its analysis and to justify its conclusions appropriate. This tool finds very widespread industry use for similar purposes. ABB licenses this proprietary model for use in natural gas supply-planning initiatives. SENDOUT works by using linear programming algorithms to simulate gas operations and optimize results. Linear programming forms the core of many commercial software models used to perform simulations and optimizations. SENDOUT considers demand forecasts, available supply and delivery options, and the costs associated with them to produce projections of costs for meeting demand with various combinations of supply options. It solves for the least-cost option to meet demand. Ultimately, SENDOUT provides users with an estimate of annual delivered supply cost that considers all costs.

We also found EnergyNorth's selection of the ENGIE, Repsol and TCPL/PNGTS supply options appropriate. Their specification to the SENDOUT modeling was based on actual contract parameters or offers of supply, which allowed for proper cost comparisons.

Our concern rests with the demand forecasts that Liberty relies on. As noted earlier, we consider them to be too high. However, we expect that EnergyNorth will continue to add customers during the LCIRP forecast period, and thus some amount of additional supply capacity will be required during that period.

EnergyNorth's SENDOUT analysis tested the Base Case, High Growth, and Low Growth Scenarios defined in the Planning Standards section of the LCIRP. The ENGIE contract that

has already begun is required in all scenarios throughout the LCIRP forecast period, making it an appropriate portfolio element for planning purposes.

The SENDOUT analysis suggests that all other supply options require "an extension of [the Company's] system … capable of accessing incremental deliveries of natural gas supplies to serve incremental demand requirements."[30] Such an extension is not required for the ENGIE contract -- ENGIE can deliver to EnergyNorth's city gates. The Company has proposed an extension of its distribution system and a large on-system LNG facility in Docket No. DG 17-198. Those facility additions, along with the other alternatives identified in the LCIRP, are being considered in that proceeding. The analysis presented in the Resource Assessment section of the LCIRP assumes the extension of EnergyNorth's distribution system to access those other supply options. Whether such an extension will be required during the LCIRP forecast period remains to be examined with better demand estimates.

Q. Please summarize your conclusions and recommendations about the supply alternatives considered and those proposed by EnergyNorth.

A. The Company has projected across the LCIRP forecast period a continuing need for the legacy pipeline and storage capacity contracts set to expire. Our first conclusion is that it is appropriate to include them on an EnergyNorth planning basis. The U. S. Federal Energy Regulatory Commission's (FERC's) incremental-pricing policy makes this supply capacity lower in price than alternatives for replacing it.

[30] LCIRP Report, at page 52

Second, we conclude that the ENGIE contract also comprises an appropriate portfolio element in Liberty Utilities' plans. We agree that there exists a need for some addition to gas supplies, both capacity and commodity, during the LCIRP forecast period. We found EnergyNorth's identification of available supply options sufficient, and its analysis of them sound and comprehensive. Consideration of any other additions, including any system extensions necessary to access them, should be deferred to the Granite Bridge proceeding, Docket No. DG 17-198.

Overall Recommendation

Q. Do you have an overall recommendation regarding the LCIRP?

A. We have addressed the original LCIRP filing's treatment of demand forecasting, planning standards, and assessment of the resource portfolio. The demand forecast has been revised, as noted above, but is still too high in our view. We find that the processes for developing the Planning Standards to be satisfactory, but they have been applied to demand estimates that are too high. We recommend revision of those parameters to correspond with our lower demand estimates.

Regarding the resource portfolio, we find that the Company's identification of potential supply options reasonable, including the proposed ENGIE contract. Any further assessment of extensions to the Company's distribution system or additional supply options should be deferred to the Granite Bridge proceeding.

Q. Does that complete your testimony?

A. Yes.

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

Natural Gas

Engagement Director for Liberty's management audit of WGL's PROJECT*pipes* for the District of Columbia Public Service Commission.

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.

Engagement Sponsor 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.

Electricity

Engagement Director for Liberty's management review of Mississippi Power for the Mississippi Public Service Commission.

Engagement Director for Liberty's rate mitigation review of Newfoundland and Labrador Hydro for the Board of Commissioners of Public Utilities.

Engagement Director 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.

Engagement Director 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.

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.

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.

Education

J.D., with academic honors, Dickinson School of Law
B.A., cum laude, Dickinson College

John Adger

Areas of Specialization

U.S. and Canadian gas industry regulation, and management studies for public utility commissions. Also, strategic analysis and business planning for the natural gas industry; natural gas supply and procurement strategy; natural gas marketing strategy.

Relevant Experience

U.S. and Canadian Gas Industry Regulation

Served 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 and Delmarva Power Company.

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, envisioned 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.

Management Studies for Public Utility Commissions

Currently serving as Lead Consultant for a comprehensive examination of the natural gas supply procurement and management practices of Northern Utilities, Inc.'s Maine Division for the Maine Public Utilities Commission.

Served as a member of a Liberty team conducting a review of Washington Gas Light Company's ProjectPIPES gas main replacement project for the District of Columbia Public Service Commission. Primary responsibilities were 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 load forecasting and fuel-supply planning, and gas-supply planning, contracting and management. Performed similar roles in the first three audits. 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.

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

1962-1968: The Massachusetts Institute of Technology: M.S., Geology and Geophysics; B.S., Earth Sciences and Chemical Physics (double major)

STATE OF NEW HAMPSHIRE

PUBLIC UTILITIES COMMISSION

DG 17-152

In the Matter of:

Liberty Utilities (EnergyNorth Natural Gas) Corp., d/b/a Liberty Utilities

LEAST COST INTEGRATED RESOURCE PLAN

Direct Testimony

of

Al-Azad Iqbal
Utility Analyst – Gas & Water Division

September 6, 2019

Q. Please state your name, occupation and business address.

A. My name is Al-Azad Iqbal, and I am employed by the New Hampshire Public Utilities Commission (Commission) as Utility Analyst. My business address is 21 South Fruit Street, Suite 10, Concord, New Hampshire, 03301.

Q. Please summarize your educational and professional experience.

A. My educational and professional background is summarized in Appendix A.

Q. What is the purpose of your testimony in this proceeding?

A. My testimony addresses Staff's position regarding the adequacy of Liberty's filings with regard to the environmental assessment requirements in the statute.

Q. Please provide a brief history on how Liberty addressed the environmental assessment requirements.

A. In October 2017, Liberty Utilities (EnergyNorth Natural Gas) Corp., d/b/a Liberty Utilities (EnergyNorth, or the Company) filed a Least Cost Integrated Resource Plan (LCIRP or Plan) pursuant to RSA 378:38. In its initial filing the Company did not address all statutory factors required to be assessed under RSA 378:38, V, and VI, as the Company believed that certain factors did not apply to natural gas distribution utilities.

RSA 378:38, V requires an "assessment of plan integration and impact on state compliance with the Clean Air Act of 1990, as amended, and other environmental laws that may impact a utility's assets or customers." Subsection VI requires an "assessment of

the Plan's long- and short-term environmental, economic, and energy price and supply impact on the state." RSA 378:39 states, in part, that when "deciding whether or not to approve the utility's plan, the commission shall consider potential environmental, economic, and health-related impacts of each proposed option."

On March 13, 2019, the Commission directed EnergyNorth to submit a supplemental filing to address certain statutory requirements not covered in its original filing.[1] Those requirements would allow the Commission to assess "potential environmental, economic and health-related impacts" of the LCIRP. Liberty submitted a supplemental filing that included testimony from William Killeen on April 30, 2019. On June 28, 2019, , pursuant to discussions during a technical session held on June 20, 2019, the Company filed additional supplemental testimony from Paul J. Hibbard, Sherrie Trefry, and Eric M. Stanley.

Q. What is Staff's view on Mr. Killeen's testimony?

A. Mr. Killeen provided the Company's interpretation of the requirements of RSA 378:38 and described the Company's analysis of the relative environmental and health related impacts of its Plan. After reviewing the testimony and participating in a subsequent technical session regarding the filing, Staff agreed with other parties that Mr. Killeen testimony did not address the issue adequately and suggested possible remedies.

Q. What was Staff's view on the additional testimonies?

[1] New Hampshire Public Utilities Commission, Order No. 26,225, "2017 Least Cost Integrated Resource Plan, Order Denying Motion to Dismiss," issued in Docket No. DG 17-152 on March 13, 2019

A. In response to the parties' concerns, the Company file additional testimony from Paul J. Hibbard, Sherrie Trefry, and Eric M. Stanley. Mr. Hibbard provided his analysis of the potential environmental, economic, and health-related impacts of each option proposed in the Company's LCIRP. Ms. Trefry addressed regulatory requirements concerning alternative options. Mr. Stanley addressed the Company's current energy efficiency efforts. After reviewing the additional testimonies, Staff believes that the Company has addressed the directives of Commission Order No. 26,225 adequately.

Q. What was Staff's conclusion on these issues?

A. Staff believes that the Company has addressed environmental as well as health related aspects in their supplemental filings at this time. Staff believes the information provided is responsive to the statutory requirements, given the absence of clear guidelines.

Q. Does that conclude your testimony?

A. Yes.

Educational and Professional Background

Al-Azad Iqbal

I am employed by the New Hampshire Public Utilities Commission (PUC) as a Utility Analyst. My business address is 21 S. Fruit Street, Suite 10, Concord New Hampshire, 03301.

I received my Bachelor degree in Architecture (B. Arch) from Bangladesh University of Engineering and Technology. Later, I received my Master's (MS) in Environmental Management from the Asian Institute of Technology and another Master's in City and Regional Planning (MCRP) from The Ohio State University. I was a Doctoral Candidate at the City and Regional Planning Department at The Ohio State University. After joining the PUC in 2007, I participated in several utility related training courses including marginal cost training by NERA; Advanced Regulatory Studies at the Institute of Public Utilities, Michigan State University; and depreciation training through the Society of Depreciation Professionals.

Prior to joining the PUC, I was involved in teaching and research activities in different academic and research organizations. Most of my research work was related to quantitative analysis of regional and environmental issues.