



REDACTED

**STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION**

Docket No. DG 17-152

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Least Cost Integrated Resource Plan

**POLICY AND GAS SUPPLY
REBUTTAL TESTIMONY**

OF

**FRANCISCO C. DAFONTE, WILLIAM R. KILLEEN,
JAMES M. STEPHENS, AND KIM N. DAO**

October 25, 2019

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I. INTRODUCTION

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

A. My name is Francisco C. DaFonte. I am Vice President, Regulated Infrastructure Development – Gas, of Liberty Utilities Co., which owns Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities (hereinafter referred to as “EnergyNorth” or the “Company”). My business address is 15 Buttrick Road, Londonderry, New Hampshire.

My name is William R. (Bill) Killeen. I am Director, Energy Procurement of Liberty Utilities (Canada) Corp., the parent company of Liberty Utilities Co. My business address is 354 Davis Road, Oakville, Ontario, Canada.

My name is James M. Stephens. I am a Partner at ScottMadden, Inc. (“ScottMadden”). My business address is 1900 West Park Drive, Suite 250, Westborough, Massachusetts.

My name is Kim N. Dao. I am a Director at ScottMadden. My business address is 1900 West Park Drive, Suite 250, Westborough, Massachusetts.

Q. On whose behalf are you submitting this Rebuttal Testimony?

A. We are submitting this joint Rebuttal Testimony before the New Hampshire Public Utilities Commission (the “Commission” or “NHPUC”) on behalf of EnergyNorth.

Q. Mr. DaFonte, please summarize your educational background and your business and professional experience.

A. I attended the University of Massachusetts Amherst where I majored in Mathematics with a concentration in Computer Science. In the summer of 1985, I was hired by

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1 Commonwealth Gas Company (now NSTAR Gas Company), where I was employed
2 primarily as a supervisor in gas dispatch and gas supply planning for nine years. In 1994,
3 I joined Bay State Gas Company (now Columbia Gas of Massachusetts) where I held
4 various positions including Director of Gas Control and Director of Energy Supply
5 Services. In 2011, I was hired as the Director of Energy Procurement by Liberty Energy
6 (NH) and promoted to Senior Director in July 2013 and Vice President in July 2014. In
7 November 2016, I became Vice President, Regulated Infrastructure Development - Gas,
8 of Liberty Utilities. Please refer to Attachment PGS-1 for a summary of my professional
9 background.

10 **Q. Mr. DaFonte, have you previously testified in regulatory proceedings before the**
11 **Commission?**

12 A. Yes, I have testified in multiple proceedings before the Commission.

13 **Q. Mr. DaFonte, have you testified in other regulatory jurisdictions?**

14 A. Yes. I have testified before the Massachusetts Department of Public Utilities, the Maine
15 Public Utilities Commission, the Indiana Utility Regulatory Commission, the Missouri
16 Public Service Commission, the Georgia Public Service Commission, and the Federal
17 Energy Regulatory Commission ("FERC").

18 **Q. Mr. Killeen, are you the same William R. (Bill) Killeen who filed direct testimony in**
19 **this proceeding?**

20 A. Yes. I submitted direct testimony on April 30, 2019.

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1 **Q. Mr. Stephens, please summarize your educational background and your professional**
2 **experience in the energy and utility industries.**

3 A. I hold a Bachelor of Science degree in Management and a Master of Business
4 Administration with a concentration in Operations Management from Bentley College. I
5 have 30 years of experience in the energy industry and have held senior management
6 positions at consulting firms, a retail energy marketing company, and natural gas local
7 distribution companies (“LDCs”). In my role as a consultant, I have assisted numerous
8 clients with various natural gas related engagements, including: the analysis of regional
9 energy market dynamics and the associated drivers for new natural gas infrastructure; the
10 evaluation of capacity opportunities associated with open seasons on various pipelines;
11 the evaluation of new markets/opportunities; integrated resource plans; and natural gas
12 supply portfolio evaluation and optimization. In addition, in my role as the President of a
13 retail energy marketing firm, I was responsible for all aspects of business unit
14 management including front, mid, and back-office functions. I was also responsible for
15 Gas Supply Procurement and Portfolio Optimization for Colonial Gas Company, which is
16 now a subsidiary of National Grid. A summary of my professional and educational
17 background is provided as Attachment PGS-2.

18 **Q. Mr. Stephens, have you previously provided testimony before the Commission?**

19 A. Yes, I have submitted expert testimony to the Commission on behalf of Public Service
20 Company of New Hampshire d/b/a Eversource Energy regarding its natural gas capacity
21 contract filing in Docket No. DE 16-241, as well as expert testimony to the Commission

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1 on behalf of EnergyNorth regarding its natural gas supply strategy in Docket No. DG 17-
2 198.

3 **Q. Mr. Stephens, have you submitted expert testimony in other regulatory jurisdictions?**

4 A. Yes, I have submitted expert testimony in several other regulatory jurisdictions, including
5 the FERC, the states of Texas, Alaska, Massachusetts and Maine, and the Canadian
6 provinces of Ontario, Québec, New Brunswick, Nova Scotia, and Alberta. A list of my
7 past expert witness appearances is provided in Attachment PGS-2.

8 **Q. Ms. Dao, please summarize your educational background and your professional**
9 **experience.**

10 A. I hold a Bachelor of Arts degree in economics from Clark University. I have 15 years of
11 consulting experience in the energy and utility industries. In my role as a consultant, I
12 have assisted clients in numerous engagements involving regulatory strategy and market
13 analyses, including the evaluation of open seasons on various pipelines, regional energy
14 market demand/supply dynamics, energy pricing and basis implications, and the
15 associated drivers for new natural gas infrastructure; the development and evaluation of
16 natural gas demand forecasts; and natural gas supply portfolio evaluation and
17 optimization. A summary of my professional and educational background is provided as
18 Attachment PGS-3.

19 **Q. Ms. Dao, have you previously testified before any regulatory bodies?**

20 A. No, I have not. However, I have provided analytical support for expert witness testimony
21 on a variety of issues, including natural gas supply planning, demand forecasting, and

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1 cost of capital and capital structure in several regulatory jurisdictions, including the states
2 of Massachusetts, New Hampshire, Maine, New Jersey, Maryland, the District of
3 Columbia, and the Canadian provinces of Ontario and Nova Scotia.

4 **II. EXECUTIVE SUMMARY**

5 **Q. Prior to discussing the objectives of your Rebuttal Testimony, please provide a**
6 **summary of the Company's initial filing and related activities in this docket.**

7 A. On October 2, 2017, the Company filed with the Commission its 2017 Least Cost
8 Integrated Resource Plan ("LCIRP") for the five-year planning horizon from 2017/18
9 through 2021/22 ("Forecast Period"). Subsequent to that filing, EnergyNorth engaged
10 with the Staff of the NHPUC ("Staff"), the Office of Consumer Advocate ("OCA"),
11 Conservation Law Foundation ("CLF"), and other intervenors through the discovery
12 process, intervenor discussions, and technical sessions on March 9, 2018, May 24, 2018,
13 and November 5, 2018.

14 On April 30, 2019, EnergyNorth submitted a supplemental filing, which included the
15 Direct Testimony of William R. Killeen, in response to the Commission's Order No.
16 26,225 (Mar. 13, 2019), which directed the Company "to submit a supplemental filing,
17 including supporting testimony, to address each of the specific elements required under
18 RSA 378:38 and RSA 378:39 that are not already addressed in its LCIRP, with adequate
19 sufficiency to permit the Commission's assessment of potential environmental,

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1 economic, and health-related impacts of each option proposed in the LCIRP, as required
2 by RSA 378:39.”¹

3 At subsequent technical sessions held on May 23, 2019, and June 20, 2019, Staff and
4 other parties acknowledged that the standards governing the revised LCIRP statute were
5 not clear, particularly as they relate to natural gas utilities, and that EnergyNorth was the
6 first natural gas utility expected to meet these new and undefined standards. Nonetheless,
7 parties expressed their views that Mr. Killeen’s direct testimony should be supplemented
8 with additional analysis. Subsequently, the Company filed additional testimony from Mr.
9 Paul J. Hibbard, Ms. Sherrie Trefry, and Mr. Eric M. Stanley on June 28, 2019.

10 On September 6, 2019, the following intervenors filed direct testimony regarding the
11 Company’s 2017 LCIRP and its supplemental filings:

- 12 • Mr. Al-Azad Iqbal, Utility Analyst – Gas & Water Division, on behalf of Staff;
- 13 • Messrs. John Antonuk and John Adger of The Liberty Consulting Group
14 (“Liberty Consulting”) on behalf of Staff;
- 15 • Dr. Elizabeth A. Stanton of Applied Economics Clinic on behalf of CLF;
- 16 • Mr. Paul Chernick of Resource Insight, Inc. on behalf of CLF; and
- 17 • Mr. Terry Michael Clark.

¹ Order No. 26,225 (Mar. 13, 2019), at 7.

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1 **Q. How is the Company's rebuttal filing organized?**

2 A. The Company's rebuttal filing is supported by the rebuttal testimonies of the following
3 witnesses:

- 4 • This Rebuttal Testimony of Francisco C. DaFonte, William R. Killeen, James M.
5 Stephens, and Kim N. Dao (hereinafter referred to as the Company's "Policy and
6 Gas Supply Rebuttal Testimony"), which will discuss the Company's 2017
7 LCIRP and its associated supplemental filings in response to (i) Messrs. Antonuk
8 and Adger of Liberty Consulting on behalf of Staff; (ii) Mr. Chernick on behalf of
9 CLF; and (iii) Mr. Clark.
- 10 • Rebuttal Testimony of William R. Killeen, William J. Clark, Eric M. Stanley,
11 James M. Stephens, and Adam J. Perry (hereinafter referred to as the Company's
12 "Demand Forecast Rebuttal Testimony"), which will discuss the Company's
13 Demand Forecast approach and results in response to (i) Messrs. Antonuk and
14 Adger of Liberty Consulting on behalf of Staff; and (ii) Mr. Chernick on behalf of
15 CLF.
- 16 • Rebuttal Testimony of Paul J. Hibbard, which will discuss the Company's
17 environmental and health-related impact analysis in response to (i) Dr. Stanton on
18 behalf of CLF; (ii) Mr. Chernick on behalf of CLF; and (iii) Mr. Clark.

19 **Q. How is your joint Policy and Gas Supply Rebuttal Testimony organized?**

20 A. Prior to presenting our response to the testimony of each intervening witness (i.e.,
21 Messrs. Antonuk and Adger of Liberty Consulting, Mr. Chernick, and Mr. Clark in

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Sections IV through VI, respectively), we provide certain, necessary context regarding the 2017 LCIRP and the Company's resource planning process, which are generally supported by Staff as further detailed in Section III. This context is provided in response to certain criticisms of the Company's 2017 LCIRP in the direct testimonies of the other intervening witnesses (i.e., CLF and Mr. Clark).

III. PURPOSE OF THE LCIRP AND THE COMPANY'S RESOURCE PLANNING PROCESS

Q. Please summarize the Company's 2017 LCIRP.

A. EnergyNorth's 2017 LCIRP sets forth the Company's resource plan to meet its expected customer requirements over the five-year Forecast Period from 2017/18 to 2021/22 using currently accepted resource planning processes, standards, and methods.² As concluded in the 2017 LCIRP, (i) the Company's modeling demonstrates a growth in customer requirements over the Forecast Period; (ii) the Company employed Planning Standards, which are reasonable and appropriate; and (iii) the resource strategies described therein are in the best interests of its customers and result in a reliable, best-cost supply and capacity portfolio to meet the forecasted demand.

Q. What are the goals and objectives of EnergyNorth's resource planning process?

A. As noted in the 2017 LCIRP, the primary goal of the Company's resource planning process is to "acquire and manage resources that provide reliable service under various demand scenarios while focusing on a best-cost resource portfolio for its customers."³

² 2017 LCIRP, at Bates 005.

³ Ibid, at Bates 007.

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1 EnergyNorth balances cost considerations with the Company's resource planning
2 objectives,⁴ which include:

- 3 • Maintaining reliability and supply security;
- 4 • Providing diversity and contract and portfolio flexibility; and
- 5 • Promoting the acquisition of viable resources.

6 **Q. Please describe the Company's resource planning process.**

7 A. At a high-level, EnergyNorth's resource planning process consists of the following four
8 steps:

- 9 1. Develop a Demand Forecast for the five-year Forecast Period;
- 10 2. Develop appropriate Planning Standards;
- 11 3. Evaluate and develop a best-cost resource portfolio to meet the expected customer
12 requirements under various growth and weather scenarios; and
- 13 4. Ensure compliance with Commission orders and statutory requirements.

14 **Q. Please discuss the first step (i.e., development of the Demand Forecast) of the**
15 **resource planning process.**

16 A. The process to develop the Company's Demand Forecast⁵ includes the following steps:

⁴ See, also, the Company's response to Staff 2-23. All responses to discovery referenced throughout our Rebuttal Testimony (excluding spreadsheets and voluminous attachments, such as detailed SENDOUT® reports) are provided collectively as Attachment PGS-4, unless otherwise noted. For ease of reference, the discovery responses included in that attachment are provided in numerical sequence by requesting party.

⁵ Please note, the Company's Demand Forecast was updated subsequent to the 2017 LCIRP filing and provided in the response to Staff Tech 1-7; the Updated Demand Forecast was developed using the same process, but reflected modifications to certain assumptions related to the out-of-model adjustments.

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1. Develop econometric models to forecast total demand;
2. Include out-of-model adjustments to account for events and trends not captured in the econometric models;
3. Account for energy efficiency;
4. Adjust for unaccounted for gas and unbilled sales; and
5. Translate monthly demand forecast to daily demand requirements.

Q. Please discuss the second step (i.e., develop Planning Standards) of the resource planning process.

A. As detailed in the 2017 LCIRP, in addition to the Normal Year standard, EnergyNorth established the Design Year and Design Day standards, which reflect weather conditions that inform the level of firm volume that the Company must plan for to maintain reliable service.⁶ EnergyNorth also developed High and Low Growth scenarios to determine the adequacy of the Company's supply portfolio under a range of demand scenarios using the same approach relied upon and approved by the Commission in the 2010 and 2013 LCIRPs.⁷

Q. Did Staff support the Company's approach to developing the Demand Forecast and Planning Standards (i.e., steps 1 and 2 of the resource planning process)?

A. Yes, Messrs. Antonuk and Adger of Liberty Consulting supported the Company's overall approach to estimating its demand requirements, including (i) the econometric models

⁶ 2017 LCIRP, at Bates 032.

⁷ See, also, the Company's responses to Staff 2-21 and CLF Tech 1-4.

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1 and results of the econometric forecast;⁸ (ii) the need for an adjustment to the
2 econometric forecast to account for events and trends not captured in the econometric
3 models;⁹ (iii) the energy efficiency savings;¹⁰ (iv) the adjustments for unaccounted for
4 gas and unbilled sales;¹¹ and (v) the approach used to develop daily demand
5 requirements,¹² as well as the approach and results of the Company's Planning
6 Standards,¹³ but identified certain issues. Please see the Company's Demand Forecast
7 Rebuttal Testimony for the Company's detailed response to these issues.

8 **Q. Please discuss the third step (i.e., evaluate and develop a best-cost resource**
9 **portfolio) of the resource planning process.**

10 A. As described in the 2017 LCIRP, the evaluation and development of a best-cost resource
11 portfolio consists of the following:

- 12 1. A review of the incremental demand requirements compared to the Company's
13 existing supply resource portfolio to determine resource need;
- 14 2. Identify resource options that are available to EnergyNorth;
- 15 3. Evaluate the available resource options based on quantitative (i.e., price factors)
16 and qualitative (i.e., non-price factors) analyses; and

⁸ Direct Testimony of John Antonuk and John Adger of The Liberty Consulting Group, at Bates 008.

⁹ Ibid, at Bates 011.

¹⁰ Ibid, at Bates 008.

¹¹ Ibid, at Bates 012.

¹² Ibid.

¹³ Ibid, at Bates 015.

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1 4. Make appropriate resource decisions to achieve a best-cost supply and capacity
2 portfolio.¹⁴

3 **Q. Please summarize the Company's supply resource portfolio as presented in the 2017**
4 **LCIRP.**

5 A. As detailed in Section V.B. of the 2017 LCIRP, to meet customer load requirements, the
6 Company's supply resource portfolio is comprised of pipeline transportation and
7 underground storage capacity contracts, as well as on-system LNG and propane facilities.
8 Specifically, the Company has:

- 9 • Firm transportation contracts on TGP (106,833 Dth/day) and PNGTS (1,000
10 Dth/day) to provide a total daily deliverability of 107,833 Dth/day to its city-
11 gates;¹⁵
- 12 • Three peaking LNG facilities in Concord, Manchester, and Tilton, which have a
13 combined operational vaporization and storage capacity of approximately 12,600
14 Dth; and
- 15 • Four propane facilities in Manchester, Nashua, Tilton, and Amherst,¹⁶ which have
16 a combined design (or nameplate) vaporization rate of approximately 34,600
17 Dth/day.

¹⁴ See, also, the Company's response to Staff 2-14.

¹⁵ As shown in Table 34 of the 2017 LCIRP, nearly all of the Company's existing pipeline transportation and underground storage contracts are scheduled to expire and require notice of renewal during the Forecast Period.

¹⁶ The propane facility in Amherst is used solely for storage.

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1 Thus, in total, EnergyNorth has Design Day resources of approximately 155,033 Dth/day.

2 **Q. Given the Company's supply resource portfolio, did EnergyNorth determine there**
3 **was a need for incremental resources to meet its forecasted demand requirements in**
4 **the 2017 LCIRP?**

5 A. Yes, the Company concluded in the 2017 LCIRP that EnergyNorth would need
6 incremental resources to meet the forecasted increase in demand requirements over the
7 Forecast Period.¹⁷

8 **Q. Did Staff support the Company's conclusion that there is a need for incremental**
9 **resources?**

10 A. Yes, Messrs. Antonuk and Adger of Liberty Consulting concluded that they "expect that
11 EnergyNorth will continue to add customers during the LCIRP forecast period, and thus
12 some amount of additional supply capacity will be required during that period."¹⁸
13 Liberty Consulting further stated that "there exists a need for some addition to gas
14 supplies, both capacity and commodity, during the LCIRP forecast period."¹⁹

¹⁷ 2017 LCIRP, at Bates 057 to 058.

¹⁸ Direct Testimony of John Antonuk and John Adger of The Liberty Consulting Group, at Bates 020.

¹⁹ Ibid, at Bates 022.

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1 **Q. Please discuss the identification of the resource options available to the Company to**
2 **meet the incremental needs presented in the 2017 LCIRP.**

3 A. As noted in the 2017 LCIRP, “[b]ased on EnergyNorth’s review of available and viable
4 resources in the marketplace to meet the Company’s existing and projected load
5 requirements, the following gas supply options [were] identified:

- 6 • ENGIE delivered supply to the EnergyNorth city-gates and LNG facilities;
- 7 • Repsol delivered supply to Dracut, Massachusetts;
- 8 • Pipeline transportation capacity from the Dawn Hub on the TCPL Mainline and
9 PNGTS pipeline systems to Dracut, Massachusetts; and
- 10 • Increasing on-system LNG storage and vaporization capacity with additional
11 infrastructure to access new gas supplies.”²⁰

12 In addition to the identification of gas supply options, the Company also assessed the
13 delivery options associated with those gas supplies since the Tennessee Gas Pipeline
14 Company, LLC (“Tennessee” or “TGP”) Concord Lateral, which is, for all intents and
15 purposes, the only feed to EnergyNorth’s service territory, has no additional capacity.²¹
16 Specifically, the Company evaluated “the option to enhance its distribution system
17 reliability, diversity and flexibility through an extension of its system,”²² which was later
18 identified as the proposed Granite Bridge Pipeline in Docket No. DG 17-198.²³

²⁰ 2017 LCIRP, at Bates 053. *See*, also, the Company’s response to Staff 2-16.

²¹ As noted in the 2017 LCIRP, EnergyNorth’s service territory is exclusively served by the TGP Concord Lateral except for the City of Berlin, which is served by PNGTS. *See*, 2017 LCIRP, at Bates 037.

²² *Ibid*, at Bates 054.

²³ *See*, also, the Company’s response to Staff 2-19.

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1 **Q. Please describe the process used by EnergyNorth to evaluate the resource options in**
2 **the 2017 LCIRP.**

3 A. The Company's evaluation of the available resource options consisted of a review of
4 price factors, using the SENDOUT® portfolio optimization model, and non-price factors,
5 including reliability, flexibility, diversity, reliability, viability, and contract term to
6 determine the best-cost, most reliable options to meet the Company's resource need.²⁴

7 **Q. Did Staff support the Company's identification and evaluation of the gas supply**
8 **options?**

9 A. Yes, Messrs. Antonuk and Adger of Liberty Consulting supported the identification of
10 the gas supply options and the approach and process used by the Company to evaluate
11 those options. Specifically, Liberty Consulting stated, "EnergyNorth's selection of the
12 ENGIE, Repsol and TCPL/PNGTS supply options [was] appropriate. Their specification
13 to the SENDOUT modeling was based on actual contract parameters or offers of supply,
14 which allowed for proper cost comparisons."²⁵ Messrs. Antonuk and Adger also noted
15 that the Company's "use of SENDOUT modeling to support its analysis and to justify its
16 conclusions appropriate."²⁶ Liberty Consulting further concluded that "EnergyNorth's
17 identification of available supply options [was] sufficient, and its analysis of them sound
18 and comprehensive."²⁷

²⁴ 2017 LCIRP, at Bates 052 to 058. *See, also*, the Company's response to Staff 2-14.

²⁵ Direct Testimony of John Antonuk and John Adger of The Liberty Consulting Group, at Bates 020.

²⁶ Ibid.

²⁷ Ibid, at Bates 022.

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1 **Q. What were the Company's conclusions and resource decisions that were laid out in**
2 **the 2017 LCIRP?**

3 A. As concluded in the 2017 LCIRP, under all weather and growth scenarios, EnergyNorth
4 would be able to meet its customers' load requirements throughout the Forecast Period
5 with: (i) renewal of all legacy pipeline and storage contracts that were set to expire during
6 the five-year Forecast Period; (ii) an increase in delivery capacity through an extension of
7 its system (i.e., the proposed Granite Bridge Pipeline); and (iii) incremental supply
8 resources.²⁸

9 **Q. Did Staff support the Company's conclusions and resource decisions presented in**
10 **the 2017 LCIRP?**

11 A. Messrs. Antonuk and Adger of Liberty Consulting supported the renewal/extension of the
12 Company's legacy pipeline and storage capacity contracts that are set to expire during the
13 Forecast Period, specifically stating that the "[FERC's] incremental-pricing policy makes
14 this supply capacity lower in price than alternatives for replacing it."²⁹ In addition, as
15 discussed above, Liberty Consulting acknowledged the need for incremental supply
16 capacity, and noted that the "ENGIE contract [was] an appropriate portfolio element for
17 planning purposes."³⁰ With respect to the Company's existing on-system resources,
18 Liberty Consulting believes that the "information available supports continuing value for
19 the Company and customers in continuing operation of its existing [propane] facilities."³¹

²⁸ 2017 LCIRP, at Bates 057 to 058.

²⁹ Direct Testimony of John Antonuk and John Adger of The Liberty Consulting Group, at Bates 021.

³⁰ Ibid.

³¹ Ibid, at Bates 018.

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1 Finally, regarding the system extension (i.e., the proposed Granite Bridge Pipeline),
2 Messrs. Antonuk and Adger stated, “[w]hether such an extension will be required during
3 the LCIRP forecast period remains to be examined.”³² The Company’s response to these
4 issues is provided in Section IV below.

5 **Q. Please discuss the fourth and last step (i.e., ensure compliance with Commission**
6 **orders and statutory requirements) of the resource planning process.**

7 A. In Section VI of the 2017 LCIRP, EnergyNorth summarized the directives from the
8 Commission’s order in Docket No. DG 13-313 (the “2013 IRP Order”) and the actions
9 taken by the Company to comply with those directives, which included the 2017 LCIRP’s
10 compliance with the statutes that govern LCIRPs (i.e., RSA 378:37 through RSA
11 378:40).

12 **Q. Did Staff support the Company’s conclusions regarding the compliance of the 2017**
13 **LCIRP and supplemental filings with Commission orders and statutory**
14 **requirements?**

15 A. Yes. Staff Witness Mr. Al-Azad Iqbal supported the assessment provided in the
16 Company’s 2017 LCIRP, supplemented by the Direct Testimony of William R. Killeen
17 on April 30, 2019, and further supplemented by the Direct Testimonies of Paul J.
18 Hibbard, Sherrie Trefry, and Eric M. Stanley on June 28, 2019, and found the Company’s
19 filings addressed the Commission’s orders and the statutory requirements of RSA 378:38
20 and RSA 378:39. Specifically, Mr. Iqbal stated, “Staff believes that the Company has

³² Ibid, at Bates 021.

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1 addressed environmental as well as health related aspects in their supplemental filings at
2 this time. Staff believes the information provided is responsive to the statutory
3 requirements, given the absence of clear guidelines.”³³

4 **IV. RESPONSE TO THE LIBERTY CONSULTING GROUP ON BEHALF OF**
5 **STAFF**

6 **Q. Please summarize the issues raised by Messrs. Antonuk and Adger of Liberty**
7 **Consulting regarding the Company’s 2017 LCIRP.**

8 A. While Staff Witnesses Messrs. Antonuk and Adger of Liberty Consulting generally
9 agreed with the Company’s approach and process used in the development of the
10 Demand Forecast and Planning Standards, as well as the Company’s approach and
11 process used to evaluate and develop a best-cost resource portfolio, Liberty Consulting
12 expressed some concerns about certain aspects of the Company’s Demand Forecast and
13 resource portfolio plan. Specifically, with respect to the Demand Forecast, Messrs.
14 Antonuk and Adger raised some concerns regarding the out-of-model adjustments and
15 overall growth rates associated with the Demand Forecast.³⁴ The Company’s response to
16 these issues is provided in the Demand Forecast Rebuttal Testimony, which demonstrates
17 that while customer growth may be lower than the projected customer additions,
18 EnergyNorth’s load projections for the 2017/18 and 2018/19 split-years are consistent

³³ Direct Testimony of Al-Azad Iqbal, at Bates 041.

³⁴ Direct Testimony of John Antonuk and John Adger of The Liberty Consulting Group, at Bates 011 and 014.

1 with normalized actual demand over the past two years. Therefore, the Company
2 continues to believe that its Demand Forecast is reasonable.

3 In addition, Liberty Consulting opined on the Company's resource strategy and future
4 portfolio decisions, including the strategy associated with (i) the existing propane
5 facilities, (ii) alternative gas supply options, and (iii) the delivery option evaluated by the
6 Company to increase deliverability to the Company's city-gates (i.e., the system
7 extension). The Company's response to each of these issues is discussed in detail below.

8 **A. Propane Facilities**

9 **Q. Please summarize Liberty Consulting's concerns regarding the Company's propane**
10 **facilities.**

11 A. Messrs. Antonuk and Adger believe there is confusion over whether the Company views
12 the retirement of the propane facilities as an option or necessity.³⁵ In addition, Liberty
13 Consulting concluded that continued reliance on these propane facilities is warranted.³⁶

14 **Q. Please summarize the Company's position with respect to its propane facilities.**

15 A. The Company has significant reliance on its propane facilities, particularly for meeting
16 demand on a Design Day or during a prolonged cold snap. Specifically, the propane
17 facilities represent over 22 percent (i.e., 34,600 Dth/day of 155,033 Dth/day) of the
18 Company's gas supply portfolio with respect to deliverability should the Company
19 experience demand associated with, or near, Design Day weather conditions.

³⁵ Ibid, at Bates 012.

³⁶ Ibid, at Bates 018.

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1 **Q. Has the Company expressed certain concerns regarding its reliance on the propane**
2 **facilities?**

3 A. Yes, it has. The Company has discussed the following three concerns with the growing
4 reliance on its propane facilities to meet demand during extreme weather conditions:

- 5 1. The introduction of higher amounts of propane into the Company's distribution
6 system affects customers' high-efficiency equipment.
- 7 2. The Company is increasing its exposure to (i.e., reliance on) the ability of the
8 propane facilities to provide the full design (or nameplate) deliverability during
9 extreme weather conditions.
- 10 3. The Company is increasing its dependence on propane facilities that are well
11 beyond the life expectancy for such facilities.

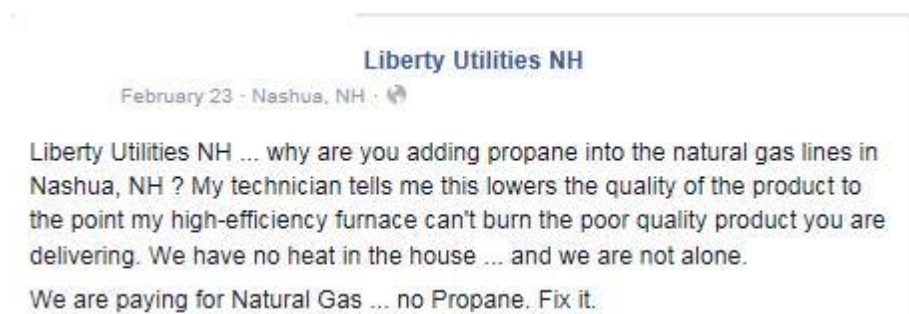
12 **Q. Please provide more detail regarding the Company's first concern, i.e., the effects of**
13 **propane on high-efficiency equipment.**

14 A. Volume from propane facilities first requires a blending with compressed air to reduce
15 the high Btu content, and then additional blending with natural gas to further reduce the
16 higher Btu content of propane. Even with an appropriate blending of natural gas with
17 propane, the Company has received customer complaints because the comingling of
18 propane causes significant problems with high efficiency heating equipment. As
19 indicated in the 2017 LCIRP, EnergyNorth's customers have experienced problems with
20 their high efficiency furnaces at various times when these propane facilities are used
21 extensively. This issue was discussed at length by the Company in the Northeast Energy

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1 Direct (“NED”) proceeding (Docket No. DG 14-380), and also in the Company’s
2 response to Staff 2-12 in this docket:

3 In addition, from a system operations perspective, the Company has
4 received multiple complaints from customers with new high-efficiency
5 heating equipment as a result of EnergyNorth’s use of the propane
6 facilities. These complaints are generally attributable to the limited
7 tolerance of more modern equipment to varying natural gas heating
8 values, and at times has led to “no heat” calls by customers. As an
9 example, the Company received the following complaint from a
10 customer via Facebook in February 2015:



11
12 Additionally, the Company has received reports from HVAC
13 contractors that service accounts near to one of EnergyNorth’s propane
14 facilities who indicated they had received numerous customer calls due
15 to noise from their high-efficiency boilers, including certain customers
16 that were uncomfortable remaining in their homes while this was
17 occurring. One of the HVAC contractors noted that it was “selling more
18 and more” of the high efficiency boilers “due to rebates that incent their
19 installation.”³⁷

20 Also, as noted in the Company’s response to Staff 2-12: “With the incentives for
21 customers to replace older, less efficient furnaces, the conversion of oil and propane

³⁷ Company’s response to Staff 2-12; *see*, also, Attachment PGS-5 (an email from Joyce Cooling and Heating, stating “Customers with high end heating units, mostly modulating gas boiler, will have a very loud rumbling noise...After we receive several calls from the same neighborhood we now [sic] that there has been propane added into the gas lines...Usually this happens on extreme cold mornings”); and Attachment PGS-6 (letter from St. Anselm’s College stating, “During almost every winter we have had critical boilers for buildings trip out during really cold storms”).

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1 customers to higher efficiency natural gas heating equipment, and simply the phasing out
2 of the manufacturing of low efficiency heating equipment, this issue will only get worse
3 unless propane can be phased out of the Company's resource portfolio. Further, it may
4 act as a deterrent for customers who want to be more energy efficient and, quite frankly,
5 take advantage of the Company's award winning energy efficiency programs.”³⁸

6 Lastly, the full operational capability of the propane facilities assumes sufficient “flow
7 by” natural gas. With a curtailment on the TGP Concord Lateral, or disruption upstream
8 on the TGP system, there would not be sufficient “flow by” natural gas to blend with
9 propane, significantly reducing the operational capability of the propane facilities.

10 **Q. Please discuss the second concern identified by the Company regarding the propane**
11 **facilities, i.e., increasing reliance on the deliverability of the design, or nameplate,**
12 **capacity.**

13 A. The Company's resource plan assumes that the full design (or nameplate) vaporization
14 capacity of the propane facilities is available to meet demand during extreme weather
15 conditions. Specifically, the Company's gas supply plan identifies 34,600 Dth/day of
16 deliverability of propane to meet demand under Design Day weather conditions.

17 **Q. Has the Company dispatched the full deliverability of the propane facilities over the**
18 **duration of one full day?**

19 A. No, it has not. While the Company has assumed the full design (or nameplate)
20 vaporization capacity of the propane facilities (i.e., 34,600 Dth/day) is available to meet

³⁸ Company's response to Staff 2-12.

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1 Design Day demand in all SENDOUT® model runs presented in the 2017 LCIRP, the
2 propane facilities have never operated at that level for an entire 24-hour period. Notably,
3 there have only been four days over the past six years during which the three propane
4 facilities in Manchester, Nashua, and Tilton operated on the same day (on March 4 and 5,
5 2014, and on December 28 and 29, 2015). Operational records indicate that for five
6 hours on March 5, 2014, from the hour ending 0400 to 0800, all three facilities were
7 operating at full to near full propane production capacity.³⁹

8 **Q. Is the Company assessing the ability of the propane facilities to provide the full**
9 **deliverability of 34,600 Dth?**

10 A. Yes, it is. The Company has initiated an internal team to review and analyze the ability
11 of the propane facilities to provide the full nameplate deliverability. This team is
12 comprised of internal experts from operations, distribution, and gas supply. The
13 Company will provide the results of this study once completed.

14 **Q. Please discuss the last concern identified by the Company regarding the propane**
15 **facilities, i.e., the general age of the propane facilities.**

16 A. While the expected useful life of propane peaking facilities is generally 40 years,⁴⁰ the
17 Company's propane facilities have been in service for well beyond their useful life
18 expectancy. Specifically, as shown in Table 1 below, the Company's two largest propane
19 facilities in Manchester and Nashua have been in service for over 70 years. As such, the

³⁹ See, also, the Company's revised response to OCA TS 1-1 in Docket No. DG 17-198.

⁴⁰ See, for example, Yankee Gas Services Company, Final Decision, Docket No. 01-05-19RE02, November 12, 2003, at 24.

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Company has a concentration risk where it has a significant reliance on propane facilities that are approaching 75-years of age and are expected to produce over 34,000 Dth/day of gas supply during extreme weather conditions. In addition, and most importantly, as the Company increases its demand requirements on Design Day, the propane facilities will be required to perform at levels not seen in the past, thus increasing the Company's and its customers' risk of a mechanical failure at one of the facilities.

Table 1: EnergyNorth's On-System Propane Facilities

Location	Design Vaporization (Dth/day)	In-Service Date
Manchester	21,600	1948
Nashua	11,000	1947
Tilton	2,000	1972

B. Alternative Gas Supply Options and Exposure to Dracut Supplies and Pricing

Q. Please summarize Liberty Consulting's conclusions regarding the available natural gas supply options.

A. While Liberty Consulting agreed that the Company's "selection of the ENGIE, Repsol and TCPL/PNGTS supply options [was] appropriate,"⁴¹ and that the "specification [of these supply options] to the SENDOUT modeling... allowed for proper cost comparisons",⁴² Messrs. Antonuk and Adger do not specifically address the lack of

⁴¹ Direct Testimony of John Antonuk and John Adger of The Liberty Consulting Group, at Bates 020.
⁴² Ibid.

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alternative gas supply options in the current marketplace⁴³ and do not provide any context regarding the current challenges faced by the Company, particularly with respect to the Company's exposure to Dracut supplies and associated pricing, given the regional natural gas market dynamics.

Q. Please discuss the Company's current upstream gas supply sources and exposure to Dracut supplies.

A. As discussed above in Section III and in the 2017 LCIRP, EnergyNorth's existing resource portfolio includes firm transportation contracts on TGP (106,833 Dth/day) and PNGTS (1,000 Dth/day), which provide the Company with access to various gas supply sources. Table 2 below summarizes the existing firm transportation capacity by upstream gas supply source.

Table 2: EnergyNorth Upstream Gas Supply Sources

Gas Supply	Contract MDQ (Dth/day)	% of Total
Canadian Supply	8,122	8%
Dracut	50,000	46%
Long-line	21,596	20%
Storage	28,115	26%
Total Firm Transportation	107,833	100%

As illustrated by Table 2, the transportation contracts from Dracut represent the single largest component of the Company's total firm pipeline capacity. Stated differently,

⁴³ In addition, as discussed in Section V of our Rebuttal Testimony, Mr. Chernick believes that imported LNG supply would be readily available in the New England natural gas marketplace. *See*, Direct Testimony of Paul Chernick on behalf of Conservation Law Foundation, at 28 to 29.

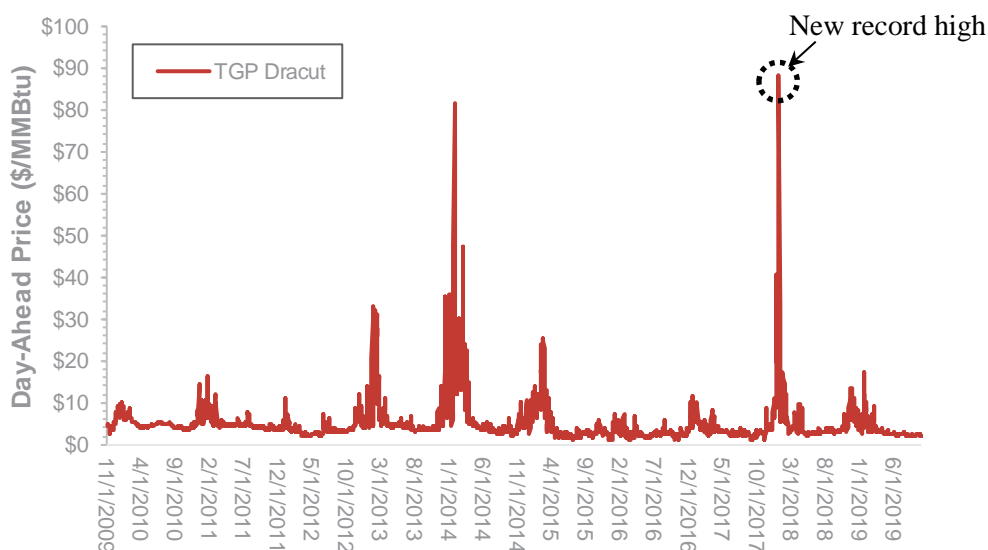
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nearly half of the Company's total firm pipeline capacity originates at Dracut; and about one-third of the Company's entire Design Day resource portfolio (i.e., 50,000 Dth/day of 155,033 Dth/day) is at Dracut. Therefore, EnergyNorth and its customers have significant exposure to Dracut supplies and its associated high winter price levels and price volatility.

Q. Please discuss the record natural gas price levels experienced at the TGP Dracut price index since the initial filing of the Company's 2017 LCIRP.

A. Please see Figure 1 below for a chart of the daily TGP Dracut price index over the November 1, 2009, through September 30, 2019, time period, and Table 3 below for a summary of the average TGP Dracut prices over the 2009/10 through 2018/19 split-years.

Figure 1: TGP Dracut Day-Ahead Prices (Nov. 1, 2009 – Sep. 30, 2019)⁴⁴



⁴⁴ Source: S&P Global Market Intelligence.

Table 3: TGP Dracut Day-Ahead Prices (2009/10 – 2018/19)⁴⁵

Split-Year (Nov-Oct)	Average TGP Dracut Winter Price (\$/MMBtu)	Max. TGP Dracut Winter Price (\$/MMBtu)	Boston Winter Heating Degree Days (“HDD”)	Winter HDD Difference from Normal⁴⁶
2009/10	\$5.84	\$10.10	4,116	(308)
2010/11	\$6.46	\$16.50	4,543	119
2011/12	\$3.85	\$11.02	3,548	(877)
2012/13	\$9.28	\$33.25	4,343	(82)
2013/14	\$15.76	\$81.50	4,806	382
2014/15	\$8.95	\$25.50	4,987	563
2015/16	\$3.07	\$7.40	3,692	(732)
2016/17	\$4.92	\$11.60	4,170	(254)
2017/18	\$8.71	\$88.30	4,449	25
2018/19	\$5.77	\$17.25	4,270	(155)

As shown in Figure 1 and Table 3 above, the TGP Dracut price index has exceeded \$10 per MMBtu during each winter period (except for the warmer-than-normal winter of 2015/16), and reached a record high of approximately \$90 per MMBtu during the winter of 2017/18.⁴⁷ As discussed, given the Company’s current resource portfolio, the Company has significant exposure to Dracut supplies and associated pricing. If the Company were to purchase its full amount of Dracut volumes (i.e., 50,000 Dth/day) at the spot gas price level of \$90 per MMBtu, gas costs to customers associated with that purchase for one day would be \$4.5 million.

⁴⁵ Sources: S&P Global Market Intelligence; and NOAA National Centers for Environmental Information, Daily Summaries for Boston, MA.

⁴⁶ Boston, MA has a total normal winter HDD of 4,424. A negative difference from normal indicates warmer-than-normal weather, and a positive difference from normal indicates a colder-than-normal winter. Source: NOAA National Centers for Environmental Information, Summary of Monthly Normals 1981-2010 for Boston, MA.

⁴⁷ Please note, since gas typically trades on Friday for delivery on Saturday, Sunday, and Monday, the TGP Dracut price was approximately \$90 per MMBtu on three consecutive dates (i.e., January 5, 2018, January 6, 2018, and January 7, 2018).

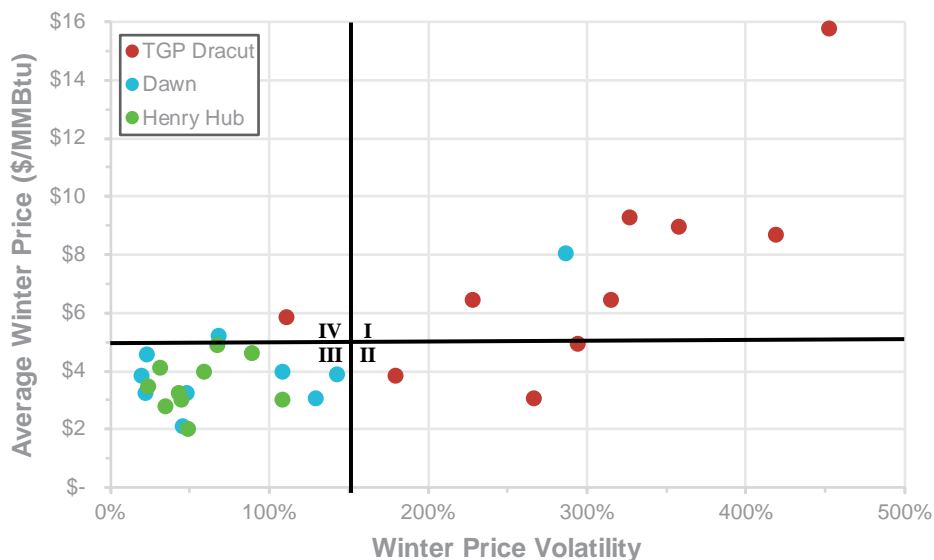
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1 **Q. Please discuss the volatility of the TGP Dracut prices.**

2 A. The TGP Dracut price index has exhibited higher price levels and more volatility relative
3 to the Dawn and Henry Hub price indices. Figure 2 below is a scatterplot showing the
4 historical natural gas price volatility⁴⁸ (on the x-axis) and the average winter price (on the
5 y-axis) for the TGP Dracut, Dawn, and Henry Hub price indices over the winters of
6 2009/10 through 2018/19. The scatterplot is divided into four quadrants with a vertical
7 line parallel to the y-axis, which separates observations with relatively lower volatility
8 (less than 150 percent) in quadrants III and IV and higher volatility (greater than 150
9 percent) in quadrants I and II, and a horizontal line parallel to the x-axis, which separates
10 observations with an average winter price level of less than \$5 per MMBtu in quadrants
11 II and III or greater than \$5 per MMBtu in quadrants I and IV.

⁴⁸ Please note, the historical natural gas price volatility measures the degree of variation in daily natural gas prices as defined by the U.S. Energy Information Administration in the August 2007 report titled “An Analysis of Price Volatility in Natural Gas Markets.”

Figure 2: Average Winter Prices and Volatility (2009/10 – 2018/19)⁴⁹



As shown in Figure 2 above, on a comparative basis, there are ten observations in Quadrants I and II, which are the higher volatility quadrants, and nine of those ten observations are the TGP Dracut price index. Specifically, for the TGP Dracut price index, six of ten observations are in quadrant I, which reflect higher price and higher volatility; three observations in quadrant II with higher volatility and average winter prices between \$3 to \$5 per MMBtu; and one observation in quadrant IV with an average winter price of nearly \$6 per MMBtu and winter price volatility of over 110 percent.

Q. In addition to high price levels and volatility, are there other concerns regarding the TGP Dracut price index?

A. Yes, there also are liquidity concerns associated with the TGP Dracut price index. There are limited gas supply options and counterparties at the TGP Dracut point. [REDACTED]

⁴⁹ Based on ScottMadden's analysis of data from S&P Global Market Intelligence.

1 [REDACTED]
2 [REDACTED]
3 [REDACTED]
4 [REDACTED]
5 [REDACTED]
6 [REDACTED]

7 [REDACTED] the lack of liquidity at Dracut in general, and on the TGP Concord Lateral in
8 particular. [REDACTED] the Company would be forced to rely solely on
9 spot gas purchases at Dracut and would not be able to execute its basis hedging plan,
10 exposing our customers to significant price volatility.⁵²

11 **Q. What alternative gas supply options are available to the Company in the current**
12 **marketplace?**

13 A. The Company presented in its 2017 LCIRP an analysis of various supply alternatives that
14 may be available to meet the demand requirements of EnergyNorth's customers over the
15 Forecast Period. Specifically, as discussed in Section III above, EnergyNorth identified
16 and analyzed delivered supply from CLNG (formerly, ENGIE), Repsol supply from
17 Canaport LNG, and pipeline transportation capacity on TCPL/PNGTS.⁵³ Subsequently,
18 in late 2017, the Company presented an analysis of natural gas supply options (i.e.,

⁵⁰ See, Docket No. DG 18-137.

⁵¹ See, Docket No. DG 19-145.

⁵² Furthermore, S&P Global Platts has recently disaggregated the Tennessee Zone 6 pricing into four price points -- TGP Zone 6 delivered, TGP Zone 6 delivered North, TGP Zone 6 delivered South, and TGP Zone 6 (300 Leg) delivered. This will not only negatively impact the price liquidity and volatility of the Tennessee Zone 6 pricing, but also the TGP Dracut index. Source: S&P Global Platts, Methodology and specifications guide, North American natural gas, November 2018.

⁵³ 2017 LCIRP, at Bates 056.

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1 CLNG/ENGIE, Repsol, TCPL/PNGTS pipeline capacity, and the proposed Granite
2 Bridge LNG facility) to meet the long-term demand requirements of EnergyNorth's
3 customers.⁵⁴ However, since 2017, there have been major natural gas market changes
4 impacting the overall availability and pricing of natural gas supplies in New England.

5 **Q. Please discuss the changes in the regional natural gas market that may limit or**
6 **impact the future availability of natural gas supplies in New England.**

7 A. The natural gas market issues discussed in the Company's 2017 LCIRP (at Bates 044 to
8 050) continue to pose significant natural gas supply and capacity challenges for the New
9 England region in general and for the Company in particular. One of the primary sources
10 of natural gas supply to the New England region, the Sable Offshore Energy Project
11 ("SOEP") and Deep Panuke Offshore Gas Development Project ("Deep Panuke"), has
12 permanently shut down production, which not only reduces natural gas supply options,
13 but also places price pressure on other natural gas supply sources. In addition, the
14 primary source of imported LNG to the New England region, the Everett LNG facility, is
15 undergoing commercial changes,⁵⁵ which may impact the future availability and pricing
16 of natural gas supply from CLNG. Furthermore, other than the Portland XPress ("PXP")
17 Project, which the Company has already contracted for pipeline transportation service as
18 part of its long-term natural gas supply strategy in Docket No. DG 17-198, there have

⁵⁴ Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities, Petition to Approve Firm Supply and Transportation Agreements and the Granite Bridge Project, Docket No. DG 17-198, December 21, 2017.

⁵⁵ Exelon Generation Company, LLC ("Exelon") completed the acquisition of the Everett LNG facility from ENGIE in October 2018. Exelon's subsidiary (CLNG) is responsible for purchasing and selling LNG to gas utilities, marketers, and other market participants throughout New England. *See*, Motion of Constellation LNG, LLC for Leave to Intervene Out-of-Time, Docket No. DG 17-198, December 12, 2018.

1 been no new announcements of pipeline projects that would provide service to
2 EnergyNorth.

3 **1. Offshore Natural Gas Supplies**

4 **Q. In the 2017 LCIRP, the decline of offshore Nova Scotia natural gas production was**
5 **reviewed in detail. Has the situation changed?**

6 A. Yes, it has. Specifically, there is no longer any natural gas production from SOEP and
7 Deep Panuke. The Canada-Nova Scotia Petroleum Board announced that production
8 from SOEP has been permanently shut down as of December 31, 2018,⁵⁶ and natural gas
9 production from Deep Panuke has been permanently shut down since May 2018.⁵⁷

10 **Q. What are the implications for New England given the recent developments associated**
11 **with SOEP and Deep Panuke production?**

12 A. Given the permanent production shut down of SOEP and Deep Panuke, the New England
13 and Maritime Canada regions no longer have access to natural gas supply flowing into
14 the Maritimes & Northeast Pipeline (“MNE”) system from offshore Nova Scotia, which
15 is a significant supply loss – at times reaching as high as 470 MMcf per day. The loss of
16 offshore Nova Scotia natural gas production places pressure on other natural gas supply
17 sources and leaves re-vaporized LNG from Repsol’s Canaport LNG facility as the only
18 gas supply option available from Maritime Canada⁵⁸ for the New England market.

⁵⁶ See, Canada-Nova Scotia Offshore Petroleum Board, Weekly Operations Report, January 3, 2019.
<https://www.cnsopb.ns.ca/sites/default/files/pdfs/Jan0319.pdf>

⁵⁷ Ibid.

⁵⁸ Excludes certain limited volume from Corridor Resources.

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1 **2. Imported LNG Supplies**

2 **Q. Please summarize the developments associated with the Everett LNG facility over the**
3 **past two years.**

4 A. As discussed in the Company's 2017 LCIRP, the Everett LNG facility is a primary
5 source of imported LNG supplies to the New England region. In 2018, the Everett LNG
6 facility was acquired by Exelon⁵⁹ and is currently undergoing commercial changes.
7 Specifically, a subsidiary of Exelon, Constellation Mystic Power, LLC ("Mystic"), filed a
8 request with the FERC in May 2018 for approval of a cost-of-service agreement between
9 Mystic, Exelon, and ISO New England ("ISO-NE"), which would support the continued
10 operation of the Mystic 8 and 9 natural gas-fired generating units.⁶⁰ In its order issued on
11 December 20, 2018, in Docket No. ER18-1639-000, the FERC approved the cost-of-
12 service agreement, with certain conditions, to maintain the fuel security needs of the ISO-
13 NE region through May 2024.⁶¹ In addition, the FERC determined that Mystic can
14 recover 91 percent of the cost of ownership and operation of the Everett LNG facility and
15 ordered the implementation of an incentive mechanism to promote third-party sales of
16 LNG from the Everett LNG facility.⁶²

⁵⁹ Exelon completed the acquisition of the Everett LNG facility from ENGIE in October 2018. *See*, Motion of Constellation LNG, LLC for Leave to Intervene Out-of-Time, Docket No. DG 17-198, December 12, 2018.

⁶⁰ The Mystic 8 and 9 units are solely supplied by the Everett LNG facility and, in fact, Mystic is the largest customer of the Everett LNG facility. *See*, Prepared Answering Testimony of Richard L. Levitan on behalf of ISO New England, Inc., FERC Docket No. ER18-1639-000, August 16, 2018.

⁶¹ *See*, Federal Energy Regulatory Commission, Order Accepting Agreement, Subject to Condition, and Directing Briefs, FERC Docket No. ER18-1639-000, December 20, 2018, Para. 133-134.

⁶² *Ibid*.

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1 **Q. What are the market implications of the commercial changes related to the Everett**
2 **LNG facility?**

3 A. Exelon's filing with the FERC and associated commercial strategy for the Everett LNG
4 facility may impact the future availability and pricing of LNG from the facility. While
5 the Company's delivered service contracts with ENGIE that are part of Docket No. DG
6 17-198 have been assigned to CLNG, a subsidiary of Exelon, there is uncertainty
7 associated with the duration and pricing of service from the Everett LNG facility beyond
8 the current term of the contracts. To that point, certain intervenors in FERC Docket No.
9 ER18-1639-000 raised concerns related to incentives in the cost-of-service compensation
10 agreement, which could cause Exelon to act in a way that may have the effect of raising
11 or lowering the natural gas prices in the Northeast.⁶³ Because Exelon will be operating
12 the Mystic and Everett LNG facilities under a new cost recovery framework, it is unclear:
13 (i) if Exelon will change the operations of the Everett LNG facility in response to the new
14 incentives; (ii) how those changes will affect natural gas supply and prices in New
15 England; or (iii) if CLNG will offer similar products and services (e.g., liquefied natural
16 gas for refill). Regardless, the commercial changes at the Everett LNG facility will
17 increase uncertainty associated with type and availability of service offerings and
18 associated price signals.

⁶³ Ibid, Para. 213-216.

1 **Q. Is there evidence that these commercial changes will impact the Company and its**
2 **customers?**

3 A.

[REDACTED]

8 **3. Incremental Pipeline Capacity**

9 **Q. Please discuss the increase in pipeline deliverability into the New England region over**
10 **the past two years.**

11 A. Recent pipeline expansions that provide incremental capacity to the region, which are
12 discussed in the Company's 2017 LCIRP, are the Algonquin Incremental Market, TGP
13 Connecticut Expansion, and Atlantic Bridge Phase I projects.⁶⁵ Since the 2017 LCIRP
14 filing, the PNGTS PXP Project, which is part of the Company's natural gas supply
15 strategy in Docket No. DG 17-198, has initiated service. As detailed in Docket No. DG
16 17-198, EnergyNorth has executed a precedent agreement with PNGTS associated with
17 the PXP Project. This agreement provides the Company with firm transportation
18 capacity of up to 5,000 Dth per day from the Dawn Hub to Dracut, Massachusetts, the
19 interconnection point between the Joint Facilities⁶⁶ and Tennessee. Phase I of the

⁶⁴ See, Docket No. DG 19-145.

⁶⁵ 2017 LCIRP, at Bates 048.

⁶⁶ The "Joint Facilities" refers to the portion of the PNGTS system from Westbrook, Maine to Dracut, Massachusetts, which is owned jointly by PNGTS and MNE-US.

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1 PNGTS PXP Project commenced service as of November 1, 2018, which provides the
2 Company with supply diversity at Dracut, but not added capacity given that there is no
3 additional capacity available on the TGP Concord Lateral. However, as discussed in
4 Section IV.C. below, if the proposed Granite Bridge Pipeline is placed in-service, the
5 contracted PXP Project capacity will be able to provide incremental Design Day supply
6 to EnergyNorth's city-gates.

7 **Q. Have there been any new pipeline projects for New England announced since 2017?**

8 A. Yes, there have been. However, while those projects may bring additional supply to very
9 specific parts of the New England region, there have been no new announcements of
10 pipeline projects that would provide service to EnergyNorth's distribution system in New
11 Hampshire. Specifically, PNGTS announced the Westbrook XPress Project, which is an
12 expansion of the PNGTS system to Westbrook, Maine, but not to the Joint Facilities (i.e.,
13 downstream to Dracut). In addition, Tennessee announced the TGP 261 Upgrade Project,
14 which is a pipeline looping and compressor upgrade project to provide service from
15 Dracut to delivery points in western Massachusetts. Finally, the other natural gas
16 pipelines that serve the region, Iroquois Gas Transmission System, L.P., Algonquin Gas
17 Transmission LLC, and MNE, have not announced any new projects to provide
18 incremental capacity to New England.

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1 **4. Summary of Regional Natural Gas Market Dynamics**

2 **Q. Please summarize how the recent changes in the New England natural gas market**
3 **will impact the gas supply options available to serve EnergyNorth's customers.**

4 **A.** The recent changes in the New England natural gas market bring into question the
5 availability and long-term feasibility of certain natural gas supply options to serve the
6 New England region in general, and EnergyNorth in particular. As discussed above, with
7 the loss of offshore Nova Scotia production, Repsol's Canaport LNG facility is now the
8 only gas supply option into MNE from the north to serve the New England and Maritime
9 Canada markets. There is uncertainty regarding the types and availability of service
10 offerings and associated pricing from the Everett LNG facility and how that uncertainty
11 may affect services offered by CLNG to the Company. In addition, there have been no
12 new pipeline capacity projects announced over the past two years that could provide
13 incremental deliverability and supply to the Company's service territory.

14 These natural gas supply challenges exacerbate the Company's concerns regarding the
15 availability of certain natural gas supply options, regional natural gas supply and
16 transportation constraints, and associated price spikes and high volatility levels,
17 particularly in the winter period.

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1 **C. System Extension**

2 **Q. Please summarize Liberty Consulting’s concern regarding the delivery option**
3 **evaluated by EnergyNorth to increase deliverability to the Company’s city-gates,**
4 **i.e., the system extension.**

5 A. Liberty Consulting believes additional information is required to evaluate the system
6 extension (i.e., the proposed Granite Bridge Pipeline). Specifically, Messrs. Antonuk and
7 Adger stated, “[w]hether such an extension will be required during the LCIRP forecast
8 period remains to be examined.”⁶⁷

9 **Q. Would the Company be able to meet its forecasted demand requirements with the**
10 **existing pipeline delivery capacity?**

11 A. No, the Company would not be able to meet its forecasted requirements over the Forecast
12 Period with its existing delivery infrastructure. EnergyNorth, for all intents and purposes,
13 is solely reliant on the TGP Concord Lateral for deliveries of gas supplies to the
14 Company’s service territories.⁶⁸ As discussed in the 2017 LCIRP, as well as in prior
15 filings before the Commission, the TGP Concord Lateral is fully subscribed and,
16 therefore, that supply feed has no additional capacity to meet the Company’s growing
17 demand requirements. Any additional requests to increase capacity and deliverability on
18 the TGP Concord Lateral will, at a minimum, require incremental facilities.

⁶⁷ Direct Testimony of John Antonuk and John Adger of The Liberty Consulting Group, at Bates 021.
⁶⁸ Except for the City of Berlin, which is served by PNGTS.

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1 **Q. Is the need for incremental resources recognized by Staff?**

2 A. Yes, it is. As discussed in Section III above, Messrs. Antonuk and Adger of Liberty
3 Consulting concluded that “there exists a need for some addition to gas supplies, both
4 capacity and commodity, during the LCIRP forecast period”⁶⁹ as they “expect that
5 EnergyNorth will continue to add customers.”⁷⁰ In addition, Liberty Consulting
6 acknowledges the deliverability constraints on the existing TGP Concord Lateral, and
7 thus, suggested that the CLNG/ENGIE contract is “an appropriate portfolio element for
8 planning purposes”⁷¹ since the CLNG/ENGIE supply can be delivered directly to the
9 Company’s city-gates.

10 **Q. Did the Company evaluate incremental delivery capacity options in the 2017**
11 **LCIRP?**

12 A. Yes, as discussed in the 2017 LCIRP, EnergyNorth evaluated the option to enhance its
13 distribution system reliability, diversity, and flexibility through an extension of its
14 system.⁷² A system extension, which was later identified as the proposed Granite Bridge
15 Pipeline in Docket No. DG 17-198, would provide a second delivery feed to the
16 Company’s service territories, and provide the Company with access to incremental gas
17 supply and capacity options.

⁶⁹ Direct Testimony of John Antonuk and John Adger of The Liberty Consulting Group, at Bates 022.

⁷⁰ Ibid, at Bates 020.

⁷¹ Ibid, at Bates 021.

⁷² 2017 LCIRP, at Bates 054.

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1 **Q. Did the Company evaluate alternatives to the proposed Granite Bridge Pipeline?**

2 A. Yes, the Company evaluated the only other alternative to the proposed Granite Bridge
3 Pipeline. Specifically, EnergyNorth had various discussions with Tennessee regarding an
4 expansion of the existing TGP Concord Lateral to provide incremental delivery capacity
5 to the Company's city-gates. These discussions commenced immediately following
6 Kinder Morgan's announcement of the cancellation of the TGP NED Project. Based on
7 the confidential information provided by Tennessee, the Company conducted a
8 quantitative and qualitative comparison of a TGP Concord Lateral expansion to the
9 proposed Granite Bridge Pipeline, which are further detailed in the Company's filing in
10 Docket No. DG 17-198.

11 **Q. Please summarize the results of the quantitative and qualitative assessment of the**
12 **two delivery options, i.e., TGP Concord Lateral expansion and the proposed**
13 **Granite Bride Pipeline from Docket No. DG 17-198.**

14 A. Based on the Company's quantitative analysis in Docket No. DG 17-198, the estimated
15 daily rate for constructing the proposed Granite Bridge Pipeline was significantly lower
16 than the daily rates provided by Tennessee for an expansion of the TGP Concord
17 Lateral.⁷³ In addition, the proposed Granite Bridge Pipeline provides significantly more
18 qualitative benefits than an expansion of the TGP Concord Lateral. Importantly, the
19 Granite Bridge Pipeline would provide a second feed to the Company, which increases
20 the diversity and flexibility of EnergyNorth's delivery infrastructure, and significantly

⁷³ Direct Testimony of William R. Killeen and James M. Stephens, Docket No. DG 17-198, at Bates 175R to 178R.

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1 increases the reliability and security of gas supply deliveries.⁷⁴ Finally, the proposed
2 Granite Bridge Pipeline is a feasible and viable option that is within the New Hampshire
3 Department of Transportation (“NHDOT”) right-of-way along Route 101, which is
4 designated as one of the state’s Energy Infrastructure Corridors; whereas, the existing
5 TGP Concord Lateral runs from Dracut, Massachusetts through highly populated and
6 congested areas along Interstate 93, and terminating near Concord, New Hampshire, the
7 expansion of which is therefore not as feasible as Granite Bridge Pipeline.

8 In summary, the Company’s quantitative and qualitative assessments of the two delivery
9 options in Docket No. DG 17-198 demonstrate that the Granite Bridge Pipeline is the
10 best-cost incremental capacity option for EnergyNorth and its customers.

11 **Q. How did EnergyNorth model the proposed Granite Bridge Pipeline in its analysis of**
12 **the resource portfolio in the 2017 LCIRP?**

13 A. Since the forecasted demand requirements exceeded the Company’s existing resource
14 portfolio, the Company included the proposed Granite Bridge Pipeline in all of the
15 SENDOUT® model runs, because the proposed Granite Bridge Pipeline would be
16 capable of accessing incremental deliveries of natural gas supplies to serve incremental
17 demand requirements.

⁷⁴ Ibid, at Bates 178R to 181R.

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1 **Q. Did the SENDOUT® results in the 2017 LCIRP demonstrate a need for the**
2 **proposed Granite Bridge Pipeline?**

3 A. Yes, it did. The SENDOUT® results for the various demand scenarios (i.e., Base Case,
4 Low Growth, and High Growth), as well as weather scenarios (i.e., Normal Year and
5 Design Year), demonstrated that there were incremental gas supply needs over the
6 LCIRP Forecast Period, which all required delivery on the proposed Granite Bridge
7 Pipeline. Stated differently, absent the inclusion of the proposed Granite Bridge Pipeline,
8 the SENDOUT® model runs would result in an infeasible solution because of the
9 deliverability constraints on the TGP Concord Lateral to the Company's city-gates.

10 **Q. Does the Company agree with Liberty Consulting's conclusions with respect to the**
11 **system extension?**

12 A. No, the Company does not. While Liberty Consulting concluded that "[w]hether such an
13 extension will be required during the LCIRP forecast period remains to be examined",⁷⁵
14 the results of the various SENDOUT® model runs included in the 2017 LCIRP
15 demonstrated that there is a need for additional delivery capability to the Company's city-
16 gates to access incremental gas supplies to meet the growing demand requirements of
17 EnergyNorth's customers. Stated differently, absent incremental and, importantly, timely
18 incremental delivery capacity, the Company will be faced with a similar situation as other
19 New England LDCs (e.g., Berkshire Gas Company and Columbia Gas of Massachusetts)

⁷⁵ Direct Testimony of John Antonuk and John Adger of The Liberty Consulting Group, at Bates 021.

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1 resulting in a moratorium on the ability of customers to choose natural gas for end-use
2 applications.

3 **V. RESPONSE TO MR. PAUL CHERNICK ON BEHALF OF CLF**

4 **Q. Please summarize the concerns raised by Mr. Chernick regarding the Company's**
5 **2017 LCIRP.**

6 A. In his direct testimony, Mr. Chernick raised a number of concerns that he believes are
7 issues with respect to the Company's 2017 LCIRP. At a high-level, Mr. Chernick takes
8 issue with EnergyNorth's overall resource planning process as outlined above in Section
9 III, including the Company's Demand Forecast methodology, the Company's evaluation
10 and development of a best-cost resource portfolio, and the Company's compliance with
11 Commission orders and statutory requirements.

12 **A. Demand Forecast Methodology**

13 **Q. Please outline the issues raised by Mr. Chernick with respect to EnergyNorth's**
14 **Demand Forecast methodology.**

15 A. The testimony of Mr. Chernick identified three areas where he disagrees with the
16 Company's Demand Forecast methodology. First, as a matter of policy, Mr. Chernick
17 proposes that EnergyNorth not engage in any promotional activity supporting customer
18 additions as Mr. Chernick opines that providing New Hampshire homeowners and
19 businesses with the option to choose natural gas is not in the public interest. Second, Mr.
20 Chernick states that the Company misapplied the forecasted reductions for energy
21 efficiency in its Demand Forecast. Finally, Mr. Chernick opines that the Company's

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1 2017 LCIRP “shows only minimal amounts of energy-efficiency load reductions”⁷⁶ and
2 argues that the EnergyNorth failed to consider additional “cost-effective” energy
3 efficiency and demand-side programs.

4 **Q. Please summarize Mr. Chernick’s position regarding the Company’s promotion of**
5 **natural gas.**

6 A. Mr. Chernick asserts that it is imprudent to shift energy load in New Hampshire to natural
7 gas.⁷⁷ He concludes that the Company’s Demand Forecast, and thus its need for
8 additional resources, would be lower if “Liberty were not promoting the shifting of
9 customer loads from other fuels to natural gas.”⁷⁸ In addition, Mr. Chernick states that
10 “demand growth that Liberty has proposed would be eliminated by ceasing Liberty’s
11 efforts to promote new gas space and water heating (and some other end uses).”⁷⁹
12 Finally, he insists that the Company “has not shown that such increases in natural gas
13 combustion are in the public interest.”⁸⁰

14 **Q. Does the Company agree with Mr. Chernick that providing customers with the**
15 **option to choose natural gas is not in the public interest?**

16 A. No, it does not. The Company vehemently opposes the draconian measures outlined by
17 Mr. Chernick that would eliminate natural gas as a fuel choice for customers. The
18 customer choice moratorium proposed by Mr. Chernick removes from the customer the

⁷⁶ Direct Testimony of Paul Chernick on behalf of Conservation Law Foundation, at 24.

⁷⁷ Ibid, at 3.

⁷⁸ Ibid, at 9.

⁷⁹ Ibid, at 23.

⁸⁰ Ibid, at 9.

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1 ability to make a uniquely individual decision -- what fuel to heat their home, use in their
2 restaurant, or install in their development/business. While CLF and Mr. Chernick may
3 believe they are the only entities able to decide the appropriate fuel choice for New
4 Hampshire homeowners and business owners, the Company firmly believes that the
5 customer has always been, and should always be, the appropriate decision maker. It is,
6 and has always been, EnergyNorth's position that the customer should have a choice.
7 The Company provides New Hampshire homeowners and businesses with the option to
8 choose natural gas, and customers are electing to switch to natural gas from other fuels
9 because it is the better fuel option for them based on their individual decisions.

10 Further, the Company has proposed innovative programs to provide New Hampshire
11 homeowners and businesses with fuel choice, which programs the Commission has
12 approved, finding them to be in the public interest.⁸¹ It is important to note that the
13 Company's Commission-approved programs provide a choice for customers and do not
14 force natural gas use on any customer. Fuel choice, with natural gas as an option, is
15 supported by the Chambers of Commerce in Greater Concord, Greater Derry-
16 Londonderry, Exeter Area, Greater Hudson, Greater Manchester, Greater Nashua, and
17 Souhegan Valley, as well as the Business and Industry Association, which is New
18 Hampshire's statewide Chamber of Commerce, who represent businesses in and around
19 the Company's service territory, as they have supported EnergyNorth's various growth
20 projects. In addition, developers that are creating jobs want natural gas as an option. The

⁸¹ See, for example, Docket Nos. DG 13-198 (improving EnergyNorth's line extension tariff), and DG 16-447 (approving the Managed Expansion Program and further changes to the line extension tariff).

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1 Company recommends that the Commission reject any policy that allows an entity to
2 control fuel choices for individual customers by eliminating options as a matter of
3 “public policy”.

4 **Q. Please summarize the Company’s response to Mr. Chernick’s conclusions regarding**
5 **the Company’s energy efficiency and demand-side programs.**

6 A. First, as detailed in the Company’s Demand Forecast Rebuttal Testimony, contrary to Mr.
7 Chernick’s assertions, the Company’s increasing energy efficiency goals are fully and
8 reasonably incorporated in the Demand Forecast. The approach used to account for
9 energy efficiency in the Demand Forecast is similar to: (i) the methodology used by the
10 Company and approved by the Commission in the NED proceeding; and (ii) approaches
11 used by other regional LDCs. With respect to the level of savings, the Company has
12 relied on the energy efficiency goals that were developed through a rigorous and
13 collaborative process involving numerous stakeholders, including CLF, and reviewed and
14 approved by the Commission.

15 **B. Evaluation and Development of a Best-Cost Resource Portfolio**

16 **Q. What are the issues raised by Mr. Chernick with respect to the Company’s**
17 **evaluation and development of a best-cost resource portfolio?**

18 A. There are four main issues identified in Mr. Chernick’s testimony with respect to the
19 Company’s evaluation and development of a best-cost resource portfolio for its
20 customers. First, Mr. Chernick asserts that it is imprudent to shift energy load in New

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1 Hampshire to natural gas⁸² and that EnergyNorth should have evaluated options, such as
2 heat pumps, as alternatives to natural gas.⁸³ Second, he concludes that the Company
3 “does not include an evaluation of alternatives to new natural gas infrastructure
4 investments”⁸⁴ as part of its 2017 LCIRP. Third, Mr. Chernick claims that the Company
5 should not acquire or develop natural gas resources as “[t]here is significant risk that the
6 [Company’s resource] plan will result in future stranded costs and higher customer
7 costs.”⁸⁵ Finally, he proposes that “[f]or meeting the remainder of the load, above
8 current supply, Liberty’s options include... limited imports of LNG.”⁸⁶

9 **Q. Please discuss Mr. Chernick’s argument that heat pumps should have been**
10 **considered as an alternative to natural gas in the 2017 LCIRP.**

11 A. Prior to discussing Mr. Chernick’s arguments regarding alternatives to natural gas, it is
12 important to reiterate that EnergyNorth provides homeowners and businesses in New
13 Hampshire with the option to choose natural gas, and these customers are making the
14 decision to switch to natural gas from other fuels as evidenced by the growth in demand
15 for natural gas. Mr. Chernick’s proposed policy, if implemented, removes choice from
16 the very people and businesses that are best positioned to decide what fuel to use for
17 various end use applications. Furthermore, while Mr. Chernick asserts that the Company
18 “fails to reasonably address future need in light of the availability of cleaner and lower

⁸² Direct Testimony of Paul Chernick on behalf of Conservation Law Foundation, at 3.

⁸³ Ibid.

⁸⁴ Ibid.

⁸⁵ Ibid.

⁸⁶ Ibid, at 23.

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1 cost resources, including...electric heat pumps,”⁸⁷ Mr. Chernick’s views on electric heat
2 pumps rest on several fundamental flaws as detailed in the Rebuttal Testimony of Paul J.
3 Hibbard.

4 First, Mr. Chernick provides no basis for his conclusions that heat pumps are a feasible
5 solution for cold weather climates like New Hampshire. In fact, a recent report issued by
6 the American Gas Association (“AGA”) stated that, “[a]ctual space heating efficiency
7 [for heat pumps] varies based on winter temperatures, with efficiency declining as the
8 temperature becomes colder”, and further concluded that “electric heat pump efficiency is
9 lowest” on the coldest winter days.⁸⁸ The same AGA report noted that:

10 ...heat pump installations are often sized to meet air conditioning load
11 requirements rather than heating requirements. Oversizing a heat pump
12 to meet peak winter requirements results in more expensive equipment,
13 lower operating efficiency, and additional wear and tear on the
14 equipment during the summer cooling season.

15 ***

16 In addition, at very low temperatures, heat pumps typically cannot
17 provide adequate heat and require some form of back-up energy,
18 typically electric resistance heat.⁸⁹

19 In addition, as discussed in the Rebuttal Testimony of Paul J. Hibbard, actual installations
20 of heat pumps by homeowners and businesses of New Hampshire have been minimal,
21 and there is no evidence to suggest that installations of electric heat pumps in New

⁸⁷ Ibid, at 3.

⁸⁸ American Gas Association, Implications of Policy-Driven Residential Electrification, July 2018, at 4 and 7.

⁸⁹ Ibid, at 16.

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1 Hampshire will experience a significant increase over the term of the 2017 LCIRP or
2 beyond.

3 Finally, Mr. Chernick fails to acknowledge that heat pumps actually require consumption
4 of natural gas to generate electricity since natural gas is the marginal fuel in the regional
5 power system (i.e., ISO-NE),⁹⁰ and on the coldest winter days, the region increases its
6 reliance on oil- and coal-fired generation. For example, ISO-NE noted that during the
7 extreme cold spell from December 26, 2017, to January 9, 2018, oil-fired generation
8 accounted for 27 percent of the regional fuel mix, with natural gas representing 24
9 percent, and coal representing 6 percent.⁹¹

10 **Q. Does EnergyNorth agree with Mr. Chernick's conclusion that the Company "does**
11 **not include an evaluation of alternatives to new natural gas infrastructure**
12 **investments" in its 2017 LCIRP?**

13 A. No, it does not. To meet the natural gas demand requirements of existing and new
14 customers, EnergyNorth employed a multi-step approach to identify and evaluate
15 available natural gas capacity and supply options to develop a reliable, best-cost resource
16 portfolio. Specifically, as detailed in the initial 2017 LCIRP filing, EnergyNorth
17 identified a wide range of resource options available in the marketplace.⁹³ Then, the

⁹⁰ As Mr. Chernick has indicated in his testimony, "the real-time marginal energy supply was from natural gas over 70% of the time" in the ISO-NE region. *See*, Direct Testimony of Paul Chernick on behalf of Conservation Law Foundation, at 13.

⁹¹ *See*, ISO-NE, About Us, Key Grid and Market Stats, Resource Mix, <https://www.iso-ne.com/about/key-stats/resource-mix/>, accessed October 9, 2019.

⁹² Direct Testimony of Paul Chernick on behalf of Conservation Law Foundation, at 3.

⁹³ 2017 LCIRP, at Bates 053.

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1 Company evaluated the available, viable supply alternatives, which included
2 CLNG/ENGIE liquid/vapor service, Repsol supply, and PNGTS/TCPL transportation
3 capacity, using the SENDOUT® model, the results of which were provided in Table 36
4 on Bates 057 and in Appendix 6.A through Appendix 6.F of the 2017 LCIRP. As
5 discussed in Section IV above, Staff “found EnergyNorth’s selection of the ENGIE,
6 Repsol and TCPL/PNGTS supply options appropriate,”⁹⁴ and concluded that the
7 Company’s “analysis of them sound and comprehensive.”⁹⁵ The Company also
8 conducted a qualitative assessment of the available supply alternatives.⁹⁶ Thus, Mr.
9 Chernick’s assertions that the Company did not evaluate alternatives to new natural gas
10 infrastructure investments are not aligned with Staff’s conclusions, and not supported by
11 the analysis submitted in this docket.

12 **Q. Please summarize Mr. Chernick’s position regarding the risk of stranded costs**
13 **associated with the Company’s resource portfolio plan.**

14 A. With respect to the Company’s conclusions and resource decisions that are outlined in the
15 2017 LCIRP (also summarized in Section III above), Mr. Chernick states that
16 EnergyNorth “has not demonstrated that the planned investments and commitments will
17 be beneficial to customers, even in the near term.”⁹⁷ He also asserts that the Company “is
18 unlikely to need the delivery capacity for very long, leaving its customers vulnerable to
19 having to pay for stranded assets.”⁹⁸ Finally, Mr. Chernick concludes that there is

⁹⁴ Direct Testimony of John Antonuk and John Adger of The Liberty Consulting Group, at Bates 020.

⁹⁵ Ibid, at Bates 022.

⁹⁶ 2017 LCIRP, at Bates 052 to 058. See, also, the Company’s response to Staff 2-14.

⁹⁷ Direct Testimony of Paul Chernick on behalf of Conservation Law Foundation, at 20.

⁹⁸ Ibid.

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1 “significant risk that the resources will not remain economic through their expected terms
2 of service.”⁹⁹

3 **Q. Does the Company agree with Mr. Chernick that it should not continue to acquire**
4 **or develop natural gas resources because of the risk of stranded costs?**

5 A. No, it does not. As a preliminary matter, any discussion of hypothetical stranded costs in
6 a five-year LCIRP is simply misplaced, given the relatively short time horizon covered in
7 this docket. However, to respond to Mr. Chernick’s position, the Company and its
8 predecessors have been providing natural gas service to homes and businesses in New
9 Hampshire for decades, and have served some locations for well over 100 years. As a
10 public utility, the Company has an obligation to provide reliable service to those
11 customers who have chosen or who decide to choose natural gas – those choices are long-
12 term decisions and investments by customers. EnergyNorth as a public utility needs to
13 invest capital in long-term infrastructure or contracts, which include distribution
14 investments as well as gas supply investments, to reliably serve existing and new
15 customers.

16 With respect to its resource portfolio, EnergyNorth reviews contracts and assets that,
17 when combined with the existing portfolio, increases the reliability of gas supply
18 delivery; provides diversity such that concentration risk is mitigated; increases the
19 flexibility of the portfolio to respond to changing weather conditions; provides more
20 resiliency in the portfolio to adjust to changing market trends or unforeseen

⁹⁹ Ibid.

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1 circumstances; and is accomplished in a cost-effective manner. It is the overall resource
2 portfolio that enables the Company to provide reliable service to customers, and these
3 contracts and assets are underpinned by long-term capital investments. Mr. Chernick's
4 position completely ignores the resource planning goals and objectives and the rigorous
5 resource planning process employed by the Company to evaluate and develop a reliable,
6 best-cost resource portfolio for customers who expect continuous service over decades.¹⁰⁰

7 **Q. Please discuss Mr. Chernick's conclusions regarding imported LNG as a supply**
8 **option for EnergyNorth.**

9 A. Mr. Chernick proposes that the Company should rely on imported LNG to meet load
10 requirements above current supply.¹⁰¹ Mr. Chernick states that "[w]hile the LCIRP may
11 be painting the lack of demand for LNG in the New England market as some sort of
12 problem, it is in fact an advantage for gas buyers, since import (and associated storage)
13 capacity is readily available."¹⁰² He further asserts that "[i]f New England needs some
14 supplemental gas, before the regional transition to electricity reduces gas load below the
15 capacity of the existing pipeline system, LNG should be available."¹⁰³

¹⁰⁰ In addition, Mr. Chernick provides no source documentation, data, and/or analysis to support his arguments regarding the risk of stranded assets. *See*, Mr. Chernick's response to LU 1-28.

¹⁰¹ Direct Testimony of Paul Chernick on behalf of Conservation Law Foundation, at 23.

¹⁰² *Ibid*, at 28.

¹⁰³ *Ibid*.

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1 **Q. Is Mr. Chernick correct in assuming that natural gas supply from the regional LNG**
2 **import facilities is readily available to meet EnergyNorth's incremental load**
3 **requirements?**

4 A. No, he is not. As a preliminary matter, Mr. Chernick's reliability standard of "should be
5 available" does not meet the reliability requirement of the Company, which has been
6 approved by the Commission, nor would it meet the reliability requirement of customers
7 during a severe winter weather event. Furthermore, although Mr. Chernick admits he has
8 no experience negotiating LNG supply contracts,¹⁰⁴ he nevertheless instructs the
9 Company on availability of service offered by LNG importation facility owners. Clearly,
10 the commercial strategies and negotiating leverage of the owners of the LNG importation
11 facilities will drive their services and price offers, which affect the costs incurred by the
12 Company to provide gas supply to its customers.

13 With respect to the two regional LNG import facilities, Mr. Chernick conflates lack of
14 utilization with availability. The lack of utilization at the regional LNG import facilities
15 reflects the commercial strategies and opportunities of the two entities that control those
16 facilities. It is important to recognize that the import LNG facilities are not governed by
17 the FERC open access rules that are applied to natural gas pipelines. As such, the
18 capacity and service from the import LNG facility is directed by the commercial
19 motivation of the owner. Stated differently, service from the import LNG facility and
20 associated contract terms will reflect the competitive advantages and disadvantages of the

¹⁰⁴ See, Mr. Chernick's response to LU 1-32.

1 two parties negotiating the deal. The recent regional natural gas market dynamics have
2 resulted in fewer gas supply options¹⁰⁵ and, therefore, more advantage to the owners of
3 the LNG importation facilities. By way of example, and as mentioned earlier, in
4 response to the Company's most recent RFP, [REDACTED]
5 [REDACTED] As discussed in Section IV.B.
6 above, the shutdown of the offshore Nova Scotia gas supplies places pressure on other
7 natural gas supply sources and leaves re-vaporized LNG from Repsol's Canaport LNG
8 facility as the only gas supply option available from Maritime Canada¹⁰⁶ to serve the
9 Maritime Canada and New England regions. Notably, the Maritime Canada market
10 participants (LDCs and other end-users) have underpinned long-term pipeline capacity
11 contracts and on-system assets, thus providing those market participants with supply asset
12 diversity and the avoidance of concentration risk.

13 Finally, Mr. Chernick fails to recognize that incremental natural gas volumes from a
14 regional LNG importation facility are not deliverable to EnergyNorth's city-gates absent
15 new infrastructure. Stated differently, without incremental delivery capacity provided by
16 the proposed Granite Bridge Pipeline, imported LNG supply cannot reach the Company's
17 customers and is simply not an option "[f]or meeting the remainder of the load, above
18 current supply"¹⁰⁷ as Mr. Chernick suggests.

¹⁰⁵ The limited natural gas supply options are further evidenced by the high TGP Dracut prices experienced during peak winter periods, and the reliance on oil- and coal-fired generation during the coldest winter days by the ISO-NE region.

¹⁰⁶ Excludes certain limited volume from Corridor Resources.

¹⁰⁷ Direct Testimony of Paul Chernick on behalf of Conservation Law Foundation, at 23.

1 **C. Compliance with Commission Orders and Statutory Requirements**

2 **Q. Please summarize the assertions made by Mr. Chernick regarding the Company’s**
3 **compliance with Commission orders and statutory requirements.**

4 A. Mr. Chernick claims that EnergyNorth’s 2017 LCIRP does not reasonably address the
5 environmental and health-related implications of its resource options, which is “not
6 consistent with New Hampshire’s planning requirements”¹⁰⁸ and not in compliance with
7 statutory requirements. Mr. Chernick also asserts that “New Hampshire would be well
8 advised to similarly reflect”¹⁰⁹ the resource decisions of other states.

9 **Q. Does the Company agree with Mr. Chernick’s conclusions?**

10 A. No, the Company does not agree with Mr. Chernick’s conclusions. First, EnergyNorth’s
11 2017 LCIRP complies with New Hampshire’s current planning requirements. Any
12 comparison to what other states require – or what New Hampshire would be “well
13 advised” to require – is not relevant. The Company, as a New Hampshire based utility
14 with nearly 95,000 customers,¹¹⁰ operates under the guidance of New Hampshire
15 regulation and not that of other states.

16 Furthermore, the Company’s approach to developing and managing a gas supply resource
17 portfolio is driven by the natural gas demand of our existing and new customers, the
18 Planning Standards that reflect the New Hampshire climactic conditions, the reliability
19 standard required to service human needs during severe weather events, in a cost-

¹⁰⁸ Ibid, at 3.

¹⁰⁹ Ibid, at 4.

¹¹⁰ EnergyNorth’s 2018 Annual Report.

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1 effective manner. The approach used by other LDCs may not be relevant to the approach
2 used by the Company and approved by the Commission in prior LCIRPs and prior pre-
3 approval of capacity contracts.

4 Finally, EnergyNorth responded to the direction of the Commission and suggestions of
5 intervening parties by submitting a comprehensive evaluation of the environmental and
6 health-related implications of the identified delivery and supply options. The Company's
7 approach and analysis were reviewed and assessed by Staff as addressing the guidelines.
8 Specifically, as detailed in Section III above, Staff found the Company's analysis of
9 environmental and health-related implications to be responsive to the statutory
10 requirements.

11 **VI. RESPONSE TO MR. TERRY MICHAEL CLARK**

12 **Q. Please summarize the concerns expressed by Mr. Clark regarding the Company's**
13 **2017 LCIRP.**

14 A. While Mr. Clark admits that he is not an expert on any topic discussed in his
15 testimony,¹¹¹ he provides his opinions regarding continued natural gas usage in New
16 Hampshire and EnergyNorth's resource planning process. Specifically, Mr. Clark
17 expresses his support for "a rapid transition to electrification"¹¹² and opines that the
18 Company's resource portfolio plan hinges on "the perceived 'reliability' of natural
19 gas."¹¹³

¹¹¹ Direct Testimony of Terry Michael Clark, at 3.

¹¹² Ibid.

¹¹³ Ibid, at 34.

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1 **Q. Does the Company agree with Mr. Clark that there needs to be “a rapid transition**
2 **to electrification”¹¹⁴?**

3 A. No, the Company does not. As detailed in the Company’s response to Mr. Chernick in
4 Section V above, it is EnergyNorth’s position that the customer should have a choice and
5 EnergyNorth provides customers in New Hampshire with the option to choose natural
6 gas. Contrary to Mr. Clark’s opinion that natural gas is not what “the citizens of Keene
7 and New Hampshire, as a whole, want,”¹¹⁵ existing and new customers in the Company’s
8 service territories are making the decision to switch to natural gas from other fuels as
9 evidenced by the Company’s growth in demand for natural gas. By way of example, and
10 as detailed in the Company’s Demand Forecast Rebuttal Testimony, the towns of
11 Windham and Pelham are very supportive of the expansion of natural gas to their
12 communities. Similar to CLF and Mr. Chernick, Mr. Clark advocates for a policy that, if
13 implemented, removes choice from the very people and businesses that are best
14 positioned to decide what fuel to use for various end use applications.

15 **Q. Does Mr. Clark provide any support for his opinion regarding the perceived**
16 **“reliability” of natural gas?**

17 A. No, he does not.

¹¹⁴ Ibid, at 3.

¹¹⁵ Ibid, at 4.

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1 **Q. Is natural gas a reliable energy source?**

2 A. Yes, it is. Estimates from both the U.S. Energy Information Administration (“EIA”) and
3 the Potential Gas Committee (“PGC”), a research entity affiliated with the Colorado
4 School of Mines, support the long-term durability of domestic U.S. natural gas supply.

5 **Q. Please describe the estimate of natural gas resources published by the EIA.**

6 A. The EIA provides an annual estimate of Proved Reserves of natural gas, which are
7 defined by the EIA as “the estimated quantities which analysis of geological and
8 engineering data demonstrate with reasonable certainty to be recoverable in future years
9 from known reservoirs under existing economic and operating conditions.”¹¹⁶ Over the
10 past ten years, the EIA has increased its estimate of the total Proved Reserves in the U.S.
11 by 80 percent from approximately 244 Tcf in 2008 to over 438 Tcf in its most recent
12 2017 estimate.¹¹⁷

13 **Q. How much domestic U.S. natural gas supply is potentially recoverable based on the**
14 **PGC estimate?**

15 A. The PGC provides a biennial estimate of technically recoverable natural gas resources in
16 the U.S., which are additive to the EIA’s estimate of Proved Reserves.¹¹⁸ The estimates

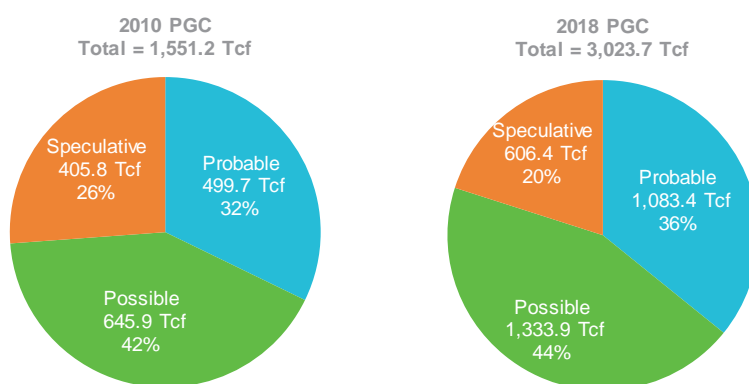
¹¹⁶ U.S. Energy Information Administration, https://www.eia.gov/dnav/ng/TblDefs/ng_enr_sum_tbldef2.asp, accessed on October 9, 2019.

¹¹⁷ U.S. Energy Information Administration, Dry Natural Gas Proved Reserves as of 12/31 (Summary), November 28, 2018.

¹¹⁸ While the EIA estimate of Proved Reserves identifies the economically recoverable resources under existing circumstances, the PGC estimate includes resources that are expected to be recoverable based on expected economic conditions, proximate resource performance, and expected technological developments. See, Potential Gas Committee, <http://potentialgas.org/what-we-do-2>, accessed on October 9, 2019.

of potential resources are classified by the PGC as Probable Resources,¹¹⁹ Possible Resources,¹²⁰ and Speculative Resources.¹²¹ As shown in Figure 3, the PGC estimate of total potential natural gas resources in the U.S. has increased by 95 percent from approximately 1,551 Tcf to 3,024 Tcf between 2010 and 2018, respectively.¹²²

Figure 3: PGC Estimates of Total Potential Resources in the U.S.¹²³



Q. Please summarize the total U.S. domestic gas supplies based on the EIA and PGC estimates.

A. As demonstrated by the EIA and PGC estimates, there has been a significant increase in U.S. reserves estimates, which supports the long-term durability of domestic U.S. natural

¹¹⁹ A Probable Resource is defined as discovered but unconfirmed resources associated with known fields and field extensions; also undiscovered resources in new pools in both productive and nonproductive areas of known fields.

¹²⁰ A Possible Resource is undiscovered resources associated with new field/pool discoveries in known productive formations in known productive areas.

¹²¹ A Speculative Resource is undiscovered resources associated with new field/pool discoveries in as-yet nonproductive areas.

¹²² Total resource potential represents the PGC estimates for the lower 48 U.S. states. Sources: The Potential Gas Agency, Colorado School of Mines, "Potential Supply of Natural Gas in the United States – Report of the Potential Gas Committee, December 31, 2010," April 2011; and The Potential Gas Agency, Colorado School of Mines, "Potential Supply of Natural Gas in the United States – Report of the Potential Gas Committee, December 31, 2018," July 2019.

¹²³ Ibid.

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1 gas supply. To provide context, assuming an annual overall U.S. natural gas
2 consumption level of approximately 30 Tcf,¹²⁴ the combined EIA Proved Reserves and
3 PGC potential resource estimates would provide sufficient supply for all U.S. natural gas
4 demand for over 115 years. Stated differently, contrary to Mr. Clark's opinion, there is
5 an abundance of domestic U.S. natural gas supply available to reliably meet the energy
6 needs of the U.S. for decades to come.

7 **VII. CONCLUSIONS**

8 **Q. Please summarize your conclusions regarding the Company's overall resource**
9 **planning process.**

10 A. As discussed in the initial filing of the 2017 LCIRP, the responses to various data
11 requests, and herein, the Company has conducted a sound resource planning process,
12 which included a detailed and rigorous analysis of the various components associated
13 with an LCIRP filing, including:

- 14 • Developing an econometric model with appropriate adjustments to reflect a
15 reasonable estimate of natural gas demand over the Forecast Period. Notably, the
16 Company's normalized actual volumes from 2017/18 and 2018/19 YTD are
17 consistent with, albeit slightly higher, than the Company's projections;
- 18 • Using a Commission approved approach that is consistent with past Company
19 practice to adjust the Demand Forecast for energy efficiency programs, lost and

¹²⁴ Represents the total annual natural gas consumption in the U.S. in 2018. Source: U.S. Energy Information Administration, Natural Gas Consumption by End Use, September 30, 2019.

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unaccounted for gas, unbilled sales, and events not in, or captured by, the
econometric models;

- Developing appropriate Planning Standards for weather conditions, such as Design Day;
- Conducting a detailed and reasonable approach to identifying potential gas supply alternatives that are available in the marketplace;
- Evaluating the gas supply options using quantitative (i.e., SENDOUT® modeling) and qualitative (e.g., reliability) analyses; and
- Complying with all statutory requirements and Commission orders associated with an LCIRP filing, including the assessment of environmental and health related impacts.

Q. Please summarize the Company's conclusions regarding the adequacy of the existing resource portfolio to meet forecasted demand requirements over the Forecast Period.

A. Based on the forecasted increase in demand requirements and the need to provide reliable and cost-effective service to customers, the Company has reached the following conclusions:

- The Company's legacy contracts with the upstream providers are necessary to provide reliable service and should be renewed;
- The Company has a significant reliance on its propane facilities and that reliance is growing given the increase in natural gas demand and the time required to

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1 permit and develop natural gas infrastructure. To assess this growing reliance on
2 aging facilities, the Company has initiated certain analyses, including the effect of
3 higher propane volumes on high-efficiency equipment and the ability of the
4 facilities to provide the nameplate capacity;

- 5 • Under all planning scenarios evaluated in the 2017 LCIRP, the Company needs
6 incremental capacity and supply to its city-gates to meet the customer
7 requirements over the Forecast Period;

8 With respect to supply options, the CLNG/ENGIE combination contract is the only
9 available third-party gas supply that can be delivered on a primary firm basis to the
10 Company's service territory; this service also provides a liquid refill supply for the
11 Company's on-system LNG facilities. However, the pipeline deliverability associated
12 with the CLNG/ENGIE service is limited to their contracted capacity on the TGP
13 Concord Lateral;

- 14 • The Company assessed the only two delivery options available: (i) increasing
15 capacity on the TGP Concord Lateral; or (ii) developing a system extension, i.e.,
16 the proposed Granite Bridge Pipeline. The reliability benefits associated with a
17 second feed that the proposed Granite Bridge Pipeline would provide to the
18 EnergyNorth system are significant as the Company would diversify its delivery
19 infrastructure and provide redundancy of delivery, better positioning the
20 Company to respond to unforeseen circumstances and events; and

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- Finally, the decisions for certain incremental resources require infrastructure expansions and long-term contract commitments, as such, the Company evaluated its requirements and resource portfolio over a longer-term planning horizon and proposed a natural gas supply strategy as part of its petition in Docket No. DG 17-198.

It is important that the Company's resource strategy and portfolio decisions balance cost considerations with those related to reliability, supply security, contract and portfolio flexibility, and supply viability based on the best information available to EnergyNorth, at the time the decision is made. To assemble a reliable and flexible resource portfolio that can reasonably respond to the changing requirements of EnergyNorth's customers, the Company's resource strategy and portfolio decisions need to account for market conditions. The New England natural gas marketplace has seen several major changes over the past two years, including: the complete shutdown of the off-shore Nova Scotia natural gas production removing significant gas supply from the region; changes to the ownership and regulatory approach for the CLNG/ENGIE LNG importation facility influencing services and associated prices; an increase in concentration risk associated with purchases at the TGP Dracut point; and significant volatility and record high natural gas prices at TGP Dracut approaching \$100 per MMBtu.

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1 **Q. Does the Company have any final thoughts with respect to certain intervenors’**
2 **proposed limitation on customer choice?**

3 A. Yes. With respect to the opinions of CLF and Mr. Clark, the Company believes that the
4 ability of customers to choose a fuel for their individual circumstances should not be
5 managed or directed by a third-party such as CLF, but rather remain with the customer.
6 The Company, with Commission approval, has developed and implemented various
7 programs to expand choice for customers, which not only provides choices and options
8 for more customers but also allows costs to be recovered from a larger volume base.
9 Banning customer choice over individual fuel decisions is simply not good public policy.

10 **Q. Does this conclude your Rebuttal Testimony?**

11 A. Yes.

F. Chico DaFonte

Docket No. DG 17-152
Attachment PGS-1

WORK EXPERIENCE

Liberty Utilities, Salem, NH	(2011-Present)
Vice President, Regulated Infrastructure Development – Gas	(2017 – Present)
Vice President, Energy Procurement	(2014 – 2017)
Senior Director, Energy Procurement	(2011-2014)
 NiSource, Inc, Westborough, MA	 (1994 – 2011)
Director, Gas Management Services	(2007 – 2011)
Director, Energy Supply Services	(1996 – 2007)
Gas Resource Marketing Analyst	(1994 – 1996)
 Commonwealth Gas Company (Eversource), Southborough, MA	 (1985 – 1994)
Senior Forecast Analyst	(1993 –1994)
Gas Control Supervisor	(1988 – 1993)
Gas Load Dispatcher	(1985 – 1988)

EDUCATION

University of Massachusetts, Amherst, MA	(1981-1985)
Mathematics and Computer Science	

PROFESSIONAL ORGANIZATIONS

Northeast Gas Association
New England – Canada Business Council
American Gas Association
Northeast Energy and Commerce Association

TESTIMONY

Various proceedings before the New Hampshire Public Utilities Commission
Various proceedings before the Massachusetts Department of Public Utilities
Various proceedings before the Missouri Public Service Commission
Various proceedings before the Georgia Public Service Commission
Various proceedings before the Maine Public Utilities Commission
Various proceedings before the Indiana Utility Regulatory Commission
Various proceedings before the Federal Energy Regulatory Commission

Summary

Mr. Stephens has 30 years of experience in the energy industry and has held senior management positions at economic consulting firms, a retail energy marketer, and local distribution companies prior to joining ScottMadden. Mr. Stephens has assisted numerous clients in the United States and Canada with natural gas supply analysis, portfolio assessment and optimization, demand forecasting and risk management, energy infrastructure evaluation, and regulatory strategy development and implementation. He has also provided expert testimony in numerous proceedings at various jurisdictions, including federal, state, and provincial regulatory agencies.

In addition, Mr. Stephens has commercial experience through his leadership positions at a retail energy marketing company, where he was responsible for all aspects of business unit management, including front, mid and back-office functions. He was also responsible for gas supply procurement and portfolio optimization for a local distribution company. Mr. Stephens holds a Bachelor of Science degree in management and a Masters in Business Administration with a concentration in operations management from Bentley College.

REPRESENTATIVE PROJECT EXPERIENCE

Energy Market Assessment

Retained by numerous companies to develop regional energy market assessments which included: market impacts associated with new energy infrastructure, assessment of the implications associated with natural gas infrastructure, market structure and regulatory situational analysis, and assessment of competitive position. Market assessment engagements typically have been used as required elements of business unit or asset-specific strategic plans or valuation analyses. In addition, certain market assessments have been submitted to various federal, state, and provincial regulatory agencies.

Representative engagements have included:

- Submitted expert testimony on behalf of Eversource to the Massachusetts Department of Public Utilities and the New Hampshire Public Utility Commission regarding pipeline capacity and LNG service precedent agreements on the Access Northeast project.
- Submitted an expert report on behalf of Union Gas and Enbridge Gas Distribution to the Ontario Energy Board with respect to pipeline precedent agreements on the NEXUS Pipeline project.
- For two Canadian LDCs, developed a review of certain mid-Atlantic natural gas supply basins.
- For the State of Maine Public Utility Commission, prepared a report that summarized the Northeast and Atlantic Canada natural gas and power markets; and analyzed the potential benefits and costs associated with natural gas pipeline expansions. The independent report was filed at the Maine Public Utility Commission.
- On behalf of Spectra Corporation, developed a market assessment evaluating the impact of new pipeline infrastructure into the New York City, New Jersey and New England markets. The independent reports were filed at the Federal Energy Regulatory Commission and/or presented to state public utility commissions.
- For a Canadian utility developed a detailed review of the U.S. Northeast energy market and presented findings to their senior management.
- For an international energy company, prepared an assessment of the market potential for distributed LNG, with a particular focus on the commercial and industrial sectors.
- For a project developer, prepared a natural gas demand analysis of the Southeast U.S. The independent report, which was filed at the Federal Energy Regulatory Commission, addressed the demand for natural gas in both the electric generation and traditional LDC markets.
- For an international energy company, prepared an analysis regarding LNG peaking facilities.
- Conducted due diligence for commercial banks regarding investments in natural gas pipelines, natural gas storage projects, and LNG facilities.

- For a project developer, assisted with the evaluation of the market opportunity for an LNG importation terminal in the northeastern United States.
- For numerous clients, provided regional natural gas demand assessments to assist with the evaluation of energy infrastructure.
- For a natural gas producer, reviewed energy contracting practices and pricing mechanisms to support a contract arbitration process.

Business Strategy and Operations

Retained by numerous North American energy companies to support the development of strategic plans and planning processes for both regulated and non-regulated entities. Specific services provided include: developing market entry strategies for the retail and wholesale energy sectors; review of management practices and procedures; and business process redesign initiatives.

Representative engagements have included:

- For Columbia Gas of Massachusetts, developed expert testimony analyzing a contract for natural gas pipeline capacity. The testimony was submitted to the Massachusetts Department of Public Utilities.
- For Union Gas, developed expert testimony regarding the gas supply planning process and associated activities. The testimony was submitted to the Ontario Energy Board.
- For Gaz Métro, developed expert testimony regarding the utilization of natural gas storage. The testimony was submitted to the Régie de l'énergie.
- For an LDC, reviewed its current retail choice program, certain proposed changes, and the potential impacts on the gas supply portfolio.
- For an LDC, reviewed the cost and benefits of expanding into new service territories.
- Reviewed natural gas supply alternatives (i.e., supply basin cost, transport basis and regulatory issues) for an integrated energy company.
- Developed regional market assessments and associated market entry strategies for a wholesale energy marketing company.
- Reviewed certain risk management practices and procedures for a wholesale energy marketing company.
- For a retail energy marketer, conducted due diligence including a review of risk management policies and procedures.
- Prepared a competitive position analysis (i.e., SWOT analysis) for an interstate gas pipeline.
- On behalf of a wholesale energy marketing company, reviewed federal and state requirements associated with entering certain natural gas markets.
- For an LDC, assessed the economic viability of gas distribution utility service expansion.
- Developed new service offerings, including firm transportation and stand-by service, for a mid-Atlantic utility.
- Managed the re-engineering of a large Midwest LDC's gas supply procurement process.
- Managed the re-engineering of a mid-Atlantic wholesale energy marketing company's gas operations including certain risk management areas.
- On behalf of an interstate pipeline, conducted a customer outreach/survey program.

Regulatory Analysis and Support

On behalf of energy market participants, supported the development of regulatory and ratemaking strategies, energy supply obligations, stranded cost assessment and recovery, rate design, and management procedures and decisions. Specific projects include: design and implementation of pipeline capacity open season processes; review utility contracting approaches with respect to gas supplies; assess compliance requirements of the FERC standard of conduct regarding affiliate transactions; analysis of provider of last resort obligations in both electric and gas markets; review the process to procure and hedge default service supplies; and develop new service offerings.

Representative engagements have included:

- Retained by EPCOR Energy Alberta to review procurement and pricing of energy for their supplier of last resort obligation, including identifying and quantifying economic risks of providing the service. Expert report and testimony were submitted to the Alberta Utilities Commission.
- Retained by a utility for regulatory support with respect to energy storage and electric vehicle infrastructure.
- On behalf of an LDC, developed an integrated resource plan including demand forecasting and gas supply portfolios analysis. The final work product was submitted to the state utility commission.
- Retained by the Alaska Gasline Development Corporation to assist with a market review and assessment; open season process development, implementation, and third party contracting; and associated activities (e.g., tariff and service development).
- Retained by various LDCs and electricity utilities to evaluate interstate pipeline capacity and storage open seasons including an analysis of the quantitative and qualitative aspects of the various projects.
- Retained by an LDC to develop regulatory strategy associated with the funding of distribution expansion.
- Retained by a Midwest U.S. interstate gas pipeline to assist with an open season including drafting of tariffs and precedent agreements.
- Retained by a Northeast energy company to review the FERC reporting requirements and standards of conduct for an interstate pipeline business unit.
- Provided regulatory and litigation support to a natural gas pipeline regarding rate impacts of new infrastructure development.
- Provided litigation support to a mid-west utility regarding proposed gas purchase disallowances for storage utilization, hedging activity, and pipeline capacity decisions.
- On behalf of a Midwest utility, developed and implemented a third party transportation program.
- Developed a demand forecast to support the AES Sparrows Point LNG FERC application.
- Provided support to a Canadian LNG supplier regarding their NEB export license application.

Energy Procurement

Directed and participated in the review of various energy procurement projects including demand modeling, portfolio review/optimization, risk management, procurement strategies and associated cost structures.

Representative experience has included:

- Retained by a utility to review the financial concepts of risk and risk aversion with respect to the provision of regulated energy service and the associated compensation for the service obligation.
- Retained by New Brunswick Power to document and assess fuel procurement and associated processes. Expert report was submitted to New Brunswick Energy and Utilities Board.
- For a municipal utility, evaluated its current gas supply portfolio and associated purchasing strategies.
- For a municipal utility, evaluated the benefits and costs associated with quick-start generation.
- Retained by a utility to review the value achieved under an asset management agreement, including the use of storage.
- Provided a market participant with a review of natural gas supply and storage options, associated prices, and risk mitigation opportunities.
- On behalf of a natural gas distribution company, evaluated the benefit associated with asset management opportunities.
- On behalf of a regional combination utility, reviewed the appropriate jurisdiction for a natural gas pipeline asset.
- On behalf of a natural gas utility, conducted a detailed audit of the gas supply, marketing, risk management, and accounting functions.
- On behalf of several gas utilities, developed demand forecasts and supported those forecasts in regulatory proceedings.
- For a multi-state utility, reviewed the demand forecast planning process and procedures and recommended certain process changes.

- On behalf of a financial institution, reviewed the competitiveness of a storage project investment and quantified the impact of various new projects on the storage project financial performance.
- As President of a retail energy marketing firm directed all aspects of the business unit and was responsible for marketing, origination, operations, accounting, and billing. In addition, was responsible for the physical and financial commodity books; developed and implemented risk management strategy and objectives; implemented risk management policies and procedures; negotiated counterparty contracts; and reviewed and reported on financial performance to the Board of Directors.

Financial and Economic Advisory Services

Involved in the sale or evaluation of several regulated and non-regulated energy companies including wholesale and retail energy marketing companies, on-line energy brokers, and energy services' companies. Assisted clients with market strategy and the identification of partnership opportunities. Specific services provided include: business unit evaluation, development of marketing and sale materials, marketing of transaction, bid evaluation and negotiation support.

Representative engagements have included:

- For an energy broker, developed and executed an acquisition strategy.
- For Eversource, assisted with the sale of its retail services business unit.
- For an international integrated utility, supported its due diligence team with respect to an evaluation of a multi-state utility.
- For a private equity firm, evaluated natural gas procurement and energy sales in support of an investment in generation.
- For a utility, supported its due diligence with respect to a potential acquisition of a natural gas distribution company.
- For a municipal utility, evaluated and negotiated an asset management agreement.
- Assisted an LDC with gas supply due diligence regarding a potential asset acquisition.
- For a third-party investor, performed an independent review of a retail energy marketer including existing physical and financial books, risk management protocols and exposures, and growth strategy.
- Supported the sale of Niagara Mohawk Power Corporation's non-regulated energy marketing affiliate.
- Directed the sale of a non-regulated marketing affiliate.
- Performed an independent valuation of an on-line energy broker on behalf of an investor.

PROFESSIONAL HISTORY

ScottMadden, Inc. (2012 – Present)

Partner

Concentric Energy Advisors, Inc. (2002 – 2012)

Executive Advisor
 Senior Vice President
 Vice President

Navigant Consulting, Inc. (2000 – 2001)

Director, Energy Market Assessment Practice Area

Providence Energy Services (1997 – 2000)

President (1998 – 2000)
 President, Providence-Southern (1997 – 1998)

REED Consulting Group (1994 – 1997)

Assistant Vice President

Colonial Gas Company (1991 – 1994)

Director, Gas Supply Planning and Acquisition (1993 – 1994)
Manager, Gas Supply (1991 – 1993)

Boston Gas Company (1987 – 1991)

Senior Gas Supply Analyst (1990 – 1991)
Transportation and Exchange Analyst (1988 – 1990)
Business Analyst (1987 – 1988)

EDUCATION

Masters in Business Administration with a concentration in Operations Management,
Bentley College, 1991
Bachelor of Science in Management, Bentley College, 1987

DESIGNATIONS AND PROFESSIONAL AFFILIATIONS

Member of the American Gas Association
Member of the New England Gas Association
Member of the Society of Gas Lighting
Member of the New England-Canada Business Council
Member of the Northeast Energy and Commerce Association
Member of the Guild of Gas Managers

Recent Expert Witness Appearances of James M. Stephens

SPONSOR	DATE	JURISDICTION	DOCKET NO.	SUBJECT
Union Gas Limited	April, 2013	Ontario	Docket No. 2013-0109	Gas Supply Planning
Columbia Gas of Massachusetts	September, 2013	Massachusetts	Docket No. 13-158	Pre-Approval of a Long-Term Capacity Contract
Columbia Gas of Massachusetts	September, 2013	Massachusetts	Docket No. 13-161	Integrated Resource Plan
Gaz Métro	October, 2013	Québec	Cause tarifaire 2014, R-3837-2013	Storage Utilization
Maine Public Utility Commission	February, 2014	Maine	Docket No. 2014-00071	Pipeline Open Season
Gaz Métro	January, 2015	Québec	Cause tarifaire 2015, R-3879-2014	Storage Utilization
UIL Holdings Corporation d/b/a Total Peaking Services, LLC	September, 2015	Federal Energy Regulatory Commission	Docket No. CP15-557-000	Market Power Study
Union Gas Limited	May, 2015	Ontario	Docket No. EB-2015-0166	Pre-Approval of a Long-Term Pipeline Capacity Contract
Enbridge Gas Distribution	June, 2015	Ontario	Docket No. EB-2015-0175	Pre-Approval of a Long-Term Pipeline Capacity Contract
Northern Utilities, Inc.	November, 2015	Maine	Docket No. 2014-00132	Retail Choice Transportation Program
Eversource Energy	December, 2015	Massachusetts	Docket No. 15-181	Pre-Approval of Long-Term Pipeline Capacity Contract
Eversource Energy	February, 2016	New Hampshire	Docket No. DE 16-241	Pre-Approval of Long-Term Pipeline Capacity Contract
New Brunswick Power	October, 2016	New Brunswick	Matter No. 336	Commodity Procurement / Risk Management
EPCOR Energy Alberta	January, 2017	Alberta	Proceeding ID 22357	Energy Procurement and Risk Assessment
Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities	December, 2017	New Hampshire	Docket No. DG 17-198	Approval of Natural Gas Supply Strategy

Resume & Testimony Listing of:
James M. Stephens
Partner

SPONSOR	DATE	JURISDICTION	DOCKET NO.	SUBJECT
Heritage Gas Limited	January, 2018	Nova Scotia	Matter No. M08473	Approval of Long-Term Natural Gas Transportation Contract; Cost Recovery Mechanism; and Capacity Assignment Principles
ENSTAR Natural Gas Company	June, 2018	Alaska	Docket No. U-18-004	Reply Testimony in Support of ENSTAR's Design Day and Gas Supply Contracting Practices
Southwestern Public Service Company	June, 2019	Texas	Docket No. 48973	Direct and Reply Testimony in Support of two Solar PPA's and Associated Cost Recovery in a Fuel Reconciliation Proceeding
Liberty Utilities (Energy/North Natural Gas) Corp. d/b/a/ Liberty Utilities	October, 2019	New Hampshire	Docket No. DG 17-152	Approval of Least-Cost Integrated Resource Plan

Summary

Ms. Dao has 15 years of experience in the energy and utility industries. She has contributed to engagements involving regulatory strategy and market analyses, including the evaluation of open seasons, regional energy market demand/supply dynamics, energy pricing and basis implications, and the associated drivers for new natural gas infrastructure; the development and evaluation of natural gas demand forecasts; and natural gas supply portfolio evaluation and optimization. Ms. Dao has also provided analytical support for expert witness testimony on a variety of issues, including gas supply planning, demand forecasting, cost of capital and capital structure, cost of service and rate design, marginal costs studies, and expense and operating performance benchmarking. She has extensive experience in data analysis, development of customized spreadsheet models (e.g., dispatch, storage optimization, gas pricing, landed costs), Monte Carlo simulation models, database development, researching regulatory and energy market issues, risk identification/assessment, performing statistical analysis, and financial analysis and modeling. Ms. Dao holds a B.A. in economics from Clark University, where she graduated summa cum laude and was a member of the Omicron Delta Epsilon Society.

Areas of Specialization

- | | |
|---|---|
| ■ Utilities | ■ Natural gas |
| ■ Market assessment | ■ Demand forecast and supply portfolio evaluation |
| ■ Regulatory strategy and rate case support | ■ Strategic and business planning |

Recent Assignments

- Retained by an integrated utility company to support their analysis of new energy infrastructure and upstream pipeline capacity contracts; used @Risk software to develop a Monte Carlo simulation model of daily natural gas pricing estimates that were used in a portfolio optimization software; supported the levelized cost modeling of the utility's proposed infrastructure development projects; developed a qualitative assessment of the proposed projects relative to alternatives; supported the development of expert testimony and sponsored data requests regarding the utility's natural gas supply strategy
- Supported expert testimony filed before and subsequently approved by the Nova Scotia Utility and Review Board regarding a pipeline capacity contract, which included a review of natural gas market dynamics, and the development of several analytical models (e.g., landed cost and resource dispatch models) to review the need for and costs associated with the pipeline capacity contract under various weather and market conditions
- Assisted several New England LDCs with the development of integrated resource plans, including demand forecast model development using various statistical and econometric approaches and supply portfolio analysis and evaluation
- Provided analyses to support expert testimony filed before and subsequently approved by the Massachusetts DPU regarding the utility's capacity decisions associated with the Algonquin Incremental Market open season
- Developed several regression models to estimate peak day demand in support of a potential capacity decision as part of an evaluation of the Tennessee Gas Pipeline Northeast Expansion open season
- Conducted an assessment of the responses to a request for proposal and supported expert testimony that was submitted to the Massachusetts Department of Public Utilities (DPU), which included an overview of current energy market conditions, a summary of natural gas supply options submitted in response to the RFP, and a quantitative and qualitative evaluation of the submissions
- Provided research and analytical support for expert testimony submitted to the Maine Public Utility Commission regarding the retail choice program and the benefits of program changes to the LDC planning function
- Provided support for expert testimony submitted to the Régie de l'énergie regarding the utilization of natural gas storage, which included the development of a natural gas storage dispatch and optimization model
- Supported expert testimony submitted to the Ontario Energy Board, which included an overview of existing market conditions and a quantitative and qualitative assessment of a natural gas transmission project
- For the Maine Public Utility Commission, prepared a report that summarized the Northeast and Atlantic Canada natural gas and power markets, reviewed the current open seasons for incremental pipeline capacity, and analyzed the potential benefits and costs associated with incremental natural gas deliverability
- Supported the evaluation of natural gas storage for an electric utility, which included a review of the open season documentation and offers, the development of a model to evaluate various levels of storage service, and benchmarking analysis of the parameters of the proposed natural gas storage contract to similar services offered by other storage providers
- Supported expert testimony on the cost of capital for ratemaking purposes before numerous state utility regulatory agencies for electric and natural gas utilities through state and company-specific research and analysis, financial analysis and modeling, and testimony development

Professional History

ScottMadden, Inc. (2016 – Present)

Director

Manager

Sussex Economic Advisors, LLC (2012 – 2016)

Managing Consultant

Concentric Energy Advisors, Inc. (2004 – 2012)

Consultant

Education

Bachelor of Arts, Economics, Clark University, summa cum laude, 2004

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

DG 17-152
Least Cost Integrated Resource Plan

Staff Data Requests - Set 2

Date Request Received: 4/10/18
Request No. Staff 2-12

Date of Response: 4/27/18
Respondent: Francisco C. DaFonte

REQUEST:

Re: the Company's *Least Cost Integrated Resource Plan*, as filed in Docket No. DG 17-152, at page 48 the Company reports "the Company's customers have experienced problems with their high efficiency furnaces at various times when these propane facilities are used extensively." Please provide details of these problems, including:

- a. How many customers have experienced problems?
- b. What has(ve) been the nature(s) of the problems?
- c. Where have the problems been relative to the locations of the propane facilities?

RESPONSE:

- a. The Company has received customer complaints at various times over the past few years. The exact number is not known as many of the calls are simply "no heat" calls and the customer is generally unaware of what has caused their furnace to stop working. However, the Company has previously discussed this issue at length in Docket No. DG 14-380 in the Rebuttal Testimony of Mr. DaFonte at Bates 051:

"...In addition, from a system operations perspective, the Company has received multiple complaints from customers with new high-efficiency heating equipment as a result of EnergyNorth's use of the propane facilities. These complaints are generally attributable to the limited tolerance of more modern equipment to varying natural gas heating values, and at times has led to "no heat" calls by customers. As an example, the Company received the following complaint from a customer via Facebook in February 2015:



Additionally, the Company has received reports from HVAC contractors that service accounts near to one of EnergyNorth's propane facilities who indicated they had received numerous customer calls due to noise from their high-efficiency boilers, including certain customers that were uncomfortable remaining in their homes while this was occurring. One of the HVAC contractors noted that it was "selling more and more" of the high efficiency boilers "due to rebates that incent their installation."

Just this past winter, the Company received calls from St. Anslem's College in Manchester, which lost heat to five buildings, and the City of Manchester, which also lost heat to several buildings including City Hall and one of the city schools. All of the affected equipment was high-efficiency.

With the incentives for customers to replace older, less efficient furnaces, the conversion of oil and propane customers to higher efficiency natural gas heating equipment, and simply the phasing out of the manufacturing of low efficiency heating equipment, this issue will only get worse unless propane can be phased out of the Company's resource portfolio. Further, it may act as a deterrent for customers who want to be more energy efficient and, quite frankly, take advantage of the Company's award winning energy efficiency programs.

- b. Please see the Company's response to part (a) above.
- c. The problems have occurred in Nashua and Manchester where the Company has two of its three propane facilities.

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

DG 17-152

Least Cost Integrated Resource Plan

Staff Data Requests - Set 2

Date Request Received: 4/10/18
Request No. Staff 2-14

Date of Response: 4/27/18
Respondent: William R. Killeen

REQUEST:

Re: the Company's *Least Cost Integrated Resource Plan*, as filed in Docket No. DG 17-152, at page 48 the Company states "When these opportunities arise, the Company uses an appropriate decision-making process to determine whether modifications to the current resource plan are appropriate." Please describe the "appropriate decision-making process".

RESPONSE:

First, the Company evaluates the need to maintain the contract, or resource, as part of the overall supply portfolio in the context of current and expected future market conditions.

Second, depending on the type of resource needed, the Company will canvas the marketplace, including evaluating on-system investments, to determine the availability of a replacement or new resource and, where appropriate, the Company will solicit competitive bids to determine the least-cost available resource.

Finally, the Company evaluates non-price factors associated with the available replacement, or new resource option, to determine the best-cost resource. The Company will consider the reliability, diversity, flexibility and viability to determine the best-cost, most reliable option to meet the Company's resource need. In all cases, EnergyNorth will renew existing contracts on a cost-effective basis in order to assure that there is sufficient deliverability to meet customer requirements over the forecast horizon.

In the third step of EnergyNorth's resource planning process, the Company evaluates the ability of its resource portfolio to meet the projected demand requirements in each year of the forecast. As part of this evaluation, the Company reviews possible strategies for meeting customer requirements under a variety of circumstances using the SENDOUT® model.

The primary goal of the Company's resource planning process is to meet the expected demand requirements of its customers in a reliable manner at the best cost. The Company's resource plan maintains or enhances the reliability of the overall resource portfolio to meet the various forecasted planning scenarios. As market conditions continue to change and evolve, the Company's gas supply portfolio must have the flexibility and optionality to adapt to these new

Docket No. DG 17-152 Request No. Staff 2-14

conditions while maintaining reliability. While the objectives of reliability, diversity, flexibility, and viability are paramount, it is important to achieve these objectives in a least-cost manner.

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

DG 17-152
Least Cost Integrated Resource Plan

Staff Data Requests - Set 2

Date Request Received: 4/10/18
Request No. Staff 2-16

Date of Response: 4/27/18
Respondent: William R. Killeen

REQUEST:

Re: the Company's *Least Cost Integrated Resource Plan*, as filed in Docket No. DG 17-152, at page 49 the Company lists five gas-supply options that have been identified:

- a. Please identify the criteria on which those options have been identified.
- b. None of those options involve the Algonquin pipeline system. Please explain why not.

RESPONSE:

- a. The process and criteria used by the Company to select the five options identified is discussed in the response to Staff 2-14. The primary goal of the Company's resource planning process is to meet the expected demand requirements of its customers in a reliable manner, at the best cost. Further, the gas supply portfolio objectives include reliability, flexibility, diversity, and viability in order to achieve the best cost. The options listed at page 49 (Bates 053) were identified as being capable of meeting the planning objectives, in particular, viability, within the LCIRP timeframe.
- b. The Company did not identify an active Enbridge project on Algonquin and/or Maritimes and Northeast Pipeline to evaluate. Algonquin has withdrawn its Access Northeast project from the pre-filing review process at the Federal Energy Regulatory Commission and no other Enbridge-sponsored project was identified by the Company for evaluation.

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

DG 17-152

Least Cost Integrated Resource Plan

Staff Data Requests - Set 2

Date Request Received: 4/10/18
Request No. Staff 2-19

Date of Response: 4/27/18
Respondent: William R. Killeen

REQUEST:

Please:

- a. State whether there have been any changes to the Company's resource plans since the filing of the IRP?
- b. If so, please describe the changes?
- c. If so, please described the reasons for making the changes.

RESPONSE:

Since the filing of the Least Cost Integrated Resource Plan ("LCIRP"), EnergyNorth has filed a Petition to Approve Firm Supply and Transportation Agreements and the Granite Bridge Project in Docket No. DG 17-198. The Company's gas supply plans as filed in Docket No. DG 17-198 are consistent with the approach outlined in the LCIRP in this docket (i.e., Docket No. DG 17-152). Specifically, in the LCIRP the Company's gas supply portfolio analysis assumed that EnergyNorth would add a new delivery option to connect to the Joint Facilities. The rationale for this new delivery option was provided in the LCIRP at Bates 054:

"With respect to deliveries to its city-gates, the Company is, for all intents and purposes, limited to one feed (i.e., TGP Concord Lateral) for delivery of gas supplies to its service territory and that feed has no additional capacity to meet the Company's growing demand. Therefore, the Company has also evaluated the option to enhance its distribution system reliability, diversity and flexibility through an extension of its system. A system extension would provide access to incremental gas supply and capacity options."

This "system extension" has been more fully evaluated and the Company has determined that it is the most appropriate delivery option and submitted this option to the New Hampshire Public Utilities Commission ("Commission") for its approval as part of the Granite Bridge Project in Docket No. DG 17-198.

Docket No. DG 17-152 Request No. Staff 2-19

In addition to the “system extension,” the Company in the LCIRP discussed the value of incremental LNG storage to meet forecasted demand at Bates 054, specifically:

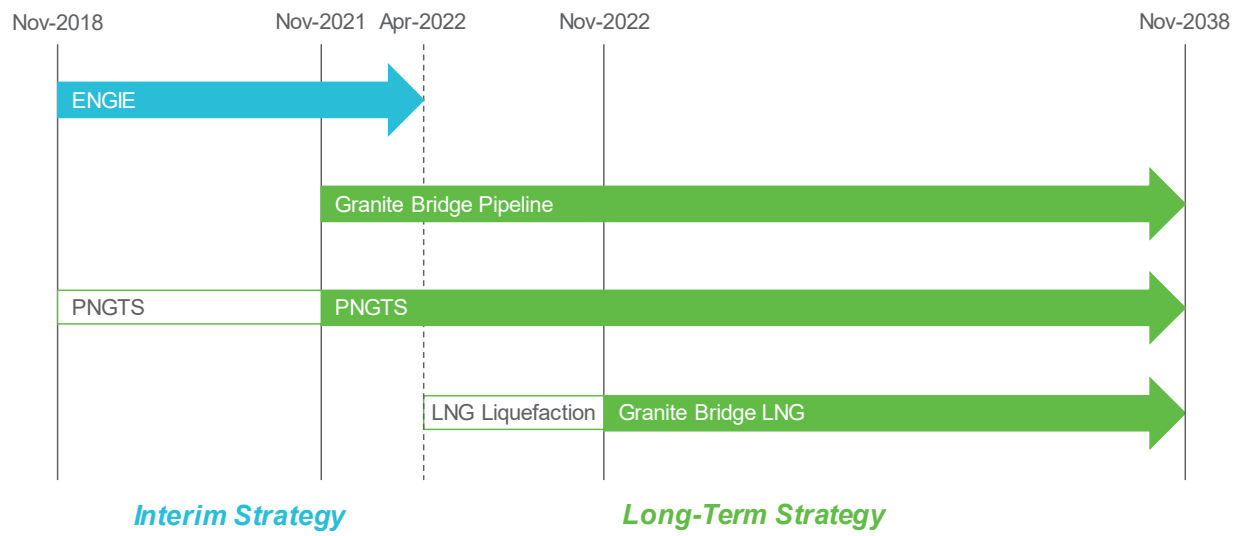
“Finally, the Company has evaluated the option of increasing its on-system LNG storage and vaporization capacity to serve its long-term resource needs. As discussed in the 2013 IRP, and demonstrated in this filing, the Company has significant demand requirements in the winter period. LNG facilities are specifically designed to provide natural gas supply during the peak periods when customers require it most. In this way incremental LNG storage and vaporization capacity would be able to serve the Company’s growing requirements for Design Day and peak period demand. Given EnergyNorth’s existing resource portfolio structure, incremental LNG would increase the Company’s existing on-system assets and diversify its supplies, which will increase the reliability of the overall portfolio.”

This incremental LNG storage and vaporization option has been more fully evaluated and the Company has determined that an LNG facility would increase the reliability, diversity, and flexibility of the gas supply portfolio and provide cost-effective service to its customers. As such, the Granite Bridge Project includes such an LNG facility and was submitted to the Commission for its approval as part of Docket No. DG 17-198.

Finally, the Company’s interim and long-term supply resource plans include contracts with ENGIE Gas & LNG LLC (“ENGIE”) for a combination liquid/vapor service and Portland Natural Gas Transmission Company (“PNGTS”) for transportation capacity on the proposed Portland XPress (“PXP”) Project. As such, the interim and long-term strategies for the gas supply portfolio as detailed in Docket No. DG 17-198 represent the Company’s plan for its gas supply portfolio and are consistent with the submission in this docket (i.e., Docket No. DG 17-152). Figure 3 from the Direct Testimony of William R. Killeen and James M. Stephens in Docket No. DG 17-198 is replicated below for convenience as it is a summary of the Company’s interim and long-term gas supply strategy.

Docket No. DG 17-152 Request No. Staff 2-19

Figure Staff 2-19



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

DG 17-152
Least Cost Integrated Resource Plan

Staff Data Requests - Set 2

Date Request Received: 4/10/18
Request No. Staff 2-21

Date of Response: 4/27/18
Respondent: William R. Killeen

REQUEST:

Please explain why a 1% adder above the base growth rate for the high scenario was chosen.

RESPONSE:

The high and low case demand scenarios add/subtract 1% from the annual Base Case growth rate, respectively. This methodology was maintained in this filing as it was consistent with the high and low demand scenario methodology in prior Least Cost Integrated Resource Plans developed by the Company and approved by the Commission (see Docket Nos. DG 13-313 and DG 10-041).

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

DG 17-152

Least Cost Integrated Resource Plan

Staff Data Requests - Set 2

Date Request Received: 4/10/18
Request No. Staff 2-23

Date of Response: 4/27/18
Respondent: Francisco C. DaFonte

REQUEST:

Please explain how non-price factors such as reliability, flexibility, viability, and supply diversity relative to economics are weighed.

RESPONSE:

The primary goal of Liberty’s planning process is to acquire and manage all available resources in a manner that achieves a best-cost resource portfolio for its customers. A best-cost portfolio appropriately balances lower costs with other important non-cost criteria such as reliability and diversity, flexibility, and viability. Pursuit of a best-cost portfolio allows the Company to provide its customers with reliable service at a reasonable cost.

The Company values portfolio security/reliability (which includes enhancing diversity across pipelines, supply basins, and suppliers) above all else when evaluating any resource. The economics of a particular resource are nearly on par with security/reliability and are a critical aspect of any resource evaluation process. Contract and supply flexibility is another key non-price factor in the determination of a best-cost portfolio. Lastly, the Company must ensure that a resource is viable in the long-term.

With respect to assessing the non-price factors, the Company primarily relies on the expertise and judgment of its gas supply staff augmented, on an as needed basis, by outside consultants.

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

DG 17-152

Least Cost Integrated Resource Plan

Staff Technical Session Data Requests - Set 1

Date Request Received: 5/30/18
Request No. Staff Tech 1-7

Date of Response: 6/27/18
Respondent: William R. Killeen
James M. Stephens
Adam Perry

REQUEST:

The previous questions focus on the work provided by ICF and its use. The Company at Technical Session Day 2 offered a more complete discussion, addressing all methods, analyses, and data inputs used to forecast customer and demand growth. Please, as offered by the Company, provide a description of all efforts and analyses undertaken to make those forecasts, and address how management combined those efforts and analyses into consolidated forecasts of customer and demand growth.

RESPONSE:

Please see Attachment Staff Tech 1-7.1, which contains the “Comprehensive Response” referred to in the responses to several other requests in this docket, and Attachment Staff Tech 1-7.2.

Detailed Review of EnergyNorth's Demand Forecast
Docket Nos. DG 17-152 and DG 17-198

I. Executive Summary

Pursuant to the May 23, 2018, technical session in Docket No. DG 17-152 and the May 24, 2018, technical session in Docket No. DG 17-198, the Company has undertaken a detailed review of its forecasted customer additions and how those estimated customer additions are integrated into the results of the econometric models (together defined herein as the Demand Forecast). The Company's detailed review resulted in the modification of certain assumptions related to the out-of-model adjustments used to produce the Demand Forecast, including:

- The customers of Concord Steam Corporation ("Concord Steam") were included in the estimate of customer additions for the existing service territory and have now been removed from the forecasted additions for the existing service territory. These customer additions are included as an out-of-model adjustment.
- The forecasted customer additions in Windham and Pelham were included in the estimate of customer additions in the existing service territory and have now been removed from the forecasted additions for the existing service territory. These customer additions are included as an out-of-model adjustment.
- The overall number of customer additions has been reduced to reflect more recent information, specifically:
 - In the initial filing, the Company included a 400-unit development in Windham; however, subsequent to the filing, the project has been reduced and is currently indefinitely delayed. As such, the project and the 400 units were removed from the forecasted customer additions for Windham and Pelham.
 - The forecasted customer additions for the potential franchise areas (i.e., Epping, Candia, and Raymond) were determined to be too high and have been lowered. Specifically, the initial filing assumed a total of 244 customers per year from the potential franchise areas, which was reduced to a total of 120 customers per year.
 - The forecasted customer composition for the potential franchise areas (i.e., the allocation between residential and commercial and industrial ("C&I") customers) resulted in a disproportionate number of commercial customer additions; specifically, the C&I customer allocation of 60% was corrected to be consistent with the Company's actual recent experience where 20% of the customer additions are C&I customers (as reflected in the residential and C&I customer additions data for 2016 and 2017 provided in the response to Staff 3-13 in Docket No. DG 17-152).¹ In addition, the 20% is consistent with the assumed C&I customer allocation for customers added in the existing service territory and in Windham and Pelham.
 - The Company also addressed a timing issue with respect to the start date for the initial customers from the potential franchise areas. The start date for these customers was delayed to better reflect the timing of the Granite Bridge Pipeline.
- For modeling purposes, certain formulas and calculations were simplified. For example, the approach to allocate the annual customer additions from the Sales and Marketing forecast to

¹ For ease of reference, all Company responses referred to in this detailed review are provided as Attachment Staff Tech 1-7.2.

monthly customer additions was simplified, which also corrected an error regarding monthly customer additions.

- The assumption regarding natural gas consumption for Innovative Natural Gas, LLC (“iNATGAS”) has been updated to reflect the actual usage information from this past winter.

As a result of these modifications to the Demand Forecast, the Company’s forecast of natural gas demand has been slightly reduced as illustrated in Table 1 below.

Table 1: Updated Demand Forecast Results (Dth)

Split-Year	Original Demand Forecast			Updated Demand Forecast		
	Normal Year	Design Year	Design Day	Normal Year	Design Year	Design Day
2017/2018	15,634,082	16,901,795	156,822	14,640,845	15,833,870	157,848
2018/2019	16,075,247	17,376,013	160,989	15,235,354	16,449,392	164,571
2019/2020	16,575,525	17,944,792	164,640	15,648,467	16,923,283	167,643
2020/2021	17,000,558	18,367,180	168,934	16,150,273	17,414,989	168,942
2021/2022	17,527,589	18,933,736	173,917	16,585,278	17,881,953	174,618
2022/2023	18,071,614	19,519,884	179,382	17,864,174	19,198,013	184,000
2023/2024	18,638,472	20,168,391	184,432	18,354,074	19,760,680	188,352
2024/2025	19,009,173	20,530,513	188,856	18,660,183	20,055,937	192,033
2025/2026	19,416,449	20,969,502	192,933	19,008,442	20,431,417	195,542
2026/2027	19,788,597	21,371,088	196,785	19,318,284	20,765,901	198,777
2027/2028	20,198,023	21,852,258	199,954	19,659,031	21,169,792	201,364
2028/2029	20,471,958	22,107,358	203,491	19,872,063	21,362,731	204,235
2029/2030	20,798,293	22,459,424	206,790	20,136,752	21,648,299	206,906
2030/2031	21,108,206	22,794,033	210,016	20,392,048	21,924,085	209,593
2031/2032	21,476,694	23,234,556	212,972	20,701,897	22,297,494	212,031
2032/2033	21,678,072	23,409,030	215,843	20,858,981	22,428,427	214,448
2033/2034	21,960,444	23,713,995	218,828	21,075,945	22,663,122	216,822
2034/2035	22,227,307	24,002,078	221,631	21,269,443	22,872,418	218,944
2035/2036	22,564,042	24,410,287	224,148	21,516,836	23,180,235	220,704
2036/2037	22,742,621	24,558,141	226,863	21,618,013	23,249,243	222,599
2037/2038	23,007,564	24,844,142	229,590	21,798,963	23,444,867	224,511
CAGR (17/18 - 21/22)	2.9%	2.9%	2.6%	3.2%	3.1%	2.6%
CAGR (17/18 - 37/38)	2.0%	1.9%	1.9%	2.0%	2.0%	1.8%

As shown in Table 1, based on the changes to the Demand Forecast discussed above, the Company is forecasting Normal Year and Design Year demand to increase at a compound annual growth rate (“CAGR”) of approximately 2.0% and Design Day demand to increase at a CAGR of 1.8% over the 2017/18 to 2037/38 time period, which is similar to the growth in the Company’s initial filing, the pace of growth in recent years, and well within the estimates of natural gas demand growth of other local distribution companies in the New England region (as provided in the responses to Staff 3-2 in Docket No. DG 17-152 and Staff 2-30 in Docket No. DG 17-198).

The inclusion of changes to the Demand Forecast, although slightly lowering the expected demand, does not alter the primary conclusions documented by the Company in Docket Nos. DG 17-152 and DG 17-198, specifically:

- The customer additions and associated volume from the econometric model do not capture the Company's focus on customer growth in New Hampshire;
- An adjustment to the results of the econometric model is warranted and supported by the recent level of customer additions, access to new and potential franchise areas, and the regulatory programs approved by the Commission, none of which are captured in the historical data; and
- An adjustment based on information developed by the Sales and Marketing team, as well as the experience and judgment of that team, is a reasonable approach to estimate the level of adjustment to the results of the econometric model.

In addition, the Company reviewed the implications of changes to the forecasted customer additions on its SENDOUT® resource portfolio optimization analysis, as initially filed in Docket No. DG 17-198 and in the responses to OCA 2-86 and OCA 2-106R in Docket No. DG 17-198. Specifically, the revised Demand Forecast was uploaded into the SENDOUT® model for an assessment of the Company's gas supply portfolio; and, based on the results of that analysis, coupled with the non-price factors discussed in the various Company submissions in Docket Nos. DG 17-152 and DG 17-198, the Company concludes that the Granite Bridge Project, as outlined in Docket No. DG 17-198, continues to be the best cost option for the customers of EnergyNorth. As shown by Tables 2 and 3 below, the results of the SENDOUT® model continue to support the Granite Bridge Project as the best cost option to meet the demand requirements of EnergyNorth's customers.

Table 2: EnergyNorth SENDOUT® Model Runs - "Prime Revised"²

Resource Planning Scenario	Granite Bridge LNG	Propane Facilities	Resource Mix Results			Total System Cost (\$000)	Comparison to Base Case Prime
			Dawn (Dth/day)	Repsol (Dth/day)	ENGIE (Dth/day)		
Base Case Prime	2.0 Bcf	No	7,920	0	0	\$2,645,295	\$ -
Base Case Prime Sensitivity	2.0 Bcf	Yes	7,920	0	0	\$2,645,925	\$ 630
Alternative Case Prime	No	No	3,080	104,920	360	\$2,850,073	\$ 204,778
Alternative Case Prime Sensitivity	No	Yes	15,040	50,370	7,000	\$2,667,144	\$ 21,849

Table 3: EnergyNorth SENDOUT® Model Runs - LNG Tank Size Scenarios - "Prime Revised"

Resource Planning Scenario	Granite Bridge LNG	Propane Facilities	Resource Mix Results			Total System Cost (\$000)	Comparison to 2.0 Bcf Tank (\$000)
			Dawn (Dth/day)	Repsol (Dth/day)	ENGIE (Dth/day)		
Base Case Prime	2.0 Bcf	No	7,920	0	0	\$2,645,295	\$ -
Base Case Prime	1.2 Bcf	No	7,920	0	470	\$2,651,792	\$ 6,497
Base Case Prime	1.5 Bcf	No	7,920	0	0	\$2,653,873	\$ 8,578
Base Case Prime	2.5 Bcf	No	7,920	0	0	\$2,724,443	\$ 79,148

As shown in Tables 2 and 3, the Resource Mix results (i.e., volumes for the various resources) and the Total System Costs across all scenarios are slightly lower than the results shown in the initial filing in Docket No. DG 17-198 and in the responses to OCA 2-86 and OCA 2-106R in Docket No. DG 17-198. However, the Total System Cost of the Base Case Prime (which includes the 2.0 Bcf Granite Bridge LNG facility) is

² The SENDOUT® model runs denoted as "Prime" reflect the impact of the Tax Cuts and Jobs Act on the proposed Granite Bridge Project infrastructure revenue requirement.

approximately \$2.645 billion over the analysis period and continues to be the lowest total cost of the resource planning scenarios and LNG tank size scenarios analyzed. The Alternative Case Prime resource planning scenario, which excludes the Granite Bridge LNG facility, results in a total system cost of approximately \$2.850 billion over the analysis period, which is nearly \$205 million more than the Base Case Prime scenario. The results shown in Tables 2 and 3 are consistent with the Company's prior analysis, and continue to support the conclusions regarding the Granite Bridge Pipeline and 2.0 Bcf Granite Bridge LNG facility.

II. Historical Customer Additions

In response to certain data requests in Docket Nos. DG 17-152 (e.g., CLF 1-9, Staff 2-4, and Staff 3-13) and DG 17-198 (e.g., Attachment OCA 1-12.b and CLF 1-8), the Company provided information with respect to historical customer additions. To be as responsive as possible to the specific data requests, the information provided by the Company was derived from several different internal data sources, each of which used different time periods, which best responded to the specific request. However, the use of various data sources and time periods in response to specific data requests has resulted in the need to reconcile the historical customer additions information submitted in Docket Nos. DG 17-152 and DG 17-198.

First, to be as consistent as possible with past submissions of long-term demand forecasts, the Company relied on an analytical framework and approach that has been used, vetted, and approved in several regulatory filings at the Commission. The use of a consistent framework across proceedings facilitates the comparison of results across those proceedings (e.g., please see Staff 1-11 in Docket No. DG 17-152, which asked the Company to compare the demand estimate for 2017 as produced in Docket Nos. DG 13-313 and DG 17-152). As such, for the development of the econometric models used by the Company in Docket Nos. DG 17-152 and DG 17-198, the Company used Customer Equivalent Bill data for the August 2010 to April 2017 period as the metric to represent customer numbers by segment (e.g., residential and C&I).³ Customer Equivalent Bill data is the same customer metric used in the 2013 LCIRP in Docket No. DG 13-313, EnergyNorth's cost of gas submissions, and the Northeast Energy Direct ("NED") contract filing in Docket No. DG 14-380. Second, in response to certain data requests for historical customer additions, the Company relied on a new customer relationship management system (i.e., the ZOHO system)⁴ used by its Sales and Marketing team, rather than the Customer Equivalent Bill data. Lastly, Company responses to certain data requests provided information for calendar years, while other responses provided information for different 12-month periods (e.g., April to March or November to October).

To reconcile the various information provided in the numerous data requests received by the Company with respect to historical customer additions, please find in Table 4 below a comparison of historical customer additions using the Customer Equivalent Bill metric and the annual customer additions from the ZOHO system.

³ Please see Bates 014 of the Company's 2017 LCIRP filed in Docket No. DG 17-152.

⁴ The ZOHO system was implemented by the Company on May 30, 2014.

Table 4: Historical Customer Additions Comparison

Year	Customer Equivalent Bill⁵	ZOHO Customer Additions⁶	Difference	Percent Difference
2014	1,178	1,199	(21)	(1.8%)
2015	1,770	1,784	(14)	(0.8%)
2016	1,531	1,588	(57)	(3.6%)
2017	1,733	1,708	25	1.5%
Total	6,212	6,279	(67)	(1.1%)
Average	1,553	1,570	(17)	(1.1%)
Average (excluding 2014)	1,678	1,693	(15)	(0.9%)

As shown in Table 4 above, the use of Customer Equivalent Bill data results in a total of 6,212 customer additions over the 2014⁷ to 2017 period, which compares to the total of 6,279 customer additions using the ZOHO system. The difference between the two data sources is 67 customer additions, or approximately 1.1%. Using the average customer additions over the 2014 to 2017 period results in 1,553 annual additions based on Customer Equivalent Bill data and 1,570 customer additions from the ZOHO system, or a difference of 17 customers. Therefore, a comparison of the calendar year customer additions using the Customer Equivalent Bill data (i.e., the dependent variable in the customer equations of the econometric models) is for all intents and purposes equivalent to the annual customer additions data from the ZOHO system used by the Sales and Marketing team.

III. Need for a Sales and Marketing Adjustment

During the May 23, 2018, and May 24, 2018, technical sessions, there were discussions regarding the need for an adjustment to the customer additions results from the Company's econometric model. Although the Company has provided support in its responses to various data requests in both Docket No. DG 17-152 and DG 17-198, a summary of the rationale supporting an adjustment to the econometric model results is warranted. The Company has provided the following primary reasons in support of an adjustment to the customer additions forecasted by the econometric model: (i) the actual customer additions in the existing service territory, particularly the recent trends; (ii) the customer opportunity in the new and potential

⁵ To accurately compare Equivalent Bill data to the data from the ZOHO system, the Company used calendarized values and selected an appropriate reference month (i.e., December) for the Equivalent Bill data and compared that to the year-end customer count from the ZOHO system. There is a slight difference between the reported ZOHO customer count and the number of such customers from the Equivalent Bill data due to certain issues including duplication and a mis-recording of the service start date. Please note that the customer additions data provided in Figure 16 of the Direct Testimony of William R. Killeen and James M. Stephens in Docket No. DG 17-198 (see Bates 151R) were based on annual Customer Equivalent Bill data for the year-ending in March and not calendar year data.

⁶ Please note, in preparation of this response, the Company noted a discrepancy in the information provided in the responses to CLF 1-9, Staff 2-4, and Staff 3-13 in Docket No. DG 17-152 compared to the information provided in the responses to OCA 1-12 and CLF 1-8 in Docket No. DG 17-198. Although the ZOHO system was used to develop all these responses, the extraction parameters were not consistent thus resulting in a different number of historical customer additions. The historical customer additions data as provided in the responses to OCA 1-12 and CLF 1-8 in Docket No. DG 17-198 uses the appropriate extraction parameters and should replace the historical customer additions information provided in the responses to CLF 1-9, Staff 2-4, and Staff 3-13 in Docket No. DG 17-152.

⁷ Please note that the ZOHO system was placed on-line in late May 2014 so the information for that year reflects a partial year and, as such, the Customer Equivalent Bill data was presented on a similar basis.

franchise areas; (iii) the expansion of the Sales and Marketing team; (iv) innovative growth programs; and (v) past Commission precedent.

As a preliminary matter, there is academic support for adjusting econometric models to reflect information that is not otherwise captured in the historical data but is relevant to the accuracy of the forecast. For example, Michael Intriligator discusses the use of “add factors” (out-of-model adjustments) in *Econometric Models, Techniques, & Applications*:

The add factors are based on judgments of factors not explicitly included in the model. For example, in a macroeconomic model there may be no explicit account taken of strike activity, but if major union contracts are expiring and a strike appears likely in the forecast period, the forecasts of production should be appropriately revised downward. Many other factors may not have been included in the model because their occurrence is rare or because data are difficult to obtain, but this does not mean that they must be overlooked in formulating a forecast. Indeed, it would be inappropriate to ignore relevant considerations simply because they were omitted from the model. In this sense forecasting with an econometric model is not simply a mechanical exercise but rather a blending of objective and subjective considerations. The subjective considerations embodied in the add factors, general improve significantly on the accuracy of the forecasts made with an econometric model.⁸

The factors discussed below show that the Company’s recent activities and new programs will continue to promote customer growth above that found in the historical data, which supports the use of an out-of-model adjustment to appropriately reflect that information.

First, for the existing service territory, the actual or historical customer additions using Customer Equivalent Bill data is greater than the forecasted customer additions from the econometric model. Specifically, the forecast of customer additions from the econometric model results in approximately 1,180 customer additions per year for the existing service territory. However, as shown by Table 4 above, using the Customer Equivalent Bill data over the 2014 to 2017 period results in approximately 1,550 customer additions per year; and, if the partial customer additions results from 2014 are excluded, the annual customer additions over the 2015 to 2017 period for the existing service territory average approximately 1,700 customers per year.⁹ Therefore, the actual customer additions information and experience in the existing service territory supports an adjustment to the customer addition results from the econometric model.

Second, in addition to the customer numbers shown in Table 4, Concord Steam has discontinued service and the Company received franchise approval for the towns of Windham and Pelham; and plans to file for approval of the potential franchise areas that would include the towns of Epping, Raymond, and Candia. None of the customers associated with the Concord Steam conversion and potential customers in the new or potential franchise areas are included in the results of the econometric model and should be considered as exogenous to the econometric model and, therefore, support the use of an adjustment to customer additions.

Third, the Company has continued to focus on growth and providing more customers with the option to choose natural gas as their fuel. As discussed in the responses to Staff 2-4 and Staff 3-13 in Docket No. DG 17-152, the Company has expanded its Sales and Marketing team by six full time equivalents (“FTEs”). These employees reside and are active in their local communities and provide “feet on the ground” with

⁸ Michael D. Intriligator, *Econometric Models, Techniques, & Applications*, at 516-517.

⁹ An analysis of the information from the ZOHO system produces similar historical customer additions over the 2014 to 2017 and 2015 to 2017 time periods.

respect to participating in business organizations and town activities. This increase in number of Sales and Marketing employees and the local presence of those employees supports an adjustment to the results of the econometric models.

Fourth, the Company has proposed and received approval from the Commission for innovative expansion plans, such as revisions to the contribution-in-aid-of-construction policy (e.g., including the assumption that 60% of customers located along a main extension will take service) and the Managed Expansion Program (“MEP”) approved by the Commission in August 2016. The MEP not only provides a mechanism to unitize expansion costs and collect those expenses over time, but also provides the Company an opportunity to install service lines for any end use application during the construction of a main, thus positioning the Company to add load from an existing customer. Stated differently, the Company, under MEP, can provide a service line to a customer for an end use application, such as water heating, and thus natural gas is a fuel choice for that customer when their existing heating equipment fails or needs to be replaced. Please see the response to Staff Tech 1-3 in Docket No. DG 17-152, which discusses the customer additions associated with MEP. In addition, the Company (1) eliminated the \$900 flat fee for a new residential customer, (2) allowed for no-cost service connections of heating customers within 100 feet of an existing natural gas main, (3) allowed for no-cost service connections of non-heating customers within 100 feet if they commit to taking service prior to a main extension or replacement, and (4) lowered the level of revenue justification required for main and service extensions.

Fifth, the use of adjustments to improve the results of an econometric model have been presented to, and approved by, the Commission. By way of example, in the NED proceeding (i.e., Docket No. DG 14-380), the Company adjusted the results of the econometric model to reflect three markets that were exogenous to the results of the econometric model; specifically, the Company included adjustments for: (i) potential volumes to Keene, NH, as an incremental market; (ii) reverse migration of capacity exempt customers, reflecting recent market trends; and (iii) incremental volumes for iNATGAS, a new, large customer in the existing service territory. Similar to the NED proceeding, the Company in Docket Nos. DG 17-152 and DG 17-198 has adjusted the results of the econometric model to reflect incremental markets (e.g., the new and potential franchise areas), recent market trends (e.g., actual level of customer additions), and incremental volume (e.g., iNATGAS).

IV. Out-of-Model Adjustments

As discussed above, the Company has provided support for certain adjustments to the results of the econometric models. The calculated values and expected saturation levels for each of those adjustments (i.e., incremental customer additions in the existing service territory, incremental customers from new or potential franchise areas, and iNATGAS) are provided below.

First, with respect to the existing service territory, the Company has adjusted the results of the econometric models to reflect the recent historical customer additions, the investment by the Company in growth (i.e., incremental Sales and Marketing staff), and the approval of innovative programs (e.g., MEP). As such, the econometric models forecast of approximately 1,180 customers per year has been adjusted to approximately 1,625 customers per year,¹⁰ which is aligned with the average customer additions over the 2015 to 2017 period (see Table 4 above). In addition, the Company has relied on the same transition schedule to the results of the econometric model for the period from 2023 to 2038 as originally filed.¹¹ As shown by Table

¹⁰ Represents an average of the customer additions for the existing service territory over the forecast period.

¹¹ The transition period is discussed on Bates 154R of the Direct Testimony of William R. Killeen and James M. Stephens in Docket No. DG 17-198, and further detailed in the response to Staff 2-62 in Docket No. DG 17-198.

5 below, the Company's forecast of new residential and C&I customers in the existing service territory results in saturation levels in 2038 that are reasonable.

Second, regarding the new franchise areas (i.e., Windham and Pelham) and the potential franchise areas (i.e., Epping, Candia, and Raymond), the Company has adjusted the results of the econometric models to reflect customer additions in these areas as these towns were exogenous to the econometric model results. The Company will leverage its larger Sales and Marketing team and the approved, innovative regulatory programs to achieve the forecasted customer additions. As shown by Table 5 below, the Company's forecast of new residential and C&I customers in the new and potential franchise areas results in saturation levels in 2038 that are reasonable.

Table 5: Saturation Levels in 2038

	Residential¹²	C&I¹³	Total
Existing Service Territory	51%	84%	54%
New Franchise Areas (Windham/Pelham)	10%	20%	11%
Potential Franchise Areas (Epping /Candia/Raymond)	18%	40%	21%

Lastly, the Company adjusted the results of the econometric models to reflect the recent actual usage and contractual arrangements associated with iNATGAS, which were approved by the Commission in Docket No. DG 14-091 and reaffirmed by the Commission in the NED proceeding in Docket No. DG 14-380. At the time of the Company's initial filing in Docket Nos. DG 17-152 and DG 17-198, the Company understood the natural gas usage of iNATGAS to be minimal. Specifically, the Company in its initial filing assumed iNATGAS would consume 20 Dth on design day and approximately 1 Dth on every other day. However, this past winter iNATGAS consumed 4,251 Dth on its peak day, which supports an adjustment to the volumes used in the Company's initial filing. The Company's revised assumption for iNATGAS volumes based on the contractual arrangements and actual usage by iNATGAS is summarized in Table 6.

¹² To calculate the residential saturation levels, the Company increased the number of residential customer prospects from ICF using certain information from Moody's (i.e., increased by the growth rate of the Total Households variable). Please see the response to Staff 2-4 in Docket No. DG 17-152 and the responses to Staff 1-8 and Staff 1-9 in Docket No. DG 17-198 for certain ICF customer prospect data.

¹³ To calculate the C&I saturation levels, the Company increased the number of commercial customer prospects from ICF using certain information from Moody's (i.e., increased by the growth rate of the Total Employment variable). Please see the response to Staff 2-4 in Docket No. DG 17-152 and the responses to Staff 1-8 and Staff 1-9 in Docket No. DG 17-198 for certain ICF customer prospect data. Please note that the total number of commercial customer prospects from ICF is conservative when compared to data from the U.S. Census Bureau, thus resulting in C&I saturation rates that are higher than rates based on data from the U.S. Census Bureau.

Table 6: iNATGAS Volumes (Dth)

Split Year	Annual Volume	Design Day
2017/18	266	20
2018/19	300,000	4,251
2019/20	300,000	4,251
2020/21	500,000	4,251
2021/22	500,000	4,251
2022/23	1,300,000	8,800
2023/24	1,300,000	8,800
2024/25	1,300,000	8,800
2025/26	1,300,000	8,800
2026/27	1,300,000	8,800
2027/28	1,300,000	8,800
2028/29	1,300,000	8,800
2029/30	1,300,000	8,800
2030/31	1,300,000	8,800
2031/32	1,300,000	8,800
2032/33	1,300,000	8,800
2033/34	1,300,000	8,800
2034/35	1,300,000	8,800
2035/36	1,300,000	8,800
2036/37	1,300,000	8,800
2037/38	1,300,000	8,800

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

DG 17-152

Least Cost Integrated Resource Plan

Conservation Law Foundation Technical Session Data Requests - Set 1

Date Request Received: 6/1/18
Request No. CLF Tech 1-4

Date of Response: 6/15/18
Respondent: William R. Killeen

REQUEST:

Please see:

Liberty Responses to Staff Data Requests - Set 2: Request No. Staff 2-21

Liberty Responses to Staff Data Requests - Set 2: Request No. Staff 2-22

Liberty Utilities 2017 LCIRP, page 31

Please answer the question on why the high/low case demand scenarios add/subtract 1% from the base case growth rate. Specifically:

- a. Please explain the reasoning behind defining a high (low) growth scenario by adding (subtracting) 1 percent to the annual growth in the base case growth.
- b. Please identify the source of the 1 percent value for this adjustment and provide all background materials related to this assumption.

RESPONSE:

- a. To generate the High Growth demand forecast, the Company added 1.0 percent per annum growth to its Base Case growth rate. That is, the growth rate in the High Growth forecast in each year is 1.0 percent above the growth rate of the Base Case forecast.

To generate the Low Growth demand forecast, the Company subtracted 1.0 percent per annum growth from its Base Case growth rate. That is, the growth rate in the Low Growth forecast in each year is 1.0 percent below the growth rate of the Base Case forecast.

In the response to Staff 2-21, the Company explained that the high and low case demand scenarios add/subtract 1.0 percent from the annual Base Case growth rate, respectively. This methodology was maintained in this filing as it was consistent with the high and low demand scenario methodology in the prior Least Cost Integrated Resource Plans ("LCIRP") filings developed by the Company and approved by the Commission (see Docket Nos. DG 13-313 and DG 10-041).

The LCIRP is to include reasonable high and low growth planning scenarios. The Company retained the growth rate adjustment methodology for the high/low cases based on the prior practice of the Company. This methodology has produced reasonable high

and low growth planning scenarios in the past two LCIRP filings, and the Commission has approved the previous two LCIRPs and therefore accepted the high and low load growth assumptions as reasonable.

For this response, the Company also reviewed the filing in Docket No. DG 06-105 (EnergyNorth was under the ownership of Keyspan at that time). The high and low growth methodology was different at that time. The Company has no opinion on the method used under Keyspan ownership. However, of note, the methods used at that time produced a very narrow range of possible demand outlooks. The load additions by the fifth year of the Plan that were approximately 550,000 Dth higher/lower than the Base Case scenario. In contrast, the High Growth and Low Growth Normal Year load additions are higher/lower by approximately 2,500,000 Dth by the fifth year of the Plan in this filing. This provides a much broader range of possible demand scenarios.

- b. The Company reviewed the last three LCIRP filings to understand the source of the 1 percent adjustment. The method changed in Docket No. DG 10-041, at which time the Company was under the ownership of National Grid.

In Docket No. DG 10-041, the following discussion was included in the LCIRP:

National Grid NH's resource portfolio must be designed to have adequate and reliable resources available to meet forecasted demand at the lowest possible cost. Because the future cannot be predicted with precision, the Company evaluates whether the portfolio resources will be adequate and reliable when actual experience departs from the forecast. Specifically, the Company considered the levels of uncertainty in the demand and sendout forecasts and developed high- and low-demand scenarios relative to the base case forecast to determine the impact a range of alternatives would have on its resource portfolio. A comparison of the average annual load additions for the base case, high- and low-demand scenarios is presented in Chart III-B-2.

National Grid NH used the results of the econometric models to develop the high and low demand scenarios. The growth rates of the combined results of econometric model for customers, use per customer and sales, for the residential heating and non-heating and C&I heating and non-heating classes were adjusted up and down by 1 percentage point. For the high case, the Company increased the growth rates on the resulting forecast by 1 percentage point to calculate the high demand values. Similarly, for the low case, the Company decreased the growth rates on the resulting forecast by 1 percentage point to calculate the low demand values.

One can only conclude that the Company deemed the high/low scenarios to be reasonable for planning purposes. The approval of the LCIRP implies that the Commission agreed with those assumptions.

REVISED

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

DG 17-198

Petition to Approve Firm Supply and Transportation Agreements and the
Granite Bridge Project

OCA Technical Session Data Requests - Set 1

Date Request Received: 6/21/19
Request No. OCA TS 1-1

Date of Response: 7/10/19
Respondent: Francisco C. DaFonte
William R. Killeen

REQUEST:

Reference Supplemental Testimony of DaFonte and Killeen, Attachment FCD/WRK-4, Bates pages 286-352:

- a. Please describe the assumed propane facility usage during the design day for the above-cited SENDOUT run.
- b. Is there any day within the last six years when the Company has used the entire capacity of its propane facilities for an entire 24 hour period? If so, please provide documentation of those instances and the Company's resource mix during those instances, preferably in live EXCEL format. Please also provide a narrative describing why the Company utilized its entire capacity of its propane storage facilities during each of those days.
- c. If the response to TS 1-1(b) is negative, is there any single hour within the last six years when the Company has used the entire capacity of its propane facilities? If so, please provide documentation of those instances and the Company's resource mix during those instances, preferably in live EXCEL format. Please also provide a narrative describing why the Company utilized its entire capacity of its propane storage facilities during each of those hours.

RESPONSE:

- a. For the Alternative Case Sensitivity Supplemental ("ACS") scenario, which was provided in the Supplemental Direct Testimony of Francisco C. DaFonte and William R. Killeen as Attachment FCD/WRK-4, the Company assumes that up to 34,600 Dth/day of supply can be provided by the propane facilities on the Design Day. Please see Confidential Attachment OCA TS 1-1.a for the SENDOUT® report showing that the model uses the maximum available supply from the propane facilities on the Design Day, which occurs on January 19 of each winter, in this ACS scenario.
- b. No.
- c. Yes. There have been four days within the last six years during which the Company's three propane facilities at Manchester, Tilton, and Nashua operated on the same day: on

December 28 and 29, 2015, and on March 4 and 5, 2014. Operational records indicate that for five hours on March 5, 2014, from 0400 to 0800, all three facilities were operating at full propane production capacity. The resource mix on the day is provided below:

Date	March 5, 2014
EDDs (Effective Degree Days)	53
Sendout	106,070
Resources:	
LNG	4,507 (incl. boiloff of 63)
LPG	4,089
Via Transport (Transportation)	27,988
Via Transport (Sales)	66,850
Operating Balance Agreement	2,636

The propane facilities are used as peaking supply, for short durations, and typically during cold weather periods to ensure customer demand and operational needs are met. This day provides an excellent example of how the propane (and LNG) facilities provide supply flexibility. Over the span of approximately 36 hours leading up to and during March 5, 2014, the weather forecast trended 6 HDDs colder, and the demand forecast increased by over 15% (or more than 15,000 Dths). Once pipeline and supply nominations were set, the weather during the gas day continued to get colder, demand trended much higher than expected, and the propane and LNG facilities were required late in the gas day to ensure customer needs were satisfied.

Confidential Attachment OCA TS 1-1.a contains third party pricing information that is “confidential, commercial, or financial information” which is protected from disclosure by RSA 91-A:5, IV, and for which the Commission granted confidential treatment of similar information in Order No. 26,166 (Aug. 1, 2018). Therefore, pursuant to that order, statute, and Puc 203.08(d), the Company has a good faith basis to seek confidential treatment of this information and will submit a motion confirming confidential treatment prior to the final hearing in this docket.

Note that the entire document has been marked confidential at this time because the personnel best suited to identify the confidential material are not available given the upcoming holiday weekend. The Company will supplement this response with a more narrowly redacted version as soon as possible.

REVISED RESPONSE:

The Company has determined there is no confidential information in the document previously provided as Confidential Attachment OCA TS 1-1.a. Therefore, the Company is revising the

Docket No. DG 17-198 Request No. OCA TS 1-1 (Revised)

above response to withdraw its claim of confidentiality and is providing the same document, with no redactions, now identified as Attachment OCA TS 1-1.a.

- 1-28 Reference Page 20, lines 8 to 9 and lines 11 to 13. “There is a significant risk that the resources will not remain economic through their expected terms of service [] Liberty is unlikely to need the delivery capacity for very long, leaving its customers vulnerable to having to pay for stranded assets.”
- a) Please provide all source documentation, data, and analysis relied upon by Mr. Chernick to support these two assertions. If there are none, please state as such.

Response:

See Mr. Chernick’s testimony at pages 20-29. The analysis relied on is identified in Mr. Chernick’s testimony.

1-32 Reference Page 28, lines 15 to 16. “While the LCIRP may be painting the lack of demand for LNG in the New England market as some sort of problem, it is in fact an advantage for gas buyers, since import (and associated storage) capacity is readily available.”

- a) Please provide a list of all the imported LNG supply contracts negotiated by Mr. Chernick.
- b) Please provide all testimony and work product developed by Mr. Chernick with respect to imported LNG supplies over the past 10 years.
- c) Please provide all testimony and work product developed by Mr. Chernick with respect to interstate pipeline capacity over the past 10 years.

Objection:

CLF objects to this data request because it is overly broad, unduly burdensome, seeks to have the witness provide information that is publicly available or additional analysis beyond his testimony, and is not reasonably calculated to lead to the discovery of admissible evidence.

Notwithstanding this objection, CLF provides the following response:

Response:

- a. None.
- b. See [http://resourceinsight.com/wp-content/uploads/2019/08/PLC-346 ME PUC 2019 00105 Direct 8-2019.pdf](http://resourceinsight.com/wp-content/uploads/2019/08/PLC-346_ME_PUC_2019_00105_Direct_8-2019.pdf) and [http://resourceinsight.com/wp-content/uploads/2019/08/PLC-345 ME PUC 2019-00101 Direct 8-2019.pdf](http://resourceinsight.com/wp-content/uploads/2019/08/PLC-345_ME_PUC_2019-00101_Direct_8-2019.pdf). Mr. Chernick’s work for Boston Gas Company in the late 1980s and early 1990s also involved imports of LNG through Distrigas, but this was outside the date range of the request.
- c. See [http://resourceinsight.com/wp-content/uploads/2015/01/PLC-286 ON OEB 2012-0451 0433 0074 Direct 6-2014.pdf](http://resourceinsight.com/wp-content/uploads/2015/01/PLC-286_ON_OEB_2012-0451_0433_0074_Direct_6-2014.pdf), [http://resourceinsight.com/wp-content/uploads/2019/09/PLC-304 GEC INTRV EVIDENCE2 CORRECTED 7-2015.pdf](http://resourceinsight.com/wp-content/uploads/2019/09/PLC-304_GEC_INTRV_EVIDENCE2_CORRECTED_7-2015.pdf), [http://resourceinsight.com/wp-content/uploads/2015/01/PLC-245 PA PUC R-2009-2139884 Direct 12-2009.pdf](http://resourceinsight.com/wp-content/uploads/2015/01/PLC-245_PA_PUC_R-2009-2139884_Direct_12-2009.pdf), [http://resourceinsight.com/wp-content/uploads/2019/09/PLC-303 PA PUC P-2014-2459362 Direct 5-2015.pdf](http://resourceinsight.com/wp-content/uploads/2019/09/PLC-303_PA_PUC_P-2014-2459362_Direct_5-2015.pdf), [http://resourceinsight.com/wp-content/uploads/2019/09/PLC-303 PA PUC P-2014-2459362 Rebuttal 7-2015.pdf](http://resourceinsight.com/wp-content/uploads/2019/09/PLC-303_PA_PUC_P-2014-2459362_Rebuttal_7-2015.pdf). Mr. Chernick has developed avoided gas costs for other Philadelphia Gas Works proceedings, Peoples Gas (Pennsylvania) and various UGI gas subsidiaries, reflecting pipeline and storage supplies, but this work did not result in any free-standing public reports.

Chico DaFonte

From: William Clark
Sent: Thursday, October 17, 2019 1:37 PM
To: Chico DaFonte
Subject: FW: Contact Information

Follow Up Flag: Follow up
Flag Status: Flagged

William Clark | [Liberty Utilities \(East Region\)](#) | Senior Director, Business Development
P: 603-724-2124 | C: 603-475-8107 | E: William.Clark@libertyutilities.com

From: Lisa DeGregory
Sent: Thursday, October 17, 2019 1:34 PM
To: Huck Montgomery <Huck.Montgomery@libertyutilities.com>
Cc: William Clark <William.Clark@libertyutilities.com>
Subject: FW: Contact Information

Please see below from Joyce P&H.

Lisa DeGregory | [Liberty Utilities \(East Region\)](#) | Senior Regional Manager, Business and Community Development
P: 603-782-2374 | C: 603-401-6512 | E: Lisa.DeGregory@libertyutilities.com

From: Ryan Lagasse
Sent: Thursday, October 17, 2019 1:21 PM
To: Lisa DeGregory <Lisa.DeGregory@libertyutilities.com>
Subject: FW: Contact Information

Joyce Heating/Cooling provided the email below describing their issues with the propane air injection.

Ryan Lagasse | [Liberty Utilities \(New Hampshire\)](#) | Territory Manager, Business and Community Development
P: 603-782-2338 | C: 603-327-7151 | E: Ryan.Lagasse@libertyutilities.com

From: Suzanne Pacheco
Sent: Thursday, October 17, 2019 1:16 PM
To: Ryan Lagasse <Ryan.Lagasse@libertyutilities.com>
Subject: FW: Contact Information

FYI

Suzanne Pacheco | [Liberty Utilities \(New Hampshire\)](#) | Residential Territory Manager, Business and Community Development
P: 603-782-2334 | C: 603-231-6299 | E: Suzanne.Pacheco@libertyutilities.com

From: Shaun Dougherty [<mailto:sd@joycecool.com>]
Sent: Thursday, October 17, 2019 1:12 PM
To: Suzanne Pacheco <Suzanne.Pacheco@libertyutilities.com>

Cc: Lisa DeGregory <Lisa.DeGregory@libertyutilities.com>

Subject: Re: Contact Information

Hi Suzanne,

I apologize for the delay on getting this to you.

Please see below In regards to the issues we experience when propane is added into the natural gas lines.

1. Customers with high end heating units, mostly modulating gas boiler, will have a very loud rumbling noise. The boiler sounds terrible and actually shakes in some cases when it happens.
2. Once the customer hears the sound they call us to set up a service call. After we receive several calls from the same neighborhood we now that there has been propane added into the gas lines. We've been told that it is due to usage and needing to increase the volume delivered to the customers.
3. We do our best to tell customers over the phone that we can't do anything to correct the issue but a lot of them want us to come out anyways and typically these systems are under warranty so we can't charge for the visit.
4. Usually this happens on extreme cold mornings when a lot of systems are running after set back from the night. We've found that after 2 or 3 hours whatever

Shaun Dougherty

Joyce *Cooling* & *Heating* Inc.

[603-882-4244](tel:603-882-4244)

Shaun Dougherty
Joyce Cooling & Heating Inc.
[603-882-4244](tel:603-882-4244)
www.joycecool.com

On Oct 17, 2019, at 10:51 AM, sd@joycecool.com wrote:

I sent an email right after we spoke last week in regards to this.

Shaun Dougherty
Joyce Cooling & Heating Inc.
[603-882-4244](tel:603-882-4244)
www.joycecool.com

On Oct 17, 2019, at 10:05 AM, Suzanne Pacheco
<Suzanne.Pacheco@libertyutilities.com> wrote:

Hi Shaun,

My apologies for not spelling your first name correctly in my last email!

I just wanted to follow up and see if you would have a free moment to document the effects of what happens when propane is fed into the system during the winter.

Thanks so much!

Suzanne

Suzanne Pacheco | [Liberty Utilities \(New Hampshire\)](#) | Residential Territory Manager,
Business and Community Development
P: 603-782-2334 | C: 603-231-6299 | E: Suzanne.Pacheco@libertyutilities.com

From: Suzanne Pacheco
Sent: Friday, October 04, 2019 12:26 PM
To: 'sd@joycecool.com' <sd@joycecool.com>
Subject: Contact Information
Importance: High

Hi Shawn,

Thank you for returning my call and agreeing to document the issues that are encountered when propane is fed in to the system in the winter.

Please find my direct contact information below.

Best Regards,
Suzanne

Suzanne Pacheco | [Liberty Utilities \(New Hampshire\)](#) | Residential Territory
Manager, Business and Community Development
P: 603-782-2334 | C: 603-231-6299 | E: Suzanne.Pacheco@libertyutilities.com
130 Elm Street, Manchester, NH 03101

Chico DaFonte

From: Chico DaFonte
Sent: Thursday, October 24, 2019 8:32 AM
To: Chico DaFonte
Subject: FW: Gas issues

Begin forwarded message:

From: Paul Renaud [<mailto:PRenaud@Anselm.Edu>]
Sent: Tuesday, October 22, 2019 8:54 AM
To: Andrew Morgan <Andrew.Morgan@libertyutilities.com>
Subject: FW: Gas issues

Hi Andrew,

In preparation for this winter I am wondering if there is anything I can do. During almost every winter we have had critical boilers for buildings trip out during really cold storms. We have some buildings here that require 100% outside air so you can imagine when the boilers trip. Luckily our freeze stats are working to shut units off. I am resending you this e-mail to refresh your memory of last year. I do not have correspondence from before that time. I am looking into getting alarm histories put together to show when the boilers tripped.

-Goulet Science has labs and animals and has 100% outside air

-Gadbois Hall is an old brick and block Nursing building which gets cold quick when no heat is available

-Alumni Hall which is our administration building and has many offices as well as some classrooms is also an old building and gets cold quick.

-Stoutenburgh Gymnasium which is where our basketball, volleyball games are and has an expensive floor. There are also gang showers.

-Dana Center is our theater building which holds upwards of 300 people and needs the temperature to be maintained

There is also the issue with costs for call-ins to reset the boilers. We are probably around 100 man hours and half of that is overtime call-ins with a 3 hour minimum.

Thank you,

Paul Renaud

Plumbing and HVAC Supervisor

603.641.7358



From: Andrew Morgan [<mailto:Andrew.Morgan@libertyutilities.com>]
Sent: Monday, March 12, 2018 8:38 AM
To: Paul Renaud <PRenaud@Anselm.Edu>
Subject: RE: Gas issues

Paul,

Good morning. Our gas control department did inject propane into the system last week for demand support. This may have caused the boilers to trip. We did not have any pressure related issues with the system. I have not heard anything from gas control saying that we will be doing this again. If I hear anything, I'll be sure to let you know.

Thank you,

Andrew Morgan | [Liberty Utilities \(New Hampshire\)](#) | Manager III-Gas, Business and Community Development
P: 603-782-2321 | C: 603-327-5357 | E: Andrew.Morgan@libertyutilities.com

From: Paul Renaud [<mailto:PRenaud@Anselm.Edu>]
Sent: Monday, March 12, 2018 7:30 AM
To: Andrew Morgan <Andrew.Morgan@libertyutilities.com>
Subject: Gas issues

Hi Andy,

In advance of this next storm I was wondering if I have to do anything? Last week's storm tripped out 5 buildings of gas boilers and 1 building I had to increase the gas pressure on the boilers gas valve to get them to fire. Do you know of anything that happened last week during the storm?

Thanks

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**STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION**

Docket No. DG 17-152

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Least Cost Integrated Resource Plan

**DEMAND FORECAST
REBUTTAL TESTIMONY**

OF

**WILLIAM R. KILLEEN, WILLIAM J. CLARK, ERIC M. STANLEY,
JAMES M. STEPHENS, AND ADAM J. PERRY**

October 25, 2019

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1 **I. INTRODUCTION**

2 **Q. Please state your name, position, and business address.**

3 A. My name is William R. (Bill) Killeen. I am Director, Energy Procurement of Liberty
4 Utilities (Canada) Corp., the parent of Liberty Utilities Co. (“Liberty Utilities”), which
5 owns Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities (hereinafter
6 referred to as “EnergyNorth” or the “Company”). My business address is 354 Davis Road,
7 Oakville, Ontario, Canada.

8 My name is William J. Clark. I am the Senior Director of Business Development for
9 Liberty Utilities. My business address is 15 Buttrick Road, Londonderry, New Hampshire.

10 My name is Eric M. Stanley. I am the Manager of Energy Efficiency and Customer
11 Programs at Liberty Utilities for New Hampshire. My business address is 15 Buttrick
12 Road, Londonderry, New Hampshire.

13 My name is James M. Stephens. I am a Partner at ScottMadden, Inc. (“ScottMadden”).
14 My business address is 1900 West Park Drive, Suite 250, Westborough, Massachusetts.

15 My name is Adam J. Perry. I am a Director at ScottMadden. My business address is 1900
16 West Park Drive, Suite 250, Westborough, Massachusetts.

17 **Q. On whose behalf are you submitting this Rebuttal Testimony?**

18 A. We are submitting this joint testimony before the New Hampshire Public Utilities
19 Commission (the “Commission” or “NHPUC”) on behalf of EnergyNorth.

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1 **Q. Mr. Killeen, are you the same William R. (Bill) Killeen who filed direct testimony in**
2 **this proceeding?**

3 A. Yes. I submitted direct testimony on April 30, 2019.

4 **Q. Mr. Clark, please summarize your educational background and your professional**
5 **experience in the energy and utility industries.**

6 A. I graduated from St. Anselm College in Goffstown, New Hampshire, with a Bachelor of
7 Science degree in Financial Economics in 1991. I have twenty-five years of experience in
8 the natural gas and electric utility industries with roles in Operations, Sales, Marketing,
9 and Business Development. I joined Liberty Utilities in 2012 and progressed into my
10 current position as Senior Director, Business Development for the East Region. In this
11 role, I am responsible for strategic growth and expansion opportunities, new technologies
12 and innovations, along with acquisitions for gas, electric and water utilities.

13 **Q. Mr. Clark, have you previously provided testimony before the Commission?**

14 A. Yes, I have submitted testimony before the Commission in eight proceedings on behalf of
15 the Company. Most recently, I provided testimony in Docket No. DG 18-140 in support
16 of EnergyNorth's renewable natural gas supply and transportation agreement with
17 RUDARPA, Inc.

18 **Q. Mr. Stanley, are you the same Eric M. Stanley who filed direct testimony in this**
19 **proceeding?**

20 A. Yes. I submitted direct testimony on June 28, 2019.

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1 **Q. Mr. Stephens, please summarize your educational background and your professional**
2 **experience in the energy and utility industries.**

3 A. I hold a Bachelor of Science degree in Management and a Master of Business
4 Administration with a concentration in Operations Management from Bentley College. I
5 have 30 years of experience in the energy industry and have held senior management
6 positions at consulting firms, a retail energy marketing company, and natural gas local
7 distribution companies (“LDCs”). In my role as a consultant, I have assisted numerous
8 clients with various natural gas related engagements, including: the analysis of regional
9 energy market dynamics and the associated drivers for new natural gas infrastructure; the
10 evaluation of capacity opportunities associated with open seasons on various pipelines; the
11 evaluation of new markets/opportunities; integrated resource plans; and natural gas supply
12 portfolio evaluation and optimization. In addition, in my role as the President of a retail
13 energy marketing firm, I was responsible for all aspects of business unit management
14 including front, mid, and back-office functions. I was also responsible for gas supply
15 procurement and portfolio optimization for Colonial Gas Company, which is now a
16 subsidiary of National Grid. A summary of my professional and educational background
17 is provided as Attachment DF-1.

18 **Q. Mr. Stephens, have you previously provided testimony before the Commission?**

19 A. Yes, I have submitted expert testimony to the Commission on behalf of Public Service
20 Company of New Hampshire d/b/a Eversource Energy regarding its natural gas capacity
21 contract filing in Docket No. DE 16-241, as well as expert testimony to the Commission

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1 on behalf of EnergyNorth regarding its natural gas supply strategy in Docket No. DG 17-
2 198.

3 **Q. Mr. Stephens, have you submitted expert testimony in other regulatory jurisdictions?**

4 A. Yes, I have submitted expert testimony in several other regulatory jurisdictions, including
5 the Federal Energy Regulatory Commission (“FERC”), the states of Texas, Alaska,
6 Massachusetts, and Maine, and the Canadian provinces of Ontario, Québec, New
7 Brunswick, Nova Scotia, and Alberta. A list of my past expert witness appearances is
8 provided in Attachment DF-1.

9 **Q. Mr. Perry, please summarize your educational background and your professional**
10 **experience in the energy and utility industries.**

11 A. I hold a Bachelor of Science degree in Economics from Northeastern University. I have
12 twelve years of experience in the energy industry as a consultant. I have assisted numerous
13 utility clients on a wide range of issues, including: the development of integrated resource
14 plans; developing and evaluating demand forecasts; benchmarking analyses related to
15 planning standards and weather normalization methodologies; and the development of cost
16 of capital testimony for electric and natural gas utilities and natural gas pipelines. A
17 summary of my professional and educational background is provided as Attachment DF-
18 2.

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1 **Q. Mr. Perry, have you previously testified before any regulatory bodies?**

2 A. Yes, I have testified before the Massachusetts Department of Public Utilities in support of
3 the demand forecast for Liberty Utilities (New England Natural Gas Company) d/b/a
4 Liberty Utilities in its three most recent Forecast and Supply Plan proceedings.

5 **Q. Please state the purpose of your joint Rebuttal Testimony.**

6 A. The purpose of our joint Rebuttal Testimony is to respond to the direct testimonies of
7 Messrs. John Antonuk and John Adger of The Liberty Consulting Group (“Liberty
8 Consulting”) on behalf of Commission Staff (“Staff”) and Mr. Paul Chernick on behalf of
9 the Conservation Law Foundation (“CLF”) as their testimonies relate to EnergyNorth’s
10 demand forecast that is part of the Company’s 2017 Least Cost Integrated Resource Plan
11 (“LCIRP”).

12 **II. SUMMARY OF REBUTTAL TESTIMONY**

13 **Q. Please provide a summary of your Rebuttal Testimony in response to the direct**
14 **testimony of Liberty Consulting.**

15 A. As discussed herein, the Company’s demand forecasting methodology is reasonable; and
16 the associated results compare well to the Company’s normalized actual demand in recent
17 years and are consistent with the growth projections of other regional LDCs. The Liberty
18 Consulting testimony, while supporting the Company’s overall approach to demand
19 forecasting, including the use of out-of-model adjustments, expresses a concern with the
20 level of the customer additions in the out-of-model adjustment used for the existing service
21 territory. While the Company agrees that the range of customer additions proposed by

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Liberty Consulting is in-line with the recent actual level of customer additions, the actual volumes of natural gas consumed are consistent with the Company's projections.

Q. Please provide a summary of your joint Rebuttal Testimony in response to the direct testimony of Mr. Chernick on behalf of CLF.

A. The direct testimony of Mr. Chernick identified three areas where he disagrees with the Company's demand forecasting methodology. First, as a matter of policy, Mr. Chernick proposes that the Company not engage in any promotional activity regarding customer additions as Mr. Chernick opines that providing customers with the option to choose natural gas is not in the public interest.¹ Second, Mr. Chernick states that the Company mis-applied the forecasted reductions associated with energy efficiency.² Lastly, Mr. Chernick argues that the Company failed to consider additional "cost-effective" demand-side programs.³

With respect to Mr. Chernick's first point (i.e., customers' option to choose natural gas), the Company vehemently opposes the draconian measures outlined by Mr. Chernick that would eliminate natural gas as a fuel choice for customers. The customer choice moratorium proposed by Mr. Chernick removes the customer from a uniquely individual decision (i.e., what fuel to heat their home, use in their restaurant, or install in their development/business). Mr. Chernick's proposal also would prevent the Company from expanding its sales base over which it can spread its fixed costs and thus lower rates to all

¹ Direct Testimony of Paul Chernick on behalf of Conservation Law Foundation, at 9.

² *Ibid.*, at 24-26.

³ *Ibid.*, at 27.

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1 customers. The Company has proposed, and the Commission has approved, innovative
2 programs to provide customers with choice and those programs have been found to be in
3 the public interest. It is important to note that the Company's approved growth programs
4 provide a choice for customers and do not force natural gas use on any customer. The
5 Company recommends the Commission oppose any policy that allows an entity to control
6 choices for individual customers by eliminating options and choices as a matter of "public
7 policy."

8 With respect to the Company's level of energy efficiency assumed in this LCIRP, the
9 Company used the level of energy efficiency outlined and approved by the Commission in
10 Docket No. DE 17-136. This approach, which uses the energy efficiency associated with
11 Commission-approved programs, is consistent with past Company practices and is
12 reasonable. Lastly, the Company's application of energy efficiency volumes in the demand
13 forecast is reasonable and consistent with the approach used in prior demand forecasts
14 approved by the Commission.

15 **III. OVERVIEW OF DEMAND FORECAST APPROACH**

16 **Q. Please provide a brief summary of EnergyNorth's demand forecast.**

17 A. The Company's LCIRP, filed on October 2, 2017 ("Initial Filing"), discussed the demand
18 forecast for planning years 2017/18 through 2021/22 ("Forecast Period") under Normal
19 Year, Design Year, and Design Day weather conditions, and under Base, High, and Low

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1 growth scenarios.⁴ Econometric analysis was used to develop models to forecast the
2 number of customers and the use per customer by customer segment.⁵ The resulting
3 demand based on the econometric models was adjusted to account for energy efficiency
4 savings, unaccounted for gas, unbilled sales, and other out-of-model adjustments.⁶ The
5 forecast was then translated from monthly to daily data to arrive at the Company's forecast
6 of daily sendout requirements.⁷ The process for developing the demand forecast is
7 summarized in Figure 2 on page 8 of the Initial Filing. The demand forecast in the Initial
8 Filing was subsequently updated in Attachment Staff Tech 1-7.1 (filed in response to Staff
9 Tech 1-7 on June 27, 2018)⁸ to reflect certain modifications, and was further updated to
10 incorporate more recent information with minor additional changes in the Supplemental
11 Direct Testimony of Francisco C. DaFonte and William R. Killeen in Docket No. DG 17-
12 198, filed March 15, 2019 (the "Updated Demand Forecast").⁹

⁴ 2017 LCIRP, Bates 032-036.

⁵ *Ibid.*, Bates 012.

⁶ *Ibid.*, Bates 025-030.

⁷ *Ibid.*, Bates 030.

⁸ All responses to discovery referenced throughout our Rebuttal Testimony (excluding spreadsheets and voluminous attachments, such as detailed SENDOUT® reports) are provided collectively as Attachment DF-3, unless otherwise noted. For ease of reference, the discovery responses included in that attachment are provided in numerical sequence by requesting party.

⁹ *See*, Supplemental Direct Testimony of Francisco C. DaFonte and William R. Killeen, Docket No. DG 17-198, Bates 051-053. The changes to the demand forecast presented in the Supplemental Direct Testimony of Francisco C. DaFonte and William R. Killeen resulted in a 0.1% decrease in Normal Year and Design Year demand in the last year of the Forecast Period (i.e., 2021/22). There were no changes to the Design Day results.

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1 **IV. RESPONSE TO DIRECT TESTIMONY OF THE LIBERTY CONSULTING**
2 **GROUP**

3 **Q. Does Liberty Consulting's testimony support aspects of the Company's Updated**
4 **Demand Forecast?**

5 A. Yes, it does. Liberty Consulting generally concluded that the approach and methods used
6 to forecast demand were reasonable and appropriate. Specific findings were:

- 7 1. The econometric models and results are reasonable;¹⁰
8 2. An out-of-model adjustment in the existing service territory is reasonable and
9 appropriate (while noting concerns regarding the magnitude of the adjustment);¹¹
10 3. The energy efficiency savings are reasonable;¹²
11 4. The adjustments for unaccounted-for gas and unbilled sales are reasonable;¹³
12 5. The approach to translating the monthly requirements to forecasts of daily
13 requirements is reasonable;¹⁴ and
14 6. Both the method for developing the Planning Standards and the resulting Planning
15 Standards are reasonable.¹⁵

¹⁰ Direct Testimony of The Liberty Consulting Group, Bates 008.

¹¹ *Ibid.*, Bates 009-012.

¹² *Ibid.*, Bates 008.

¹³ *Ibid.*, Bates 012.

¹⁴ *Ibid.*

¹⁵ *Ibid.*, Bates 015.

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1 **Q. Does Liberty Consulting express any concerns with the Updated Demand Forecast?**

2 A. Yes, it does. Liberty Consulting expresses a concern related to the out-of-model
3 adjustment associated with the level of customer additions for the existing service territory;
4 specifically, with the magnitude of that adjustment. Liberty Consulting also concludes that
5 the compound annual growth rate (“CAGR”) for the Company’s forecasted volumes over
6 the Forecast Period is too high.¹⁶ Liberty Consulting’s conclusion regarding the
7 Company’s CAGR is based on a lower out-of-model adjustment for the number of
8 customer additions in the existing service territory and on a comparison of the Company’s
9 CAGR to that of Northern Utilities, Inc. (“Northern”).¹⁷

10 **A. Overview of the Application of Out-Of-Model Adjustments**

11 **Q. Please describe the role of the econometric models in developing the demand forecast.**

12 A. As noted in the Initial Filing, econometric models for the number of customers and use per
13 customer were developed for four customer segments: residential heating, residential non-
14 heating, commercial and industrial (“C&I”) heating, and C&I non-heating.¹⁸ The number
15 of customers and use per customer forecasts were multiplied together to estimate demand
16 for each segment, and summed across the segments to derive total firm demand.¹⁹

¹⁶ *Ibid.*, Bates 012 and 016.

¹⁷ *Ibid.*, Bates 012-013.

¹⁸ 2017 LCIRP, Bates 013.

¹⁹ *Ibid.*, Bates 012.

1 **Q. Please provide a summary of the out-of-model adjustments to the Company's**
2 **Updated Demand Forecast.**

3 A. The out-of-model adjustments applied to the Updated Demand Forecast, which reflect
4 certain growth trends or events, are: (1) estimates of customer additions in the Company's
5 existing service territory greater than those forecast by the econometric models; (2)
6 estimates of the number of customers in new service territories in which the Company is
7 expanding; and (3) demand associated with iNATGAS.²⁰

8 **Q. Is there academic support for including out-of-model adjustments in forecasts?**

9 A. Yes, there is. For example, Michael Intriligator discusses the use of "add factors" (out-of-
10 model adjustments) in *Econometric Models, Techniques, & Applications*:

11 The add factors are based on judgments of factors not explicitly included
12 in the model. For example, in a macroeconometric model there may be
13 no explicit account taken of strike activity, but if major union contracts
14 are expiring and a strike appears likely in the forecast period, the
15 forecasts of production should be appropriately revised downward.
16 Many other factors may not have been included in the model because
17 their occurrence is rare or because data are difficult to obtain, but this
18 does not mean that they must be overlooked in formulating a forecast.
19 Indeed, it would be inappropriate to ignore relevant considerations
20 simply because they were omitted from the model. In this sense
21 forecasting with an econometric model is not simply a mechanical
22 exercise but rather a blending of objective and subjective
23 considerations. The subjective considerations embodied in the add
24 factors, general improve significantly on the accuracy of the forecasts
25 made with an econometric model.²¹

²⁰ 2017 LCIRP, Bates 025-027.

²¹ Michael D. Intriligator, *Econometric Models, Techniques, & Applications*, at 516-517.

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1 As such, including out-of-model adjustments for factors that are not explicitly included or
2 reflected in the historical data used to develop the econometric models are reasonable and
3 necessary.

4 **Q. Why is an out-of-model adjustment necessary for the customer additions in the**
5 **existing service territory?**

6 A. The out-of-model adjustment for the number of customer additions in the Company's
7 existing service territory was required because the customer additions resulting from the
8 econometric models were below the Company's recent experience. Stated differently,
9 relying solely on the customer addition results from the econometric models would
10 understate the forecast of customer additions based on recent actual Company
11 performance. Specifically, as noted in Attachment Staff Tech 1-7.1, the econometric
12 models resulted in customer additions of approximately 1,180 per year over the Forecast
13 Period. As shown on page 10 of Liberty Consulting's testimony and in Table 4 of
14 Attachment Staff Tech 1-7.1, the Company's actual customer additions have outpaced the
15 results forecasted by the econometric models. By way of example, in 2017 the Company
16 added over 1,700 customers, which is approximately 500 customers, or more than 40%,
17 greater than the econometric model results noted above.²²

18 In addition, the Company has received approval for innovative customer growth programs
19 such as the managed expansion program ("MEP") from the Commission, and has invested

²² See, Attachment Staff Tech 1-7.1 in the response to Staff Tech 1-7, at 5-6 (provided as Attachment DF-3).

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1 in internal resources including additional Sales and Marketing staff.²³ As such, the actual
2 customer additions experienced (e.g., 1,700 in 2017), coupled with the Company's
3 innovative customer growth programs and investments in New Hampshire Sales and
4 Marketing employees, supports the use of an out-of-model adjustment and the expectation
5 that the recent level of customer additions is sustainable and should be planned for.

6 **Q. Please explain the out-of-model adjustments for new service territories.**

7 A. The out-of-model adjustment for customer additions in the Company's new service
8 territories was necessary because these towns and associated potential customers are not
9 reflected in the historical dataset used to develop the econometric models. Specifically,
10 the Company has adjusted the results of the econometric models to reflect customer
11 additions from the new franchise areas (i.e., Windham and Pelham) because natural gas
12 demand in these towns is exogenous to the econometric model results.

13 **Q. Why is an out-of-model adjustment necessary for demand associated with iNATGAS?**

14 A. An out-of-model adjustment for the volumes associated with iNATGAS was required
15 because iNATGAS represents a single large customer that the Company has a contractual
16 obligation to provide certain levels of service as outlined in the special contract approved
17 by the Commission, and its usage was not reflected in the historical data.

²³ As discussed in the responses to Staff 2-4 and CLF 1-9 (see, Attachment DF-3), the Company has expanded its Sales and Marketing team by six full time equivalents ("FTEs"). These employees reside and are active in their local communities and provide "feet on the ground" with respect to participating in business organizations and town activities.

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1 **Q. Regarding the out-of-model adjustment for iNATGAS, has the Commission**
2 **previously approved such an approach for iNATGAS?**

3 A. Yes, the Commission has. As discussed in Attachment Staff Tech 1-7.1 in the response to
4 Staff Tech 1-7:

5 The use of adjustments to improve the results of an econometric model
6 have been presented to, and approved by, the Commission. By way of
7 example, in the NED proceeding (i.e., Docket No. DG 14-380), the
8 Company adjusted the results of the econometric model to reflect three
9 markets that were exogenous to the results of the econometric model;
10 specifically, the Company included adjustments for: (i) potential
11 volumes to Keene, NH, as an incremental market; (ii) reverse migration
12 of capacity exempt customers, reflecting recent market trends; and (iii)
13 incremental volumes for iNATGAS, a new, large customer in the
14 existing service territory.

15 As it did in the Northeast Energy Direct (“NED”) Project proceeding (Docket No. DG 14-
16 380), the Company adjusted the results of the demand forecast based on the econometric
17 models to reflect the incremental volume associated with iNATGAS in the Updated
18 Demand Forecast.

19 **Q. Why was the out-of-model adjustment for the existing service territory performed on**
20 **a customer, and not a volume, basis?**

21 A. As noted in the Initial Filing, it was assumed that the new customers added in the existing
22 service territory would have usage similar to existing EnergyNorth customers.²⁴ This
23 approach allowed the Company to incorporate additional customer growth in the service
24 territory that was not reflected in the historical data, while also relying on the econometric

²⁴ 2017 LCIRP, Bates 026.

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1 forecast of use per customer. Doing so ensured that the resulting volumes were not only
2 based on both exogenous customer growth expectations, but also the statistical analysis of
3 use per customer.

4 **Q. Does the Company make supply decisions based on its forecast of number of**
5 **customers?**

6 A. No, it does not. The number of customers forecast is used in conjunction with the use per
7 customer forecast to estimate demand; and it is the demand forecast that is used in the
8 SENDOUT® portfolio optimization model to review and evaluate the Company's supply
9 resource portfolio and inform gas supply portfolio strategy.

10 **B. Comparison of Forecast to Actual Experience**

11 **Q. How does the Updated Demand Forecast compare to normalized actual demand?**

12 A. As shown in Table 1, the normalized actual demand in 2017/18 was 129,046 Dth higher
13 than the Company's forecast (a 0.9% difference). Focusing on the most recent data (i.e.,
14 2018/19 year-to-date),²⁵ normalized actual demand exceeded the Company's forecast by
15 415,435 Dth (a 3.0% difference). Although the total number of customers added was
16 somewhat below the forecast of customer additions, normalized actual demand is
17 consistent with the Company's Updated Demand Forecast.

²⁵ 2018/19 year-to-date ("YTD") represents the period November 2018 through August 2019.

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Table 1: Forecast Versus Actual Demand (Dth)²⁶

Year	Updated Demand Forecast – Normal Year	Normalized Actual Demand	Difference	% Difference
2017/18	14,475,900	14,604,947	129,046	0.9%
2018/19 YTD	14,025,783	14,441,219	415,435	3.0%

Q. How does the Updated Demand Forecast compare to normalized actual demand by customer segment?

A. As shown in Tables 2 and 3 below, the normalized actual demand was higher in each customer segment in 2017/18 and 2018/19 YTD, with the lone exception being the C&I heating segment in 2017/18.

Table 2: 2017/18 Forecast vs. Normalized Actual Demand (Dth)²⁷

	Residential Non-Heating	Residential Heating	C&I Heating	C&I Non-Heating	Total
Forecast	67,147	6,071,864	6,367,971	1,968,918	14,475,900
Normalized Actual	73,221	6,188,550	6,275,233	2,067,942	14,604,947
Difference	6,074	116,686	-92,738	99,024	129,046
Difference (%)	9.0%	1.9%	-1.5%	5.0%	0.9%

²⁶ The normalized actual data is based on billing data on a customer segment basis. To provide an appropriate comparison, the Updated Demand Forecast includes energy efficiency, but is presented prior to adjustments for unbilled sales and lost and unaccounted for. Values have been rounded to nearest Dth. Please note that volumes for iNATGAS are excluded.

²⁷ The normalized actual data is based on billing data on a customer segment basis. To provide an appropriate comparison, the forecast demand includes energy efficiency, but is presented prior to adjustments for unbilled sales and lost and unaccounted for. Values have been rounded to nearest Dth. Please note that volumes for iNATGAS are excluded.

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Table 3: 2018/19 YTD Forecast vs. Normalized Actual Demand (Dth)²⁸

	Residential Non-Heating	Residential Heating	C&I Heating	C&I Non- Heating	Total
Forecast	60,430	5,923,772	6,272,358	1,769,224	14,025,783
Normalized Actual	63,372	6,054,235	6,386,978	1,936,634	14,451,100
Difference	2,942	130,463	114,620	167,410	415,435
Difference (%)	4.9%	2.2%	1.8%	9.5%	3.0%

Q. Which customer segments contribute to the difference between the Updated Demand Forecast and normalized actual demand?

A. The residential heating and C&I heating volumes are within approximately 2.0% of the forecast for those segments in both 2017/18 and 2018/19 YTD. Although the percentage variance between normalized actual demand and the forecast for the residential non-heating customer segment is larger, residential non-heating demand represents less than 0.5% of the total demand. That is, the volumes associated with the residential non-heating customer segment are not a significant driver of the variance between the normalized actual demand and the forecast. However, the percentage variance in demand for the C&I non-heating customer segment was relatively higher at 5.0% and 9.5% for 2017/18 and 2018/19 YTD, respectively.

²⁸ 2018/19 YTD represents the period November 2018 through August 2019 (i.e., 10 months). The volumes in 2018/19 YTD are generally lower than 2017/18 because they do not represent a full year (i.e., 12 months).

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1 **Q. Has the Company determined what factors may contribute to the higher normalized**
2 **actual demand in the C&I non-heating customer segment?**

3 A. Yes, it has. While there are likely several factors that contribute to the variance in
4 normalized actual demand for the C&I non-heating customer segment, the Company has
5 identified and reviewed two drivers, which are the volume associated with C&I non-
6 heating customers added in 2016/17 and the recent reverse migration of capacity-exempt
7 customer to firm sales or capacity-assigned transportation service.

8 **Q. Please discuss the first factor, the C&I non-heating customer volume added in**
9 **2016/17.**

10 A. As a preliminary matter, customers added in any split-year (i.e., November to October) are
11 added throughout the year and, as such, the volumes associated with additions in any one
12 year are not fully reflected in that year, but rather in subsequent years.

13 As shown in Attachment Staff (Revised) 8-2.xlsx in the response to Staff 8-2 (Docket No.
14 DG17-198),²⁹ the 2016/17 estimated volumes were significantly higher than the prior two
15 split-years. As such, these higher estimated volumes are likely contributing to the variance
16 in volumes in 2017/18 and 2018/19 YTD.

17 **Q. Please discuss the second factor, reverse migration.**

18 A. Since 2015, nine customers have switched from capacity-exempt to firm sales or capacity-
19 assigned transportation service.³⁰ Those customers are now included in the C&I heating

²⁹ See, Attachment DF-3.

³⁰ See, the supplemental response to Staff 4-8, provided in Attachment DF-3.

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1 and non-heating customer segments. The Updated Demand Forecast did not explicitly
2 assume reverse migration because the impact of reverse migration is not embedded in the
3 full range of historical data used to generate the forecast. As such, the additional C&I
4 customers, which are now included in the normalized actual data, serve to increase demand
5 above the forecast.

6 **Q. Has the Company assessed whether the variance in volumes will persist over the**
7 **Forecast Period?**

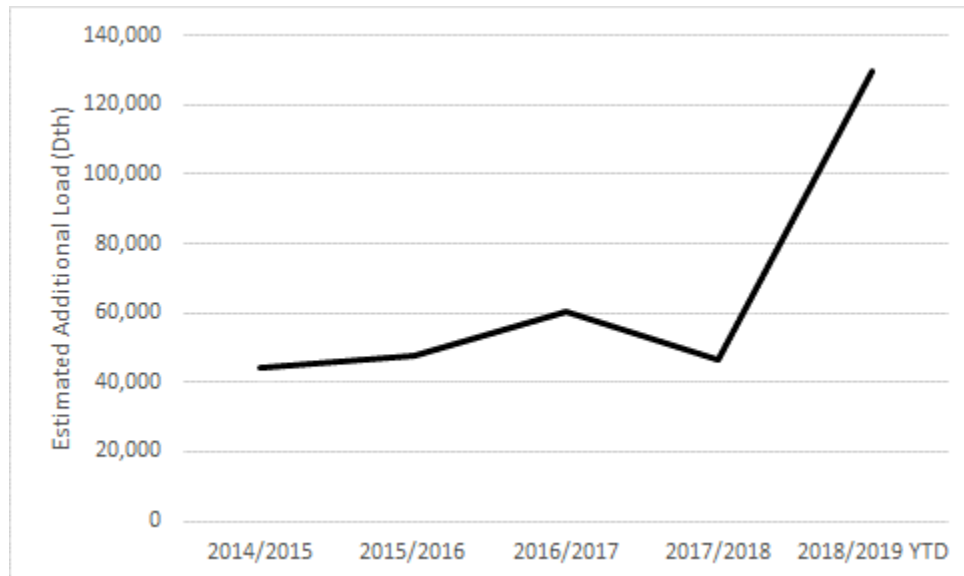
8 A. Although the Company has not conducted a review of all the factors that may contribute to
9 the continuation of the variance in volume, the following additional factors were reviewed.

10 First, the historical dataset includes a certain volume addition from existing customers.
11 However, the volume added by existing customers is significantly higher in 2018/19 YTD
12 than the prior periods.

13 The volumes presented in Chart 1, below, represent estimated additional annual load
14 reported, not actual volumes delivered and billed in that year.³¹ Those additional annual
15 loads are reported when the customers' equipment is installed, a higher capacity meter is
16 set, or the Company identifies a significant change in load. The load is then billed
17 throughout the subsequent year, so that any annual increase in demand from an existing
18 customer may not be fully reflected in load on the system until subsequent years.

³¹ Additional annual load is the incremental annual load above a customer's existing annual load.

Chart 1: Additional Load for Existing C&I Customers³²



As shown in Chart 1, existing C&I customers added a relatively high level of load in 2018/19 YTD.³³ As such, the higher added load at existing customer locations in 2018/19 YTD would contribute to higher demand over the Forecast Period.

Second, the Company currently has approximately 60 capacity-exempt customers. As noted above, since 2015 nine customers have switched from capacity-exempt to firm sales or capacity-assigned transportation service. It is possible that additional capacity-exempt customers could migrate to firm sales or capacity-assigned transportation service. Additional customers returning to firm sales or capacity-assigned transportation service

³² The Company implemented its new customer relationship management system (i.e., the ZOHO system) on May 30, 2014. As such, 2014/15 is the first full split-year the data are available. 2018/19 YTD data are through September 2019.

³³ Almost two-thirds of the additional load from existing customers in 2018/19 YTD was associated with two C&I non-heating customers: [REDACTED]

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1 during the Forecast Period could contribute to higher demand than projected in the Updated
2 Demand Forecast.

3 **Q. What are your conclusions as they relate to the reasonableness of the Updated**
4 **Demand Forecast relative to normalized actual demand?**

5 A. Although the Company agrees that the number of customer additions have been somewhat
6 below the Company's projections, additional volumes added in 2016/17 were higher than
7 prior years, and capacity-exempt customers returning to firm sales or capacity-assigned
8 transportation service have increased demand for the C&I customer segments. In addition,
9 recent experience showing higher than expected increasing loads for existing customers
10 points to continued increases in demand over the Forecast Period. As such, the Updated
11 Demand Forecast continues to be reasonable and is supported by actual experience over
12 the most recent two years of the five-year Forecast Period.

13 **C. Comparison of Growth Rates in New England**

14 **Q. Do you have any observations related to Liberty Consulting's concern that the**
15 **CAGRs for demand are too high in the Updated Demand Forecast relative to**
16 **Northern's demand forecast?**

17 A. Yes, we do. The CAGRs in the Company's and Northern's demand forecasts should be
18 reviewed in proper context. As discussed in Attachment Staff Tech 1-7.1, in the Updated
19 Demand Forecast, the annual and Design Day demand for iNATGAS increases from a
20 minimal amount in 2017/18 to higher volumes in 2021/22 (see, Table 4, below).

Table 4: iNATGAS Volumes (Dth)³⁴

Split-Year	Annual Volume	Design Day
2017/18	266	20
2018/19	300,000	4,251
2019/20	300,000	4,251
2020/21	500,000	4,251
2021/22	500,000	4,251

Because the CAGR is calculated relative to a starting year of 2017/18, the updated assumptions related to iNATGAS result in a relatively higher CAGR over the Forecast Period. Removing the effect of iNATGAS would result in overall CAGRs of 2.3% for the Normal Year and the Design Year, and 1.9% for the Design Day.

These CAGRs that result from EnergyNorth's Updated Demand Forecast are greater than those for Northern (which are 1.4% for the Normal Year, Design Year, and Design Day), but the Company's CAGRs are less than the forecasted CAGRs in the Company's 2013 LCIRP (Docket No. DG 13-313), which were between 2.4% and 2.5% for the Normal Year,³⁵ Design Year, and Design Day.³⁶ It is also important to recognize that the CAGR for normalized *actual* demand for EnergyNorth during the period 2010/11 through 2016/17 was 2.2%, and if calculated through 2017/18 the CAGR increased to 2.5%.³⁷ These observations are consistent with the growth rates in the Updated Demand Forecast.

³⁴ As described in Attachment Staff 1-7.1 in the response to Staff 1-7, the forecast design day volume for iNATGAS of 4,251 Dth is consistent with its highest daily usage in the 2017/18 winter.

³⁵ 2017 LCIRP, Bates 031.

³⁶ 2013 LCIRP, Docket No. DG 13-313, Bates 045.

³⁷ The normalized actual data is based on billing data on a customer segment basis. Please note that volumes for iNATGAS are excluded.

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1 **Q. How do the Updated Demand Forecast CAGRs excluding iNATGAS compare to**
2 **other LDCs in New England?**

3 A. The Company reviewed recent demand forecasts for LDCs in New England to determine
4 if the Company's CAGRs for the Normal Year, Design Year, and Design Day are
5 consistent with other LDCs.³⁸ Based on the Company's review, the CAGRs for the other
6 New England LDCs generally fall in the range of 0% to 2%, which reflect the unique
7 circumstances of each LDC. The Company's CAGRs are generally consistent with that
8 range.

9 **Q. What are your conclusions related to Liberty Consulting's comparison of the growth**
10 **rates in the Updated Demand Forecast to those in Northern's demand forecast?**

11 A. Liberty Consulting's comparison of the growth in the Updated Demand Forecast to a single
12 LDC (Northern) provides little insight into the unique factors in the Company's service
13 territory that affect its growth. When accounting for the effect of iNATGAS on the growth
14 rate, the CAGRs are consistent with both the Company's historical growth and forecast
15 growth in the Company's previous LCIRP, and those of other LDCs in New England.

16 **V. RESPONSE TO THE DIRECT TESTIMONY OF MR. CHERNICK**

17 **Q. Please summarize Mr. Chernick's direct testimony as it relates to the Company's**
18 **demand forecast.**

19 A. Mr. Chernick does not raise any concerns with the Company's econometric models, the
20 general forecasting approach, or the Planning Standards. However, there are three areas in

³⁸ See, Attachment DF-4.

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1 which Mr. Chernick raises concerns with the demand forecast methodology. Specifically,
2 Mr. Chernick (1) states the Company is “promoting the shifting of customer loads from
3 other fuels to natural gas,”³⁹ (2) opines that the application of energy efficiency in the
4 demand forecast is incorrect and should reflect a cumulative trend,⁴⁰ and (3) argues that the
5 Company failed to consider additional “cost-effective” energy efficiency and demand-side
6 programs.⁴¹

7 **Q. Do you have any concerns with the demand forecast data presented in Mr. Chernick’s**
8 **direct testimony?**

9 A. Yes, we do. As noted in Section III above, the Company made certain revisions and
10 updates to the demand forecast, which resulted in the Updated Demand Forecast. The data
11 presented in Tables 1, 3, 5, and 6 of Mr. Chernick’s direct testimony do not reflect the
12 Updated Demand Forecast.⁴² Rather, Mr. Chernick’s testimony is based on the forecast
13 presented in the Initial Filing and does not reflect the Company’s current Updated Demand
14 Forecast.⁴³ Please note, we have provided updated versions of Tables 22 and 24 from the
15 Initial Filing in Appendix A of our Rebuttal Testimony.

³⁹ Direct Testimony of Paul Chernick on behalf of the Conservation Law Foundation, at 9.

⁴⁰ *Ibid.*, at 25-26.

⁴¹ *Ibid.*, at 27.

⁴² Mr. Chernick also references calculations based on those results in his direct testimony.

⁴³ Although in response to discovery, Mr. Chernick acknowledged that he was aware the Company had updated its demand forecast. *See*, Mr. Chernick’s response to Liberty Utilities data request 1-9.

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1 **Q. Do you have any additional observations related to the energy efficiency savings**
2 **presented by Mr. Chernick?**

3 A. Yes, we do. The historical energy efficiency savings presented in Mr. Chernick's Table 4
4 represent the savings for all EnergyNorth customers. The same is true for the estimated
5 savings in 2018 as referenced on page 25 of Mr. Chernick's direct testimony. The energy
6 efficiency savings applied to the Company's Updated Demand Forecast (and those
7 referenced in Mr. Chernick's Tables 3, 5, and 6) reflect only the portion of the total savings
8 attributable to sales and capacity-assigned transportation customers. That is, it is not
9 possible to do a direct comparison between the historical energy efficiency savings and the
10 forecast savings Mr. Chernick presents, because the historical energy efficiency savings
11 likely include some level of energy efficiency from capacity-exempt customers, for which
12 the Company does not need to plan.

13 **A. Sales and Marketing Program**

14 **Q. Please describe Mr. Chernick's concern with the Company's "promotional efforts."**

15 A. Mr. Chernick reviews the out-of-model adjustments described on pages 21-23 of the Initial
16 Filing and calculates the difference by customer segment between the demand forecast
17 before and after those out-of-model adjustments.⁴⁴ Mr. Chernick states that if those out-
18 of-model adjustments were excluded, the CAGR of the demand forecast would fall from
19 2.7% to 0.9%.⁴⁵ As a result, Mr. Chernick concludes that if the Company did not have a

⁴⁴ Direct Testimony of Paul Chernick on behalf of Conservation Law Foundation, at 8.

⁴⁵ *Ibid.*, at 9. Mr. Chernick notes, "Without these new heating customers, Liberty's forecast would fall from 2.7% annually to 0.9%." Please note Mr. Chernick's calculation assumes a decrease in customer growth in all customer segments, not just the residential heating and C&I heating segments.

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1 Sales and Marketing program promoting customers to switch to natural gas, the “need for
2 additional resources would be dramatically reduced.”⁴⁶ Further, Mr. Chernick believes
3 EnergyNorth has not shown that adding customers is in the public interest.⁴⁷

4 **Q. Does the Company agree with Mr. Chernick’s conclusions?**

5 A. No, the Company wholeheartedly disagrees with Mr. Chernick’s conclusion. As discussed
6 in detail below, the Commission has supported the Company’s various growth initiatives
7 as plainly serving the public interest.

8 **Q. Has the Company received approval from the Commission for its growth initiatives?**

9 A. Yes, it has. As discussed in Attachment Staff 1-7.1 in the response to Staff Tech 1-7
10 (provided as Attachment DF-3):

11 [T]he Company has proposed and received approval from the
12 Commission for innovative expansion plans, such as revisions to the
13 contribution-in-aid-of-construction policy (e.g., including the
14 assumption that 60% of customers located along a main extension will
15 take service) and the Managed Expansion Program (“MEP”) approved
16 by the Commission in August 2016. The MEP not only provides a
17 mechanism to unitize expansion costs and collect those expenses over
18 time, but also provides the Company an opportunity to install service
19 lines for any end use application during the construction of a main, thus
20 positioning the Company to add load from an existing customer. Stated
21 differently, the Company, under MEP, can provide a service line to a
22 customer for an end use application, such as water heating, and thus
23 natural gas is a fuel choice for that customer when their existing heating
24 equipment fails or needs to be replaced. In addition, the Company (1)
25 eliminated the \$900 flat fee for a new residential customer, (2) allowed
26 for no-cost service connections of heating customers within 100 feet of
27 an existing natural gas main, (3) allowed for no-cost service connections
28 of non-heating customers within 100 feet if they commit to taking

⁴⁶ *Ibid.*

⁴⁷ *Ibid.*

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1 service prior to a main extension or replacement, and (4) lowered the
2 level of revenue justification required for main and service extensions.

3 In granting approval for these growth initiatives, the Commission noted, “Liberty proposes
4 a program, rates and tariffs that are designed to promote economic expansion of gas service
5 in Liberty’s service territory.”⁴⁸ The Commission supported the expansion of natural gas
6 service: “We support Liberty’s efforts to economically expand natural gas service to more
7 customers.”⁴⁹

8 Further, in the Commission’s order in Docket No. DG 15-362, approving a settlement
9 agreement granting EnergyNorth the franchise rights to Windham and Pelham, the
10 Commission noted that, “Exercise of franchise rights by Liberty in Pelham and Windham
11 must be for the public good, and the conditions pertaining thereto must be considered to be
12 in the public interest.”⁵⁰ The Commission concluded: “[W]e find the Settlement
13 Agreement in the public interest, and the expansion of Liberty’s franchise into Pelham and
14 Windham as for the public good.”⁵¹

15 **Q. Do customers benefit from the Company’s ability to expand its offering of natural gas**
16 **service?**

17 **A.** Yes, they do. EnergyNorth continues to focus on providing energy choice to businesses
18 and residents of New Hampshire. As noted above, the Company has invested in increasing

⁴⁸ State of New Hampshire Public Utilities Commission, Managed Expansion Program Rules, Order Approving Rates and Tariffs, Docket No. DG 16-447, Order No. 25,933, August 4, 2016, at 6.

⁴⁹ *Ibid.*, at 7.

⁵⁰ State of New Hampshire Public Utilities Commission, Petition for Franchise Approval in Pelham and Windham, Order Settlement Agreement and Franchise Petition, Docket No. DG 15-362, Order No. 25,987, February 8, 2017, at 11.

⁵¹ *Ibid.*, at 12.

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1 its local Sales and Marketing efforts, as well as expanding its service territory, to provide
2 natural gas as an energy choice to the business community and homeowners. The
3 Company provides customers with the opportunity to choose natural gas service, but
4 potential customers are not required to take service from the Company. Customers
5 consider their unique circumstances and requirements and make decisions based on their
6 individual needs and associated budgets.

7 Furthermore, existing customers benefit from the expansion of gas service. Increasing gas
8 sales, and consequently gas revenue, lowers rates for all customers by spreading the
9 embedded fixed costs of providing service over more customers and more volumes.

10 **Q. Have any potential customers in unserved areas expressed interest in natural gas**
11 **service?**

12 A. Yes, they have. Energy choice was raised as an important factor in the Company seeking
13 to serve the Town of Pelham:

14 The Town's Planning Director, Mr. Jeff Gowan, testified that Pelham is
15 a growing community with approximately 13,000 residents, with around
16 100 homes being built per year. Tr. at 58. Mr. Gowan noted frustration
17 among Pelham's residents and municipal leadership that there is no
18 natural gas service available even though the TGP Concord Lateral
19 passes through Pelham. Tr. at 58-59. Mr. Gowan also expressed the
20 importance of broader energy availability to Pelham's economic
21 development plans. He testified that the Pelham Board of Selectmen
22 voted unanimously to support the Settlement Agreement. Tr. at 59.⁵²

⁵² *Ibid.*, at 8.

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Representatives from the Town of Windham made similar statements in a letter to the Commission regarding the importance of energy choice:

On behalf of the Windham Board of Selectmen, I send this letter to express to you the Board's support of Liberty Utilities' petition to the Commission for expansion of their current franchise to include the Town of Windham. The Board, as part of their regular meeting on October 5, voted unanimously to endorse Liberty's request after hearing at length from their representatives, as well as residents who were in attendance. As you may know, the towns of Windham and Pelham are the only two (2) communities in this portion of the State whose residents and businesses cannot avail themselves of the option to utilize natural gas; an overall less costly and cleaner energy solution.⁵³

The Greater Derry Londonderry Chamber of Commerce also supported EnergyNorth's petition for franchise rights in Windham and Pelham, noting that the lack of access to natural gas "has proved a detriment to economic development" and providing natural gas service would "help to lower residential heating bills."⁵⁴ The Greater Derry Londonderry Chamber of Commerce also stated that large employers have located their businesses outside of Windham and Pelham "in part because of the lack of natural gas infrastructure," and ultimately concluded that, "In short, approving Liberty Utilities' petition to expand natural gas infrastructure to Windham, Pelham, and parts of Londonderry will be a win for business and residential consumers alike."⁵⁵

⁵³ Letter from Town of Windham Board of Selectmen to the State of New Hampshire Public Utilities Commission, Docket No. DG 15-362, October 9, 2015.

⁵⁴ Letter from the Greater Derry Londonderry Chamber of Commerce to the State of New Hampshire Public Utilities Commission, Docket No. DG 15-362, December 10, 2015.

⁵⁵ *Ibid.*

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1 Further, although the Commission did not grant the Company franchise rights to the Town
2 of Epping, it is important to note that the Town of Epping issued a Request for Proposals
3 from EnergyNorth and Northern to serve the businesses and residents in the town.⁵⁶ That
4 is, the Town of Epping expressed its interest to the Company for access to natural gas
5 service.

6 **Q. What are your conclusions related to the Company's growth initiatives?**

7 A. Mr. Chernick's conclusion that the "need for additional resources would be dramatically
8 reduced" if the Company did not have a Sales and Marketing program is irrelevant, as that
9 conclusion is true for any gas utility, should the choice to select natural gas be banned. The
10 approach advocated by Mr. Chernick is simply a moratorium on individual customer
11 choice, would maintain unnecessarily higher rates for gas service, and is simply bad public
12 policy.

13 The Company's growth initiatives, which have been Commission-approved as serving the
14 public interest, provide businesses and homeowners in New Hampshire the opportunity to
15 take natural gas service and affords them the benefit of additional fuel choice. Given the
16 wide range of support for increasing access to natural gas service from the Commission,
17 towns, and Chambers of Commerce, the Company disagrees with Mr. Chernick that the
18 EnergyNorth's growth initiatives are not in the public interest.

⁵⁶ Town of Epping, Request for Proposals, Natural Gas Distribution Services in Epping, NH, July 17, 2018.

B. Application of Energy Efficiency

Q. Please describe Mr. Chernick's concern with the application of energy efficiency in the demand forecast.

A. Mr. Chernick reviews Table 24 of the Initial Filing, which shows the annual energy efficiency savings, and suggests that these values reflect minimal incremental energy efficiency savings. Mr. Chernick comes to this conclusion by reviewing what he calculates as incremental savings relative to EnergyNorth's historical energy efficiency savings. Mr. Chernick believes that the application of energy efficiency in the demand forecast is incorrect and the savings in each year should be calculated cumulatively.⁵⁷

Q. Please provide a brief summary of the application of energy efficiency into the Updated Demand Forecast.

A. As described on pages 23 through 24 of the Initial Filing, the Company incorporated its annual energy efficiency goals approved by the Commission in the 2018-2020 Statewide Energy Efficiency Plan ("EE Plan") to estimate future savings.⁵⁸ Energy efficiency savings goals were developed through calendar year 2020, consistent with the planning period of the EE Plan. To estimate the energy efficiency savings for the final two years of the Updated Demand Forecast (i.e., after 2020), the Company applied the percentage of energy efficiency savings relative to total demand in 2020 to the total demand in the final two forecast years. The energy efficiency savings in the Updated Demand Forecast are

⁵⁷ Direct Testimony of Paul Chernick on behalf of Conservation Law Foundation, at 24-26.

⁵⁸ As shown in Appendix 2 of the Initial Filing, the energy efficiency savings in the Updated Demand Forecast are consistent with the Company's energy efficiency goals for the period 2018-2020, as approved by the Commission. *See*, 2018-2020 New Hampshire Statewide Energy Efficiency Plan, Docket No. DE 17-136, September 1, 2017, Revised January 12, 2018.

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provided in Table 5, below. As shown, energy efficiency savings are expected to increase by approximately 22,000 Dth over the Forecast Period, or at a CAGR of 4.8%.

Table 5: Energy Efficiency Savings (Dth)⁵⁹

Split-Year	Savings
2017/2018	106,785
2018/2019	113,258
2019/2020	121,480
2020/2021	125,408
2021/2022	128,686
CAGR	4.8%

The Updated Demand Forecast was adjusted downward in each year to reflect the energy efficiency savings in Table 5.

Q. Is the application of energy efficiency in the Updated Demand Forecast similar to the Company's past practice?

A. Yes, it is. The Company used a similar approach to apply energy efficiency savings to the demand forecast presented and approved by the Commission in the NED proceeding, Docket No. DG 14-380.

Q. Are there multiple approaches that are used to apply energy efficiency savings to a demand forecast?

A. Yes, there are. Energy efficiency savings in demand forecasts can be applied using different methodologies, including the approaches taken by Mr. Chernick and the

⁵⁹ Represents energy efficiency savings for sales and capacity-assigned transportation customers.

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1 Company. One approach may be favored by a jurisdiction over another, which may guide
2 a company in the application of energy efficiency in its demand forecast. In this
3 proceeding, the Company has used a reasonable approach in its Updated Demand Forecast,
4 which is consistent with the approach relied on by (i) the Company in the NED proceeding,
5 and (ii) LDCs in other jurisdictions (discussed in more detail below).

6 The underlying assumption of the Company's application of energy efficiency savings is
7 that because the Updated Demand Forecast is developed using econometric models, which
8 are based on historical data, a trend in energy efficiency savings over the historical
9 analytical period is already reflected in the forecast. As Mr. Chernick shows in his Table
10 4, and as provided in Table 2-2 of the Initial Filing, the Company was engaged in energy
11 efficiency programs before and during the Company's analytical period.⁶⁰ These energy
12 efficiency programs resulted in relatively consistent savings during the analytical period.
13 As such, the historical data likely reflects a trend in energy efficiency savings. A
14 cumulative calculation, as Mr. Chernick suggests, may result in energy efficiency savings
15 being double counted, i.e., reflected in the econometric model forecasts and in an out-of-
16 model adjustment.

17 **Q. How do historical energy efficiency savings compare to those used in the Updated**
18 **Demand Forecast?**

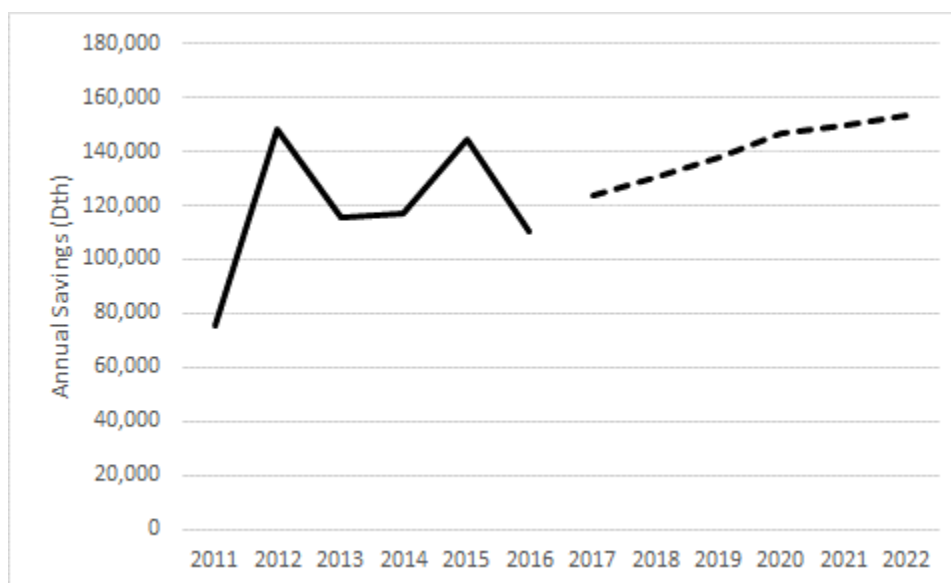
19 **A.** As shown in Chart 2, the forecasted energy efficiency savings are generally greater than
20 historical levels. Because forecast energy efficiency savings from the EE Plan are greater

⁶⁰ The analytical period used to develop the econometric models was from August 2010 through April 2017.

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than historical savings, an adjustment to reflect additional energy efficiency savings is appropriate.

Chart 2: Energy Efficiency Savings Over Time (Dth)⁶¹



The relationship between the Company's historical actual energy efficiency savings and the forecast is further illustrated in Table 6, below.

Table 6: Average Annual Energy Efficiency Savings (Dth)⁶²

2011-2016 (Actual)	2017-2022 (Forecast)
118,494	140,349

⁶¹ Represents total energy efficiency savings (i.e., including sales, capacity-assigned transportation, and capacity-exempt customers).

⁶² Represents total energy efficiency savings (i.e., including sales, capacity-assigned transportation, and capacity-exempt customers).

Q. Did you prepare any additional analyses as a reasonableness check on the application of energy efficiency savings in the Updated Demand Forecast?

A. Yes, we did. As another approach to assess if the Updated Demand Forecast captures the trend in energy efficiency savings present in the historical data, the Company performed a regression analysis wherein the dependent variable was the monthly historical energy efficiency savings⁶³ and a time trend variable and dummy variables for each month were the independent variables. The historical data included the period from August 2010 through April 2017, consistent with the analytical period on which the econometric models were based. The Company then compared the energy efficiency savings predicted by the regression analysis to the energy efficiency forecast used in the Updated Demand Forecast.⁶⁴ Those results are shown in Table 7, below.

Table 7: Energy Efficiency Forecast vs. Trend (Dth)

Split-Year	Savings in Updated Demand Forecast	Regression Predicted Savings	Difference
2017/18	106,785	112,224	-5,439
2018/19	113,258	116,199	-2,941
2019/20	121,480	120,173	1,308
2020/21	125,408	124,147	1,261
2021/22	128,686	128,121	565

⁶³ The monthly historical energy efficiency values were derived from the annual savings provided in Table 2-2 of the Initial Filing. The allocation of the annual energy efficiency savings to a monthly basis were performed in the same manner as described on page 24 of the Initial Filing.

⁶⁴ The Company did not rely on this analysis to develop its energy efficiency forecast or its application in the demand forecast. Rather, the analysis is presented here to check the reasonableness of the Company's energy efficiency assumptions.

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1 **Q. How should the results in Table 7 be interpreted?**

2 A. If the energy efficiency savings predicted by the regression analyses were equal to the
3 savings forecast in the Updated Demand Forecast, then the difference would be zero and
4 there would be no need to adjust the Updated Demand Forecast. That is, all forecast energy
5 efficiency savings are accounted for in the trend present in the historical data. A negative
6 difference in Table 7 suggests that the trend in the historical data is greater than the amount
7 of savings based on the Company's energy efficiency goals. As such, an adjustment to the
8 forecast is not needed because the trend in energy efficiency savings is greater than the
9 energy efficiency savings forecast. A positive difference suggests that the historical trend
10 does not fully account for expected increases in energy efficiency savings, and an upward
11 adjustment to account for that difference may be warranted.

12 **Q. What are your conclusions based on the regression analysis?**

13 A. The results in Table 7 support the Company's conclusions that (1) the historical data
14 includes a trend in energy efficiency savings, and (2) the expected energy efficiency
15 savings in the Updated Demand Forecast, which are based on the goals established in the
16 EE Plan, are greater than what would be expected by the historical trend in 2019/20 through
17 2021/22. As shown in Table 8, the difference between the regression analysis and the
18 Company's energy efficiency forecast is less than the incremental savings in the Updated
19 Demand Forecast. As such, the treatment of energy efficiency in the Updated Demand
20 Forecast includes additional energy efficiency savings above what would be implied based
21 on the historical trend and is a reasonable assessment of the effect of energy efficiency on
22 the Company's sendout requirements.

Table 8: Incremental Energy Efficiency Savings (Dth)

Split-Year	Difference from Table 7	Year-Over-Year Savings in Updated Demand Forecast
2017/18	-5,439	5,379
2018/19	-2,941	6,473
2019/20	1,308	8,222
2020/21	1,261	3,927
2021/22	565	3,278

Q. Are there any other reasons that the energy efficiency savings in the Updated Demand Forecast are conservative?

A. Yes. As noted above, the predicted savings based on the historical trend in energy efficiency are similar to the energy efficiency savings in the Updated Demand Forecast. In the first year of the Updated Demand Forecast, the energy efficiency savings do not only reflect an adjustment above the historical trend, but include the entire year's worth of energy efficiency savings. That is, rather than include only the year-over-year savings presented in Table 8 (i.e., 5,379 Dth), savings of 106,785 Dth were assumed in the forecast. As such, the Company took a conservative approach in including additional energy efficiency savings, even though the historical data may suggest that savings are already accounted for in the econometric results.

Q. Do other utilities rely on a similar methodology to account for energy efficiency in the forecast?

A. Yes. The Company's methodology approaches energy efficiency in a manner similar to that of several companies in New York and Rhode Island that the Company reviewed.

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1 LDCs in New York and Rhode Island recognize that the historical data used in their
2 modeling includes a trend that captures savings from company-sponsored energy
3 efficiency programs. For example, in its 2018-19 Winter Supply Review, National Grid
4 developed econometric models for customers and use per customer to forecast demand,
5 similar to the approach developed by EnergyNorth.⁶⁵ In its discussion of the treatment of
6 energy efficiency, National Grid noted, “The forecast includes this trend in continuing load
7 reduction based on the historical successes in energy efficiency reductions in load. No
8 further adjustments were made to the forecast.”⁶⁶ Similarly, New York State Electric &
9 Gas (“NYSEG”) and Rochester Gas and Electric (“RG&E”) noted in their 2018-19 Winter
10 Supply Plan, “The impacts of existing gas efficiency programs are assumed to be implicitly
11 contained in the history used to generate the forecasts so out of model adjustments are only
12 made for projected future incremental EE impacts.”⁶⁷ Because the historical annual
13 savings exceeded the projected energy efficiency program savings, NYSEG and RG&E
14 did not make an adjustment to the demand forecast.

15 The Narragansett Electric Company (“Narragansett”), in Rhode Island, also considers
16 historical energy efficiency to determine if an adjustment is necessary to its demand
17 forecast. In its most recent Gas Long-Range Resource and Requirements Plan,
18 Narragansett noted:

⁶⁵ National Grid, 2018-19 Winter Supply Review, New York Department of Public Service, Case 18-M-0272, July 16, 2018, at 5-6.

⁶⁶ *Ibid.*, at 6.

⁶⁷ New York State Electric & Gas and Rochester Gas and Electric, 2018-2019 Winter Supply Plan, New York Department of Public Service, Case 18-M-0272, July 16, 2018 at 32.

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1 Because the Company's econometric forecast is based on historical
2 data, which does not fully incorporate the increasing penetration of the
3 Company's energy efficiency programs in the Residential and
4 Commercial and Industrial sectors, the Company reviewed its historical
5 energy efficiency efforts to see if its retail demand forecast required any
6 adjustment to reflect the increases in energy efficiency efforts. Analysis
7 of the Company's historical energy efficiency programs shows that
8 historical data should have embedded within annual savings of 226,572
9 MMBtu for Residential customers and 234,479 MMBtu for Commercial
10 and Industrial customers. These figures are based on the three-year
11 average of 2016 through 2018 actual energy efficiency savings. The
12 Company uses a three-year average in lieu of the most recent year to
13 smooth out the year-to-year fluctuations that may occur. The
14 Company's analysis indicated no further adjustment was required to its
15 forecast this year.⁶⁸ [Emphasis added]

16 **Q. What are your conclusions as they relate to the application of energy efficiency in the**
17 **Updated Demand Forecast?**

18 A. Contrary to Mr. Chernick's concern, the energy efficiency savings were applied
19 appropriately to the Updated Demand Forecast. The "minimal amounts of energy-
20 efficiency load reductions"⁶⁹ Mr. Chernick references, which are consistent with the year-
21 over-year energy efficiency savings noted in Table 8 above, actually imply increasing
22 levels of energy efficiency savings above what the trend in the historical data would
23 suggest. As such, the Updated Demand Forecast incorporates the Company's increasing
24 energy efficiency goals, is a reasonable approach, and has been approved by the
25 Commission. Lastly, the approach used by the Company is similar to that of certain LDCs
26 in New York and Rhode Island.

⁶⁸ The Narragansett Electric Company, Gas Long-Range Resource and Requirements Plan for the Forecast Period 2019/20 to 2023/24, Pursuant to the Joint Memorandum in RIPUC Docket No. 4816, July 2, 2019, at 8.

⁶⁹ Direct Testimony of Paul Chernick on behalf of Conservation Law Foundation, at 24.

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1 **C. Level of Energy Efficiency Savings in Demand Forecast**

2 **Q. Does Mr. Chernick believe the Company has reflected an appropriate level of energy**
3 **efficiency savings in the demand forecast?**

4 A. No, he does not. Mr. Chernick points to the Massachusetts Joint Statewide Electric and
5 Gas Three-Year Energy Efficiency Plan 2019-2021 and the most recent ACEEE scorecard
6 to suggest that EnergyNorth's energy efficiency savings are out of line with other LDCs.
7 Mr. Chernick also states that the Company should consider additional "cost-effective"
8 energy efficiency and demand-side programs beyond those developed as part of the 2018-
9 2020 New Hampshire Statewide Energy Efficiency Plan.⁷⁰

10 **Q. Please provide background regarding the process to develop the Company's energy**
11 **efficiency goals.**

12 A. On August 2, 2016, the Commission issued an order approving a unanimous settlement
13 agreement by and among stakeholders, including CLF, which established the Energy
14 Efficiency Resource Standard ("EERS"), a framework for implementing the energy
15 efficiency programs consisting of three-year planning periods and savings goals.⁷¹
16 Subsequently, the New Hampshire utilities noted:

17 Since the August 2, 2016 Commission Order, the NH Utilities have
18 elicited and received significant stakeholder feedback to inform the
19 preparation of the 3-Year Plan. The main bodies for stakeholder
20 discussion and input are NH's Energy Efficiency and Sustainable
21 Energy (EESE) Board and a committee of the Board, the EERS
22 Committee. In early 2017, the NH Utilities and the EESE Board, with
23 the advice and assistance of the stakeholder consultant, jointly hosted a

⁷⁰ *Ibid.*, at 27.

⁷¹ State of New Hampshire Public Utilities Commission, Energy Efficiency Resource Standard, Order Approving Settlement Agreement, Order No. 25,932, August 2, 2016.

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1 series of stakeholder workshops designed to allow deeper discussion
2 and input on the key topic areas for the 3-Year Plan. The workshops
3 were well attended and generated a great deal of information and
4 discussion to inform the planning process.⁷²

5 On January 2, 2018, the Commission issued an order approving another unanimous
6 settlement agreement by and among all stakeholders, including CLF, for the three-year
7 energy efficiency plan for the 2018 through 2020 period.⁷³ This settlement included the
8 following:

9 The plan calls for the establishment of stakeholder working groups to
10 further analyze key issues including: evaluation, measurement and
11 verification of the approved energy efficiency programs; alternate
12 sources of funding and financing of programs; the benefit/cost test used
13 to screen energy efficiency programs; potential changes to the
14 calculation of performance incentives; and the calculation of demand
15 savings in connection with lost base revenues.⁷⁴

16 As described in the Commission's order, the programs are screened using a detailed
17 benefit/cost analysis, and the programs implemented by the utilities in New Hampshire are
18 subject to evaluation, measurement, and verification.⁷⁵

19 **Q. Why did the Company rely on the savings goals from the 2018-2020 New Hampshire**
20 **Statewide Energy Efficiency Plan in the Updated Demand Forecast?**

21 **A.** As discussed above, the Company relied on a rigorous and collaborative process involving
22 numerous stakeholders, which was reviewed and approved by the Commission, to develop

⁷² 2018-2020 New Hampshire Statewide Energy Efficiency Plan, Docket No. DE 17-136, September 1, 2017, Revised January 12, 2018, at 16. [Footnotes omitted]

⁷³ State of New Hampshire Public Utilities Commission, 2018-2020 New Hampshire Statewide Energy Efficiency Plan, Order Approving Settlement Agreement, Order No. 26,095, Docket No. DE 17-136, January 2, 2018.

⁷⁴ *Ibid.*, at 1.

⁷⁵ *Ibid.*, at 10-11.

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1 its energy efficiency goals for the 2018 to 2020 period. The Commission's order stated
2 that, "The parties acknowledge that the Three-Year Plan includes a comprehensive, cost-
3 effective portfolio of [energy efficiency] programs... Based on the record, the Three-Year
4 Plan meets the requirements of the 2016 EERS Order and is consistent with applicable law,
5 including the least cost integrated planning requirements promoting energy efficiency."⁷⁶
6 As such, the goals developed through that process represent a reasonable forecast of cost-
7 effective energy efficiency over the Forecast Period.

8 **Q. What is your response to Mr. Chernick's assertion that the energy efficiency savings**
9 **in the Updated Demand Forecast are inconsistent with other states?**

10 A. Although Mr. Chernick reviews the energy efficiency savings for a select number of states,
11 he does not consider the range of energy efficiency savings targets for other LDCs in New
12 England. As noted on page 6 of Mr. Stanley's direct testimony, the sales reductions targets
13 for the Company are within the range of New England LDCs. In addition, Mr. Chernick
14 points to the current Massachusetts energy efficiency savings goal of 1.25% for the period
15 2019 through 2021.⁷⁷ The individual savings goals for the LDCs in Massachusetts are
16 provided in Table 9, below.

⁷⁶ *Ibid.*, at 18.

⁷⁷ Direct Testimony of Paul Chernick on behalf of Conservation Law Foundation, at 27.

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Table 9: Massachusetts Savings Goals by LDC (as a Percentage of Sales)⁷⁸

Company	Total (2019-2021)
NSTAR Gas Company	1.34%
National Grid	1.28%
Columbia Gas of Massachusetts	1.28%
Fitchburg Gas & Electric d/b/a Unitil	0.78%
Berkshire Gas Company	0.65%
Liberty Utilities (New England Natural Gas Company)	0.58%
Aggregate Statewide	1.25%

The energy efficiency savings in the Updated Demand Forecast, which increase from 0.75% of total sales in 2018 to 0.82% in 2020, are within the range of savings goals for LDCs in Massachusetts.

VI. CONCLUSION

Q. Please summarize the results of the Updated Demand Forecast.

A. The Updated Demand Forecast is provided in Table 10, below.

Table 10: Updated Demand Forecast Results (Dth)

Split-Year	Normal Year	Design Year	Design Day
2017/2018	14,640,845	15,833,870	157,848
2018/2019	15,235,354	16,449,392	164,571
2019/2020	15,648,467	16,923,283	167,643
2020/2021	16,150,273	17,414,989	168,942
2021/2022	16,565,963	17,862,082	174,618
CAGR	3.1%	3.1%	2.6%
CAGR – excluding iNATGAS	2.3%	2.3%	1.9%

⁷⁸ Massachusetts Department of Public Utilities Order, Docket Nos. D.P.U. 18-110 through 18-119, January 29, 2019, at 13.

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1 **Q. Please summarize your conclusions with respect to the Company's Updated Demand**
2 **Forecast.**

3 A. The Updated Demand Forecast remains reasonable and appropriate without further
4 adjustment. The Updated Demand Forecast to date has been in line with, although
5 somewhat below, normalized actual demand. The somewhat higher normalized actual
6 demand relative to the Updated Demand Forecast is driven by increased volumes from new
7 customers and reverse migration. Furthermore, additional load from existing customers
8 and the potential for additional reverse migration support higher demand over the
9 remainder of the Forecast Period.

10 Mr. Chernick's assertion that the Company's growth initiatives are not in the public interest
11 is inconsistent with the wide range of support from the Commission, towns, and Chambers
12 of Commerce. Mr. Chernick's assertion that energy efficiency savings were incorrectly
13 applied to the forecast does not consider the trend in energy efficiency within the historical
14 data. Mr. Chernick's approach of applying energy efficiency on a cumulative basis could
15 result in a double counting of energy efficiency in the Updated Demand Forecast. Lastly,
16 the energy efficiency goals in the EE Plan were developed through a rigorous and
17 collaborative process, are consistent with the range of goals of other LDCs, and represent
18 a reasonable expectation of energy efficiency savings over the Forecast Period.

19 **Q. Does this conclude your Rebuttal Testimony?**

20 A. Yes, it does.

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APPENDIX A

Table A-1: Calendar Year Energy Efficiency

Year	Residential		C&I		Total	
	Energy Efficiency / Demand	Energy Efficiency (Dth)	Energy Efficiency / Demand	Energy Efficiency (Dth)	Energy Efficiency / Demand	Energy Efficiency (Dth)
2017	0.58%	34,584	0.83%	88,970	0.74%	123,554
2018	0.63%	39,079	0.81%	90,993	0.75%	130,072
2019	0.63%	39,586	0.87%	98,494	0.78%	138,080
2020	0.67%	42,664	0.90%	104,266	0.82%	146,929
2021	0.67%	43,493	0.90%	106,513	0.82%	150,009
2022	0.67%	44,395	0.90%	109,058	0.82%	153,453

Table A-2: Demand Forecast Results (Dth)¹

Split-Year	Econometric Forecast Including Out-of-Model Adjustments	Energy Efficiency	Demand Net of Energy Efficiency
2017/18	14,582,686	106,785	14,475,900
2018/19	14,872,185	113,258	14,758,927
2019/20	15,228,065	121,480	15,106,585
2020/21	15,587,463	125,408	15,462,056
2021/22	15,985,398	128,686	15,856,712
CAGR	2.3%	4.8%	2.3%

¹ Results are prior to unaccounted for gas and unbilled sales, and the out-of-model adjustment for iNATGAS. Differences due to rounding.

Summary

Mr. Stephens has 30 years of experience in the energy industry and has held senior management positions at economic consulting firms, a retail energy marketer, and local distribution companies prior to joining ScottMadden. Mr. Stephens has assisted numerous clients in the United States and Canada with natural gas supply analysis, portfolio assessment and optimization, demand forecasting and risk management, energy infrastructure evaluation, and regulatory strategy development and implementation. He has also provided expert testimony in numerous proceedings at various jurisdictions, including federal, state, and provincial regulatory agencies.

In addition, Mr. Stephens has commercial experience through his leadership positions at a retail energy marketing company, where he was responsible for all aspects of business unit management, including front, mid and back-office functions. He was also responsible for gas supply procurement and portfolio optimization for a local distribution company. Mr. Stephens holds a Bachelor of Science degree in management and a Masters in Business Administration with a concentration in operations management from Bentley College.

REPRESENTATIVE PROJECT EXPERIENCE

Energy Market Assessment

Retained by numerous companies to develop regional energy market assessments which included: market impacts associated with new energy infrastructure, assessment of the implications associated with natural gas infrastructure, market structure and regulatory situational analysis, and assessment of competitive position. Market assessment engagements typically have been used as required elements of business unit or asset-specific strategic plans or valuation analyses. In addition, certain market assessments have been submitted to various federal, state, and provincial regulatory agencies.

Representative engagements have included:

- Submitted expert testimony on behalf of Eversource to the Massachusetts Department of Public Utilities and the New Hampshire Public Utility Commission regarding pipeline capacity and LNG service precedent agreements on the Access Northeast project.
- Submitted an expert report on behalf of Union Gas and Enbridge Gas Distribution to the Ontario Energy Board with respect to pipeline precedent agreements on the NEXUS Pipeline project.
- For two Canadian LDCs, developed a review of certain mid-Atlantic natural gas supply basins.
- For the State of Maine Public Utility Commission, prepared a report that summarized the Northeast and Atlantic Canada natural gas and power markets; and analyzed the potential benefits and costs associated with natural gas pipeline expansions. The independent report was filed at the Maine Public Utility Commission.
- On behalf of Spectra Corporation, developed a market assessment evaluating the impact of new pipeline infrastructure into the New York City, New Jersey and New England markets. The independent reports were filed at the Federal Energy Regulatory Commission and/or presented to state public utility commissions.
- For a Canadian utility developed a detailed review of the U.S. Northeast energy market and presented findings to their senior management.
- For an international energy company, prepared an assessment of the market potential for distributed LNG, with a particular focus on the commercial and industrial sectors.
- For a project developer, prepared a natural gas demand analysis of the Southeast U.S. The independent report, which was filed at the Federal Energy Regulatory Commission, addressed the demand for natural gas in both the electric generation and traditional LDC markets.
- For an international energy company, prepared an analysis regarding LNG peaking facilities.
- Conducted due diligence for commercial banks regarding investments in natural gas pipelines, natural gas storage projects, and LNG facilities.

- For a project developer, assisted with the evaluation of the market opportunity for an LNG importation terminal in the northeastern United States.
- For numerous clients, provided regional natural gas demand assessments to assist with the evaluation of energy infrastructure.
- For a natural gas producer, reviewed energy contracting practices and pricing mechanisms to support a contract arbitration process.

Business Strategy and Operations

Retained by numerous North American energy companies to support the development of strategic plans and planning processes for both regulated and non-regulated entities. Specific services provided include: developing market entry strategies for the retail and wholesale energy sectors; review of management practices and procedures; and business process redesign initiatives.

Representative engagements have included:

- For Columbia Gas of Massachusetts, developed expert testimony analyzing a contract for natural gas pipeline capacity. The testimony was submitted to the Massachusetts Department of Public Utilities.
- For Union Gas, developed expert testimony regarding the gas supply planning process and associated activities. The testimony was submitted to the Ontario Energy Board.
- For Gaz Métro, developed expert testimony regarding the utilization of natural gas storage. The testimony was submitted to the Régie de l'énergie.
- For an LDC, reviewed its current retail choice program, certain proposed changes, and the potential impacts on the gas supply portfolio.
- For an LDC, reviewed the cost and benefits of expanding into new service territories.
- Reviewed natural gas supply alternatives (i.e., supply basin cost, transport basis and regulatory issues) for an integrated energy company.
- Developed regional market assessments and associated market entry strategies for a wholesale energy marketing company.
- Reviewed certain risk management practices and procedures for a wholesale energy marketing company.
- For a retail energy marketer, conducted due diligence including a review of risk management policies and procedures.
- Prepared a competitive position analysis (i.e., SWOT analysis) for an interstate gas pipeline.
- On behalf of a wholesale energy marketing company, reviewed federal and state requirements associated with entering certain natural gas markets.
- For an LDC, assessed the economic viability of gas distribution utility service expansion.
- Developed new service offerings, including firm transportation and stand-by service, for a mid-Atlantic utility.
- Managed the re-engineering of a large Midwest LDC's gas supply procurement process.
- Managed the re-engineering of a mid-Atlantic wholesale energy marketing company's gas operations including certain risk management areas.
- On behalf of an interstate pipeline, conducted a customer outreach/survey program.

Regulatory Analysis and Support

On behalf of energy market participants, supported the development of regulatory and ratemaking strategies, energy supply obligations, stranded cost assessment and recovery, rate design, and management procedures and decisions. Specific projects include: design and implementation of pipeline capacity open season processes; review utility contracting approaches with respect to gas supplies; assess compliance requirements of the FERC standard of conduct regarding affiliate transactions; analysis of provider of last resort obligations in both electric and gas markets; review the process to procure and hedge default service supplies; and develop new service offerings.

Representative engagements have included:

- Retained by EPCOR Energy Alberta to review procurement and pricing of energy for their supplier of last resort obligation, including identifying and quantifying economic risks of providing the service. Expert report and testimony were submitted to the Alberta Utilities Commission.
- Retained by a utility for regulatory support with respect to energy storage and electric vehicle infrastructure.
- On behalf of an LDC, developed an integrated resource plan including demand forecasting and gas supply portfolios analysis. The final work product was submitted to the state utility commission.
- Retained by the Alaska Gasline Development Corporation to assist with a market review and assessment; open season process development, implementation, and third party contracting; and associated activities (e.g., tariff and service development).
- Retained by various LDCs and electricity utilities to evaluate interstate pipeline capacity and storage open seasons including an analysis of the quantitative and qualitative aspects of the various projects.
- Retained by an LDC to develop regulatory strategy associated with the funding of distribution expansion.
- Retained by a Midwest U.S. interstate gas pipeline to assist with an open season including drafting of tariffs and precedent agreements.
- Retained by a Northeast energy company to review the FERC reporting requirements and standards of conduct for an interstate pipeline business unit.
- Provided regulatory and litigation support to a natural gas pipeline regarding rate impacts of new infrastructure development.
- Provided litigation support to a mid-west utility regarding proposed gas purchase disallowances for storage utilization, hedging activity, and pipeline capacity decisions.
- On behalf of a Midwest utility, developed and implemented a third party transportation program.
- Developed a demand forecast to support the AES Sparrows Point LNG FERC application.
- Provided support to a Canadian LNG supplier regarding their NEB export license application.

Energy Procurement

Directed and participated in the review of various energy procurement projects including demand modeling, portfolio review/optimization, risk management, procurement strategies and associated cost structures.

Representative experience has included:

- Retained by a utility to review the financial concepts of risk and risk aversion with respect to the provision of regulated energy service and the associated compensation for the service obligation.
- Retained by New Brunswick Power to document and assess fuel procurement and associated processes. Expert report was submitted to New Brunswick Energy and Utilities Board.
- For a municipal utility, evaluated its current gas supply portfolio and associated purchasing strategies.
- For a municipal utility, evaluated the benefits and costs associated with quick-start generation.
- Retained by a utility to review the value achieved under an asset management agreement, including the use of storage.
- Provided a market participant with a review of natural gas supply and storage options, associated prices, and risk mitigation opportunities.
- On behalf of a natural gas distribution company, evaluated the benefit associated with asset management opportunities.
- On behalf of a regional combination utility, reviewed the appropriate jurisdiction for a natural gas pipeline asset.
- On behalf of a natural gas utility, conducted a detailed audit of the gas supply, marketing, risk management, and accounting functions.
- On behalf of several gas utilities, developed demand forecasts and supported those forecasts in regulatory proceedings.
- For a multi-state utility, reviewed the demand forecast planning process and procedures and recommended certain process changes.

- On behalf of a financial institution, reviewed the competitiveness of a storage project investment and quantified the impact of various new projects on the storage project financial performance.
- As President of a retail energy marketing firm directed all aspects of the business unit and was responsible for marketing, origination, operations, accounting, and billing. In addition, was responsible for the physical and financial commodity books; developed and implemented risk management strategy and objectives; implemented risk management policies and procedures; negotiated counterparty contracts; and reviewed and reported on financial performance to the Board of Directors.

Financial and Economic Advisory Services

Involved in the sale or evaluation of several regulated and non-regulated energy companies including wholesale and retail energy marketing companies, on-line energy brokers, and energy services' companies. Assisted clients with market strategy and the identification of partnership opportunities. Specific services provided include: business unit evaluation, development of marketing and sale materials, marketing of transaction, bid evaluation and negotiation support.

Representative engagements have included:

- For an energy broker, developed and executed an acquisition strategy.
- For Eversource, assisted with the sale of its retail services business unit.
- For an international integrated utility, supported its due diligence team with respect to an evaluation of a multi-state utility.
- For a private equity firm, evaluated natural gas procurement and energy sales in support of an investment in generation.
- For a utility, supported its due diligence with respect to a potential acquisition of a natural gas distribution company.
- For a municipal utility, evaluated and negotiated an asset management agreement.
- Assisted an LDC with gas supply due diligence regarding a potential asset acquisition.
- For a third-party investor, performed an independent review of a retail energy marketer including existing physical and financial books, risk management protocols and exposures, and growth strategy.
- Supported the sale of Niagara Mohawk Power Corporation's non-regulated energy marketing affiliate.
- Directed the sale of a non-regulated marketing affiliate.
- Performed an independent valuation of an on-line energy broker on behalf of an investor.

PROFESSIONAL HISTORY

ScottMadden, Inc. (2012 – Present)

Partner

Concentric Energy Advisors, Inc. (2002 – 2012)

Executive Advisor
 Senior Vice President
 Vice President

Navigant Consulting, Inc. (2000 – 2001)

Director, Energy Market Assessment Practice Area

Providence Energy Services (1997 – 2000)

President (1998 – 2000)
 President, Providence-Southern (1997 – 1998)

REED Consulting Group (1994 – 1997)

Assistant Vice President

Colonial Gas Company (1991 – 1994)

Director, Gas Supply Planning and Acquisition (1993 – 1994)
Manager, Gas Supply (1991 – 1993)

Boston Gas Company (1987 – 1991)

Senior Gas Supply Analyst (1990 – 1991)
Transportation and Exchange Analyst (1988 – 1990)
Business Analyst (1987 – 1988)

EDUCATION

Masters in Business Administration with a concentration in Operations Management,
Bentley College, 1991
Bachelor of Science in Management, Bentley College, 1987

DESIGNATIONS AND PROFESSIONAL AFFILIATIONS

Member of the American Gas Association
Member of the New England Gas Association
Member of the Society of Gas Lighting
Member of the New England-Canada Business Council
Member of the Northeast Energy and Commerce Association
Member of the Guild of Gas Managers

Recent Expert Witness Appearances of James M. Stephens

SPONSOR	DATE	JURISDICTION	DOCKET NO.	SUBJECT
Union Gas Limited	April, 2013	Ontario	Docket No. 2013-0109	Gas Supply Planning
Columbia Gas of Massachusetts	September, 2013	Massachusetts	Docket No. 13-158	Pre-Approval of a Long-Term Capacity Contract
Columbia Gas of Massachusetts	September, 2013	Massachusetts	Docket No. 13-161	Integrated Resource Plan
Gaz Métro	October, 2013	Québec	Cause tarifaire 2014, R-3837-2013	Storage Utilization
Maine Public Utility Commission	February, 2014	Maine	Docket No. 2014-00071	Pipeline Open Season
Gaz Métro	January, 2015	Québec	Cause tarifaire 2015, R-3879-2014	Storage Utilization
UIL Holdings Corporation d/b/a Total Peaking Services, LLC	September, 2015	Federal Energy Regulatory Commission	Docket No. CP15-557-000	Market Power Study
Union Gas Limited	May, 2015	Ontario	Docket No. EB-2015-0166	Pre-Approval of a Long-Term Pipeline Capacity Contract
Enbridge Gas Distribution	June, 2015	Ontario	Docket No. EB-2015-0175	Pre-Approval of a Long-Term Pipeline Capacity Contract
Northern Utilities, Inc.	November, 2015	Maine	Docket No. 2014-00132	Retail Choice Transportation Program
Eversource Energy	December, 2015	Massachusetts	Docket No. 15-181	Pre-Approval of Long-Term Pipeline Capacity Contract
Eversource Energy	February, 2016	New Hampshire	Docket No. DE 16-241	Pre-Approval of Long-Term Pipeline Capacity Contract
New Brunswick Power	October, 2016	New Brunswick	Matter No. 336	Commodity Procurement / Risk Management
EPCOR Energy Alberta	January, 2017	Alberta	Proceeding ID 22357	Energy Procurement and Risk Assessment
Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities	December, 2017	New Hampshire	Docket No. DG 17-198	Approval of Natural Gas Supply Strategy

SPONSOR	DATE	JURISDICTION	DOCKET No.	SUBJECT
Heritage Gas Limited	January, 2018	Nova Scotia	Matter No. M08473	Approval of Long-Term Natural Gas Transportation Contract; Cost Recovery Mechanism; and Capacity Assignment Principles
ENSTAR Natural Gas Company	June, 2018	Alaska	Docket No. U-18-004	Reply Testimony in Support of ENSTAR's Design Day and Gas Supply Contracting Practices
Southwestern Public Service Company	June, 2019	Texas	Docket No. 48973	Direct and Reply Testimony in Support of two Solar PPA's and Associated Cost Recovery in a Fuel Reconciliation Proceeding
Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a/ Liberty Utilities	October, 2019	New Hampshire	Docket No. DG 17-152	Approval of Least-Cost Integrated Resource Plan

Summary

Adam Perry has 12 years of experience in the energy industry. Adam's experience in the energy industry includes work related to demand forecasting, cost of capital, regulatory proceedings, and market analyses. His work has included econometric modeling, modeling and analyzing financial data, researching regulatory issues, and developing and writing reports and testimony.

Adam has testified before the Massachusetts Department of Public Utilities. Adam holds a B.S. from Northeastern University.

Areas of Specialization

- Utilities
- Demand Forecasting
- Rates and Regulation
- Natural Gas
- Regulatory Strategy and Rate Case Support

Recent Assignments

- Developed econometric analyses, researched Department precedent and market information, developed filing, and testified in support of the demand forecast in the Liberty Utilities (New England Natural Gas Company) three most recent Forecast and Supply Plans filed with the Massachusetts Department of Public Utilities.
- Developed Design Day demand forecasts using econometric analysis for a natural gas utility covering four jurisdictions and 20 service territories.
- Evaluated an electric utility's sales, revenue, supply and peak load forecast modeling processes and provided recommendations regarding methods to improve the forecasts.
- For numerous electric and natural gas utilities, and natural gas pipelines, supported ROE testimony through research, testimony development, and the creation of analytical models and supporting analyses.
- Performed benchmarking analyses of North American utilities to review a utility's gas supply planning practices and the appropriateness of the weather normalization methodology used in its demand forecasting process.
- Developed benchmarking analyses and assisted with the preparation of testimony and a report supporting Total Peaking Services' Market Power Study filed with the Federal Energy Regulatory Commission for approval of market-based rates.

Professional History

ScottMadden, Inc. (2016 – Present)

Director
Manager

Sussex Economic Advisors, LLC (2012 – 2016)

Managing Consultant

Concentric Energy Advisors, Inc. (2007 – 2012)

Consultant
Assistant Consultant
Analyst
Associate

Education

Bachelor of Science, Economics, Northeastern University, magna cum laude, 2008

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

DG 17-152

Least Cost Integrated Resource Plan

Staff Data Requests - Set 2

Date Request Received: 4/10/18
Request No. Staff 2-4

Date of Response: 4/27/18
Respondent: William R. Killeen
James M. Stephens

REQUEST:

Re: the Company's *Least Cost Integrated Resource Plan*, as filed in Docket No. DG 17-152, please provide details of the Company's out-of-model adjustments to its econometric forecasts of gas requirements. Specifically:

- a. Provide a quantitative justification for the adjustment made for the Company's recently-expanded sales and marketing efforts.
- b. Provide a quantitative justification for the adjustment made for the Company's new service territories in New Hampshire.
- c. For the new service territories, provide a comparison of expected customer additions with those for Maine, Massachusetts and Connecticut gas distribution companies' customer additions off of existing mains for each of the last five years.
 - i. For the Maine, Massachusetts and Connecticut companies, provide the types of customers added in categories matching as closely as possible EnergyNorth's customer categories.
 - ii. For each of the Maine, Massachusetts and Connecticut companies, also provide the total numbers of each type of customers.

RESPONSE:

- a. The expansion of the sales and marketing efforts has resulted in 6,322 new customer additions and \$7,297,998 in incremental margin since 2014. The Company expanded the sales and marketing organization in 2014 and added six FTEs to sales and marketing staff. The Company plans to continue its focus and support of the sales and marketing efforts. Please also see the response to Staff 1-7.
- b. The sales and marketing forecast of customer additions in new service territories is consistent with, and supported by the Company's operating budget and capital expansion plans. These plans are reviewed within the Company's franchise approval applications or rate cases submitted to the New Hampshire Public Utility Commission. Please also see

Docket No. DG 17-152 Request No. Staff 2-4

the response to Staff 1-7. The data with respect to customer prospect information from ICF International for each of the relevant service territories is provided below.

Location	Type of Prospect	Total Prospect Count
Windham	Residential	4,730
Windham	Commercial	985
Pelham	Residential	4,233
Pelham	Commercial	789
Epping	Residential	2,456
Epping	Commercial	403
Candia	Residential	1,382
Candia	Commercial	280
Raymond	Residential	3,499
Raymond	Commercial	515

- c. The Company is not in possession of the requested information. However, the projected demand growth of the Company is consistent with other local natural gas distribution company (LDC) growth expectations in the New England region, which ranges between 1% and 3% annually based on recent forecast filings.

SUPPLEMENTAL

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

DG 17-152

Least Cost Integrated Resource Plan

Staff Data Requests - Set 4

Date Request Received: 7/9/18
 Request No. Staff 4-8

Date of Response: 10/25/19
 Respondent: William R. Killeen

REQUEST:

For each of 2015, 2016 and 2017, please provide the following measures of the Company’s experience with capacity-exempt customers, for customers who changed from services of that type, please provide:

- a. How many customers
- b. Representing what volume
- c. To what service classifications they changed.

RESPONSE:

- a. Since 2015, six customers migrated from capacity-exempt to capacity-eligible service. Please see the table below.

Year	Number of Customers
2015	2
2016	3
2017	1

- b. The transportation contract quantity for the customers that migrated from capacity-exempt to capacity-eligible service each year is summarized below.

Docket No. DG 17-152 Request No. Staff 4-8 (SUPPLEMENTAL)

Year	Transportation Contract Quantity (Dth)
2015	300
2016	78
2017	80

- c. The service classification changes of the capacity-exempt customers leaving this status each year were as follows:
- In 2015, two customers switched from capacity-exempt to capacity-eligible status, with one from each of rate classes G-43 and G-53;
 - In 2016, three customers switched from capacity-exempt to capacity-eligible status, with one from each of rate classes G-52, G-42, and G-41;
 - In 2017, one customer switched from capacity-exempt to capacity-eligible status, with a rate classes G-53.

SUPPLEMENTAL RESPONSE:

The Company submits this supplemental response to provide an update to the capacity-exempt data previously provided.

- a. Since 2015, nine customers migrated from capacity-exempt to capacity-eligible service, as shown in the table below.

Year	Number of Customers
2015	2
2016	3
2017	1
2018	2
2019	1

In addition to the customers identified in the table above, in each of 2018 and 2019, one capacity exempt customer left this service and their business location has remained vacant. It is expected that, at some future date, these locations will resume natural gas service. Further details are discussed in part c below.

- b. The transportation contract quantity for the customers that migrated from capacity-exempt to capacity-eligible service each year is summarized below.

Docket No. DG 17-152 Request No. Staff 4-8 (SUPPLEMENTAL)

Year	Transportation Contract Quantity (Dth/day)
2015	300
2016	78
2017	80
2018	100
2019	30

- c. The service classification changes of the capacity-exempt customers leaving this status each year were as follows:
- In 2015, two customers switched from capacity-exempt to capacity-eligible status, with one from each of rate classes G-43 and G-53;
 - In 2016, three customers switched from capacity-exempt to capacity-eligible status, with one from each of rate classes G-52, G-42, and G-41;
 - In 2017, one customer switched from capacity-exempt to capacity-eligible status, from rate class G-53;
 - In 2018, three customers dropped from capacity-exempt status. Two of these customers switched from capacity-exempt to capacity eligible status. These customers were in rate class G-42 (with a TCQ of 70 Dth/day). The third customer dropped from capacity-exempt eligible status in 2018 and the location remains inactive as the building is vacant. That customer was also G-42. If a new customer moves into this location, they are eligible to retain company capacity (approximately 30 Dth/day); and
 - In 2019 (to date), two customers have dropped from capacity-exempt status. Both customers were in rate class G-41. Both customers moved out. One has been replaced with a new customer who now retains Company capacity (15 Dth/day). The other building is vacant. If a new customer moves into this location, they are eligible to retain Company capacity (approximately 15 Dth/day).

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

DG 17-152

Least Cost Integrated Resource Plan

Staff Technical Session Data Requests - Set 1

Date Request Received: 5/30/18
Request No. Staff Tech 1-7

Date of Response: 6/27/18
Respondent: William R. Killeen
James M. Stephens
Adam Perry

REQUEST:

The previous questions focus on the work provided by ICF and its use. The Company at Technical Session Day 2 offered a more complete discussion, addressing all methods, analyses, and data inputs used to forecast customer and demand growth. Please, as offered by the Company, provide a description of all efforts and analyses undertaken to make those forecasts, and address how management combined those efforts and analyses into consolidated forecasts of customer and demand growth.

RESPONSE:

Please see Attachment Staff Tech 1-7.1, which contains the “Comprehensive Response” referred to in the responses to several other requests in this docket, and Attachment Staff Tech 1-7.2.

Detailed Review of EnergyNorth's Demand Forecast
Docket Nos. DG 17-152 and DG 17-198

I. Executive Summary

Pursuant to the May 23, 2018, technical session in Docket No. DG 17-152 and the May 24, 2018, technical session in Docket No. DG 17-198, the Company has undertaken a detailed review of its forecasted customer additions and how those estimated customer additions are integrated into the results of the econometric models (together defined herein as the Demand Forecast). The Company's detailed review resulted in the modification of certain assumptions related to the out-of-model adjustments used to produce the Demand Forecast, including:

- The customers of Concord Steam Corporation ("Concord Steam") were included in the estimate of customer additions for the existing service territory and have now been removed from the forecasted additions for the existing service territory. These customer additions are included as an out-of-model adjustment.
- The forecasted customer additions in Windham and Pelham were included in the estimate of customer additions in the existing service territory and have now been removed from the forecasted additions for the existing service territory. These customer additions are included as an out-of-model adjustment.
- The overall number of customer additions has been reduced to reflect more recent information, specifically:
 - In the initial filing, the Company included a 400-unit development in Windham; however, subsequent to the filing, the project has been reduced and is currently indefinitely delayed. As such, the project and the 400 units were removed from the forecasted customer additions for Windham and Pelham.
 - The forecasted customer additions for the potential franchise areas (i.e., Epping, Candia, and Raymond) were determined to be too high and have been lowered. Specifically, the initial filing assumed a total of 244 customers per year from the potential franchise areas, which was reduced to a total of 120 customers per year.
 - The forecasted customer composition for the potential franchise areas (i.e., the allocation between residential and commercial and industrial ("C&I") customers) resulted in a disproportionate number of commercial customer additions; specifically, the C&I customer allocation of 60% was corrected to be consistent with the Company's actual recent experience where 20% of the customer additions are C&I customers (as reflected in the residential and C&I customer additions data for 2016 and 2017 provided in the response to Staff 3-13 in Docket No. DG 17-152).¹ In addition, the 20% is consistent with the assumed C&I customer allocation for customers added in the existing service territory and in Windham and Pelham.
 - The Company also addressed a timing issue with respect to the start date for the initial customers from the potential franchise areas. The start date for these customers was delayed to better reflect the timing of the Granite Bridge Pipeline.
- For modeling purposes, certain formulas and calculations were simplified. For example, the approach to allocate the annual customer additions from the Sales and Marketing forecast to

¹ For ease of reference, all Company responses referred to in this detailed review are provided as Attachment Staff Tech 1-7.2.

monthly customer additions was simplified, which also corrected an error regarding monthly customer additions.

- The assumption regarding natural gas consumption for Innovative Natural Gas, LLC (“iNATGAS”) has been updated to reflect the actual usage information from this past winter.

As a result of these modifications to the Demand Forecast, the Company’s forecast of natural gas demand has been slightly reduced as illustrated in Table 1 below.

Table 1: Updated Demand Forecast Results (Dth)

Split-Year	Original Demand Forecast			Updated Demand Forecast		
	Normal Year	Design Year	Design Day	Normal Year	Design Year	Design Day
2017/2018	15,634,082	16,901,795	156,822	14,640,845	15,833,870	157,848
2018/2019	16,075,247	17,376,013	160,989	15,235,354	16,449,392	164,571
2019/2020	16,575,525	17,944,792	164,640	15,648,467	16,923,283	167,643
2020/2021	17,000,558	18,367,180	168,934	16,150,273	17,414,989	168,942
2021/2022	17,527,589	18,933,736	173,917	16,585,278	17,881,953	174,618
2022/2023	18,071,614	19,519,884	179,382	17,864,174	19,198,013	184,000
2023/2024	18,638,472	20,168,391	184,432	18,354,074	19,760,680	188,352
2024/2025	19,009,173	20,530,513	188,856	18,660,183	20,055,937	192,033
2025/2026	19,416,449	20,969,502	192,933	19,008,442	20,431,417	195,542
2026/2027	19,788,597	21,371,088	196,785	19,318,284	20,765,901	198,777
2027/2028	20,198,023	21,852,258	199,954	19,659,031	21,169,792	201,364
2028/2029	20,471,958	22,107,358	203,491	19,872,063	21,362,731	204,235
2029/2030	20,798,293	22,459,424	206,790	20,136,752	21,648,299	206,906
2030/2031	21,108,206	22,794,033	210,016	20,392,048	21,924,085	209,593
2031/2032	21,476,694	23,234,556	212,972	20,701,897	22,297,494	212,031
2032/2033	21,678,072	23,409,030	215,843	20,858,981	22,428,427	214,448
2033/2034	21,960,444	23,713,995	218,828	21,075,945	22,663,122	216,822
2034/2035	22,227,307	24,002,078	221,631	21,269,443	22,872,418	218,944
2035/2036	22,564,042	24,410,287	224,148	21,516,836	23,180,235	220,704
2036/2037	22,742,621	24,558,141	226,863	21,618,013	23,249,243	222,599
2037/2038	23,007,564	24,844,142	229,590	21,798,963	23,444,867	224,511
CAGR (17/18 - 21/22)	2.9%	2.9%	2.6%	3.2%	3.1%	2.6%
CAGR (17/18 - 37/38)	2.0%	1.9%	1.9%	2.0%	2.0%	1.8%

As shown in Table 1, based on the changes to the Demand Forecast discussed above, the Company is forecasting Normal Year and Design Year demand to increase at a compound annual growth rate (“CAGR”) of approximately 2.0% and Design Day demand to increase at a CAGR of 1.8% over the 2017/18 to 2037/38 time period, which is similar to the growth in the Company’s initial filing, the pace of growth in recent years, and well within the estimates of natural gas demand growth of other local distribution companies in the New England region (as provided in the responses to Staff 3-2 in Docket No. DG 17-152 and Staff 2-30 in Docket No. DG 17-198).

The inclusion of changes to the Demand Forecast, although slightly lowering the expected demand, does not alter the primary conclusions documented by the Company in Docket Nos. DG 17-152 and DG 17-198, specifically:

- The customer additions and associated volume from the econometric model do not capture the Company's focus on customer growth in New Hampshire;
- An adjustment to the results of the econometric model is warranted and supported by the recent level of customer additions, access to new and potential franchise areas, and the regulatory programs approved by the Commission, none of which are captured in the historical data; and
- An adjustment based on information developed by the Sales and Marketing team, as well as the experience and judgment of that team, is a reasonable approach to estimate the level of adjustment to the results of the econometric model.

In addition, the Company reviewed the implications of changes to the forecasted customer additions on its SENDOUT® resource portfolio optimization analysis, as initially filed in Docket No. DG 17-198 and in the responses to OCA 2-86 and OCA 2-106R in Docket No. DG 17-198. Specifically, the revised Demand Forecast was uploaded into the SENDOUT® model for an assessment of the Company's gas supply portfolio; and, based on the results of that analysis, coupled with the non-price factors discussed in the various Company submissions in Docket Nos. DG 17-152 and DG 17-198, the Company concludes that the Granite Bridge Project, as outlined in Docket No. DG 17-198, continues to be the best cost option for the customers of EnergyNorth. As shown by Tables 2 and 3 below, the results of the SENDOUT® model continue to support the Granite Bridge Project as the best cost option to meet the demand requirements of EnergyNorth's customers.

Table 2: EnergyNorth SENDOUT® Model Runs - "Prime Revised"²

Resource Planning Scenario	Granite Bridge LNG	Propane Facilities	Resource Mix Results			Total System Cost (\$000)	Comparison to Base Case Prime
			Dawn (Dth/day)	Repsol (Dth/day)	ENGIE (Dth/day)		
Base Case Prime	2.0 Bcf	No	7,920	0	0	\$2,645,295	\$ -
Base Case Prime Sensitivity	2.0 Bcf	Yes	7,920	0	0	\$2,645,925	\$ 630
Alternative Case Prime	No	No	3,080	104,920	360	\$2,850,073	\$ 204,778
Alternative Case Prime Sensitivity	No	Yes	15,040	50,370	7,000	\$2,667,144	\$ 21,849

Table 3: EnergyNorth SENDOUT® Model Runs - LNG Tank Size Scenarios - "Prime Revised"

Resource Planning Scenario	Granite Bridge LNG	Propane Facilities	Resource Mix Results			Total System Cost (\$000)	Comparison to 2.0 Bcf Tank (\$000)
			Dawn (Dth/day)	Repsol (Dth/day)	ENGIE (Dth/day)		
Base Case Prime	2.0 Bcf	No	7,920	0	0	\$2,645,295	\$ -
Base Case Prime	1.2 Bcf	No	7,920	0	470	\$2,651,792	\$ 6,497
Base Case Prime	1.5 Bcf	No	7,920	0	0	\$2,653,873	\$ 8,578
Base Case Prime	2.5 Bcf	No	7,920	0	0	\$2,724,443	\$ 79,148

As shown in Tables 2 and 3, the Resource Mix results (i.e., volumes for the various resources) and the Total System Costs across all scenarios are slightly lower than the results shown in the initial filing in Docket No. DG 17-198 and in the responses to OCA 2-86 and OCA 2-106R in Docket No. DG 17-198. However, the Total System Cost of the Base Case Prime (which includes the 2.0 Bcf Granite Bridge LNG facility) is

² The SENDOUT® model runs denoted as "Prime" reflect the impact of the Tax Cuts and Jobs Act on the proposed Granite Bridge Project infrastructure revenue requirement.

approximately \$2.645 billion over the analysis period and continues to be the lowest total cost of the resource planning scenarios and LNG tank size scenarios analyzed. The Alternative Case Prime resource planning scenario, which excludes the Granite Bridge LNG facility, results in a total system cost of approximately \$2.850 billion over the analysis period, which is nearly \$205 million more than the Base Case Prime scenario. The results shown in Tables 2 and 3 are consistent with the Company's prior analysis, and continue to support the conclusions regarding the Granite Bridge Pipeline and 2.0 Bcf Granite Bridge LNG facility.

II. Historical Customer Additions

In response to certain data requests in Docket Nos. DG 17-152 (e.g., CLF 1-9, Staff 2-4, and Staff 3-13) and DG 17-198 (e.g., Attachment OCA 1-12.b and CLF 1-8), the Company provided information with respect to historical customer additions. To be as responsive as possible to the specific data requests, the information provided by the Company was derived from several different internal data sources, each of which used different time periods, which best responded to the specific request. However, the use of various data sources and time periods in response to specific data requests has resulted in the need to reconcile the historical customer additions information submitted in Docket Nos. DG 17-152 and DG 17-198.

First, to be as consistent as possible with past submissions of long-term demand forecasts, the Company relied on an analytical framework and approach that has been used, vetted, and approved in several regulatory filings at the Commission. The use of a consistent framework across proceedings facilitates the comparison of results across those proceedings (e.g., please see Staff 1-11 in Docket No. DG 17-152, which asked the Company to compare the demand estimate for 2017 as produced in Docket Nos. DG 13-313 and DG 17-152). As such, for the development of the econometric models used by the Company in Docket Nos. DG 17-152 and DG 17-198, the Company used Customer Equivalent Bill data for the August 2010 to April 2017 period as the metric to represent customer numbers by segment (e.g., residential and C&I).³ Customer Equivalent Bill data is the same customer metric used in the 2013 LCIRP in Docket No. DG 13-313, EnergyNorth's cost of gas submissions, and the Northeast Energy Direct ("NED") contract filing in Docket No. DG 14-380. Second, in response to certain data requests for historical customer additions, the Company relied on a new customer relationship management system (i.e., the ZOHO system)⁴ used by its Sales and Marketing team, rather than the Customer Equivalent Bill data. Lastly, Company responses to certain data requests provided information for calendar years, while other responses provided information for different 12-month periods (e.g., April to March or November to October).

To reconcile the various information provided in the numerous data requests received by the Company with respect to historical customer additions, please find in Table 4 below a comparison of historical customer additions using the Customer Equivalent Bill metric and the annual customer additions from the ZOHO system.

³ Please see Bates 014 of the Company's 2017 LCIRP filed in Docket No. DG 17-152.

⁴ The ZOHO system was implemented by the Company on May 30, 2014.

Table 4: Historical Customer Additions Comparison

Year	Customer Equivalent Bill⁵	ZOHO Customer Additions⁶	Difference	Percent Difference
2014	1,178	1,199	(21)	(1.8%)
2015	1,770	1,784	(14)	(0.8%)
2016	1,531	1,588	(57)	(3.6%)
2017	1,733	1,708	25	1.5%
Total	6,212	6,279	(67)	(1.1%)
Average	1,553	1,570	(17)	(1.1%)
Average (excluding 2014)	1,678	1,693	(15)	(0.9%)

As shown in Table 4 above, the use of Customer Equivalent Bill data results in a total of 6,212 customer additions over the 2014⁷ to 2017 period, which compares to the total of 6,279 customer additions using the ZOHO system. The difference between the two data sources is 67 customer additions, or approximately 1.1%. Using the average customer additions over the 2014 to 2017 period results in 1,553 annual additions based on Customer Equivalent Bill data and 1,570 customer additions from the ZOHO system, or a difference of 17 customers. Therefore, a comparison of the calendar year customer additions using the Customer Equivalent Bill data (i.e., the dependent variable in the customer equations of the econometric models) is for all intents and purposes equivalent to the annual customer additions data from the ZOHO system used by the Sales and Marketing team.

III. Need for a Sales and Marketing Adjustment

During the May 23, 2018, and May 24, 2018, technical sessions, there were discussions regarding the need for an adjustment to the customer additions results from the Company's econometric model. Although the Company has provided support in its responses to various data requests in both Docket No. DG 17-152 and DG 17-198, a summary of the rationale supporting an adjustment to the econometric model results is warranted. The Company has provided the following primary reasons in support of an adjustment to the customer additions forecasted by the econometric model: (i) the actual customer additions in the existing service territory, particularly the recent trends; (ii) the customer opportunity in the new and potential

⁵ To accurately compare Equivalent Bill data to the data from the ZOHO system, the Company used calendarized values and selected an appropriate reference month (i.e., December) for the Equivalent Bill data and compared that to the year-end customer count from the ZOHO system. There is a slight difference between the reported ZOHO customer count and the number of such customers from the Equivalent Bill data due to certain issues including duplication and a mis-recording of the service start date. Please note that the customer additions data provided in Figure 16 of the Direct Testimony of William R. Killeen and James M. Stephens in Docket No. DG 17-198 (see Bates 151R) were based on annual Customer Equivalent Bill data for the year-ending in March and not calendar year data.

⁶ Please note, in preparation of this response, the Company noted a discrepancy in the information provided in the responses to CLF 1-9, Staff 2-4, and Staff 3-13 in Docket No. DG 17-152 compared to the information provided in the responses to OCA 1-12 and CLF 1-8 in Docket No. DG 17-198. Although the ZOHO system was used to develop all these responses, the extraction parameters were not consistent thus resulting in a different number of historical customer additions. The historical customer additions data as provided in the responses to OCA 1-12 and CLF 1-8 in Docket No. DG 17-198 uses the appropriate extraction parameters and should replace the historical customer additions information provided in the responses to CLF 1-9, Staff 2-4, and Staff 3-13 in Docket No. DG 17-152.

⁷ Please note that the ZOHO system was placed on-line in late May 2014 so the information for that year reflects a partial year and, as such, the Customer Equivalent Bill data was presented on a similar basis.

franchise areas; (iii) the expansion of the Sales and Marketing team; (iv) innovative growth programs; and (v) past Commission precedent.

As a preliminary matter, there is academic support for adjusting econometric models to reflect information that is not otherwise captured in the historical data but is relevant to the accuracy of the forecast. For example, Michael Intriligator discusses the use of “add factors” (out-of-model adjustments) in *Econometric Models, Techniques, & Applications*:

The add factors are based on judgments of factors not explicitly included in the model. For example, in a macroeconomic model there may be no explicit account taken of strike activity, but if major union contracts are expiring and a strike appears likely in the forecast period, the forecasts of production should be appropriately revised downward. Many other factors may not have been included in the model because their occurrence is rare or because data are difficult to obtain, but this does not mean that they must be overlooked in formulating a forecast. Indeed, it would be inappropriate to ignore relevant considerations simply because they were omitted from the model. In this sense forecasting with an econometric model is not simply a mechanical exercise but rather a blending of objective and subjective considerations. The subjective considerations embodied in the add factors, general improve significantly on the accuracy of the forecasts made with an econometric model.⁸

The factors discussed below show that the Company’s recent activities and new programs will continue to promote customer growth above that found in the historical data, which supports the use of an out-of-model adjustment to appropriately reflect that information.

First, for the existing service territory, the actual or historical customer additions using Customer Equivalent Bill data is greater than the forecasted customer additions from the econometric model. Specifically, the forecast of customer additions from the econometric model results in approximately 1,180 customer additions per year for the existing service territory. However, as shown by Table 4 above, using the Customer Equivalent Bill data over the 2014 to 2017 period results in approximately 1,550 customer additions per year; and, if the partial customer additions results from 2014 are excluded, the annual customer additions over the 2015 to 2017 period for the existing service territory average approximately 1,700 customers per year.⁹ Therefore, the actual customer additions information and experience in the existing service territory supports an adjustment to the customer addition results from the econometric model.

Second, in addition to the customer numbers shown in Table 4, Concord Steam has discontinued service and the Company received franchise approval for the towns of Windham and Pelham; and plans to file for approval of the potential franchise areas that would include the towns of Epping, Raymond, and Candia. None of the customers associated with the Concord Steam conversion and potential customers in the new or potential franchise areas are included in the results of the econometric model and should be considered as exogenous to the econometric model and, therefore, support the use of an adjustment to customer additions.

Third, the Company has continued to focus on growth and providing more customers with the option to choose natural gas as their fuel. As discussed in the responses to Staff 2-4 and Staff 3-13 in Docket No. DG 17-152, the Company has expanded its Sales and Marketing team by six full time equivalents (“FTEs”). These employees reside and are active in their local communities and provide “feet on the ground” with

⁸ Michael D. Intriligator, *Econometric Models, Techniques, & Applications*, at 516-517.

⁹ An analysis of the information from the ZOHO system produces similar historical customer additions over the 2014 to 2017 and 2015 to 2017 time periods.

respect to participating in business organizations and town activities. This increase in number of Sales and Marketing employees and the local presence of those employees supports an adjustment to the results of the econometric models.

Fourth, the Company has proposed and received approval from the Commission for innovative expansion plans, such as revisions to the contribution-in-aid-of-construction policy (e.g., including the assumption that 60% of customers located along a main extension will take service) and the Managed Expansion Program (“MEP”) approved by the Commission in August 2016. The MEP not only provides a mechanism to unitize expansion costs and collect those expenses over time, but also provides the Company an opportunity to install service lines for any end use application during the construction of a main, thus positioning the Company to add load from an existing customer. Stated differently, the Company, under MEP, can provide a service line to a customer for an end use application, such as water heating, and thus natural gas is a fuel choice for that customer when their existing heating equipment fails or needs to be replaced. Please see the response to Staff Tech 1-3 in Docket No. DG 17-152, which discusses the customer additions associated with MEP. In addition, the Company (1) eliminated the \$900 flat fee for a new residential customer, (2) allowed for no-cost service connections of heating customers within 100 feet of an existing natural gas main, (3) allowed for no-cost service connections of non-heating customers within 100 feet if they commit to taking service prior to a main extension or replacement, and (4) lowered the level of revenue justification required for main and service extensions.

Fifth, the use of adjustments to improve the results of an econometric model have been presented to, and approved by, the Commission. By way of example, in the NED proceeding (i.e., Docket No. DG 14-380), the Company adjusted the results of the econometric model to reflect three markets that were exogenous to the results of the econometric model; specifically, the Company included adjustments for: (i) potential volumes to Keene, NH, as an incremental market; (ii) reverse migration of capacity exempt customers, reflecting recent market trends; and (iii) incremental volumes for iNATGAS, a new, large customer in the existing service territory. Similar to the NED proceeding, the Company in Docket Nos. DG 17-152 and DG 17-198 has adjusted the results of the econometric model to reflect incremental markets (e.g., the new and potential franchise areas), recent market trends (e.g., actual level of customer additions), and incremental volume (e.g., iNATGAS).

IV. Out-of-Model Adjustments

As discussed above, the Company has provided support for certain adjustments to the results of the econometric models. The calculated values and expected saturation levels for each of those adjustments (i.e., incremental customer additions in the existing service territory, incremental customers from new or potential franchise areas, and iNATGAS) are provided below.

First, with respect to the existing service territory, the Company has adjusted the results of the econometric models to reflect the recent historical customer additions, the investment by the Company in growth (i.e., incremental Sales and Marketing staff), and the approval of innovative programs (e.g., MEP). As such, the econometric models forecast of approximately 1,180 customers per year has been adjusted to approximately 1,625 customers per year,¹⁰ which is aligned with the average customer additions over the 2015 to 2017 period (see Table 4 above). In addition, the Company has relied on the same transition schedule to the results of the econometric model for the period from 2023 to 2038 as originally filed.¹¹ As shown by Table

¹⁰ Represents an average of the customer additions for the existing service territory over the forecast period.

¹¹ The transition period is discussed on Bates 154R of the Direct Testimony of William R. Killeen and James M. Stephens in Docket No. DG 17-198, and further detailed in the response to Staff 2-62 in Docket No. DG 17-198.

5 below, the Company's forecast of new residential and C&I customers in the existing service territory results in saturation levels in 2038 that are reasonable.

Second, regarding the new franchise areas (i.e., Windham and Pelham) and the potential franchise areas (i.e., Epping, Candia, and Raymond), the Company has adjusted the results of the econometric models to reflect customer additions in these areas as these towns were exogenous to the econometric model results. The Company will leverage its larger Sales and Marketing team and the approved, innovative regulatory programs to achieve the forecasted customer additions. As shown by Table 5 below, the Company's forecast of new residential and C&I customers in the new and potential franchise areas results in saturation levels in 2038 that are reasonable.

Table 5: Saturation Levels in 2038

	Residential¹²	C&I¹³	Total
Existing Service Territory	51%	84%	54%
New Franchise Areas (Windham/Pelham)	10%	20%	11%
Potential Franchise Areas (Epping /Candia/Raymond)	18%	40%	21%

Lastly, the Company adjusted the results of the econometric models to reflect the recent actual usage and contractual arrangements associated with iNATGAS, which were approved by the Commission in Docket No. DG 14-091 and reaffirmed by the Commission in the NED proceeding in Docket No. DG 14-380. At the time of the Company's initial filing in Docket Nos. DG 17-152 and DG 17-198, the Company understood the natural gas usage of iNATGAS to be minimal. Specifically, the Company in its initial filing assumed iNATGAS would consume 20 Dth on design day and approximately 1 Dth on every other day. However, this past winter iNATGAS consumed 4,251 Dth on its peak day, which supports an adjustment to the volumes used in the Company's initial filing. The Company's revised assumption for iNATGAS volumes based on the contractual arrangements and actual usage by iNATGAS is summarized in Table 6.

¹² To calculate the residential saturation levels, the Company increased the number of residential customer prospects from ICF using certain information from Moody's (i.e., increased by the growth rate of the Total Households variable). Please see the response to Staff 2-4 in Docket No. DG 17-152 and the responses to Staff 1-8 and Staff 1-9 in Docket No. DG 17-198 for certain ICF customer prospect data.

¹³ To calculate the C&I saturation levels, the Company increased the number of commercial customer prospects from ICF using certain information from Moody's (i.e., increased by the growth rate of the Total Employment variable). Please see the response to Staff 2-4 in Docket No. DG 17-152 and the responses to Staff 1-8 and Staff 1-9 in Docket No. DG 17-198 for certain ICF customer prospect data. Please note that the total number of commercial customer prospects from ICF is conservative when compared to data from the U.S. Census Bureau, thus resulting in C&I saturation rates that are higher than rates based on data from the U.S. Census Bureau.

Table 6: iNATGAS Volumes (Dth)

Split Year	Annual Volume	Design Day
2017/18	266	20
2018/19	300,000	4,251
2019/20	300,000	4,251
2020/21	500,000	4,251
2021/22	500,000	4,251
2022/23	1,300,000	8,800
2023/24	1,300,000	8,800
2024/25	1,300,000	8,800
2025/26	1,300,000	8,800
2026/27	1,300,000	8,800
2027/28	1,300,000	8,800
2028/29	1,300,000	8,800
2029/30	1,300,000	8,800
2030/31	1,300,000	8,800
2031/32	1,300,000	8,800
2032/33	1,300,000	8,800
2033/34	1,300,000	8,800
2034/35	1,300,000	8,800
2035/36	1,300,000	8,800
2036/37	1,300,000	8,800
2037/38	1,300,000	8,800

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

DG 17-152

Least Cost Integrated Resource Plan

Conservation Law Foundation Data Requests - Set 1

Date Request Received: 4/9/18
 Request No. CLF 1-9

Date of Response: 4/23/18
 Respondent: William R. Killeen

REQUEST:

Please see Liberty Utilities 2017 LCIRP p.22: “The Company recently expanded its sales and marketing efforts and expects to continue to do so through the Forecast Period. Because the Company’s sales and marketing programs are expected to continue to expand throughout the Forecast Period, the effect of those programs is not fully captured in the historical billing data, and, as, such is not reflected in the econometric forecast.”

- a. In what month and year did the Company expand its sales and marketing efforts?
- b. Please provide a quantification of these expanded efforts in person-hours, FTE, or another relevant metric.
- c. Using that same metric, please provide a measure of the Company’s total effort expended on sales and marketing for each historical year for which data exist.

RESPONSE:

- a. The Company expanded the sales and marketing organization over the course of 2014.
- b. The Company added six FTEs to the sales and marketing staff in 2014.
- c. The sales and marketing staff’s focus on customer outreach has resulted in customer additions in residential conversions, commercial conversions, new construction markets, and other opportunities. Since 2014, the expansion of sales and marketing has resulted in 6,322 new customer additions and \$7,297,998 in incremental margin. The incremental margin added each year is as follows:

2017 \$2,293,513

2016 \$1,694,574

2015 \$1,624,853

2014 \$1,685,058

REVISED

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

DG 17-198

Petition to Approve Firm Supply and Transportation Agreements and the
Granite Bridge Project

Staff Data Requests - Set 8

Date Request Received: 5/3/19
Request No. Staff 8-2

Date of Response: 10/25/19
Respondent: William R. Killeen
William J. Clark

REQUEST:

Using the same format and the same categories as in the previous request, and the same months in each of the split years as in the previous request, please report the actual numbers of customers added in each of the following years:

- a. 2014/15
- b. 2015/16
- c. 2016/17
- d. 2017/18
- e. 2018/19 to date
- f. 2018/19 currently committed but not yet installed.

RESPONSE:

For responses to subparts a. through f., see Attachment Staff 8-2.xlsx.

Please note, in 2016/17 the volumes associated with new C&I customers are higher than other years due to a number of large C&I customers that were added within the Company's existing service territory.

REVISED RESPONSE:

For responses to subparts a. through f., see Attachment Staff 8-2 (Revised).xlsx.

Please note, in 2016/17 the volumes associated with new C&I customers are higher than other years due to a number of large C&I customers that were added within the Company's existing service territory.

In the original attachment to this response, iNATGAS volumes in 2016/17 were inadvertently included in the "C&I – existing areas" row. This has been corrected in Attachment Staff 8-2 (Revised).xlsx.

Service Territory	2017/18						2018/19						2019/20						2020/21					
	Resi	ADTH	C&I	ADTH	Tot Cust	Est Tot	Resi	ADTH	C&I	ADTH	Tot Cust	Est Tot	Resi	ADTH	C&I	ADTH	Tot Cust	Est Tot	Resi	ADTH	C&I	ADTH	Tot Cust	Est Tot
Former Concord Steam	0	0	3	3,221			0	0	8	3,276			0	0	27	59,016			0	0	0	0		
Residential - existing areas	1,2	98, 92					1, 99	11, 828					1, 327	105,109					1, 2	98, 92				
C&I - existing areas			236	225,1 6					271	200,078					03	3 3,380								
Wincham, Pelham																								
Hanover and Lebanon	0	0					0	0	0	0			0	0	0	0			0	0				
Epping, Raymond, and Cand a	0	0					0	0	0	0			0	0	0	0			0	0				
INATGAS																								
Total	1 2	98 92	236	228 367	1 83	326 858	1 99	11 828	279	203 35	1 778	318 182	1 327	105 109	63	72 05	1 790	829 163	1 261	92 771	325	292 582	1 586	385 353

PUC Docket No. DG 17-152
Liberty Utilities Least Cost Integrated Resource Plan
CLF Responses to Liberty Data Requests – Set 1
Witness: Paul Chernick
September 27, 2019

1-9 Reference Pages 8, 9, 24, and 26. Is Mr. Chernick aware that the Company provided an updated demand forecast reflecting more recent data in the response to Staff Tech 1-7?

Response:

Yes. That response elaborates on Liberty's efforts to increase sales and changes both some inputs to the econometric model and the out-of-model adjustments for sales and marketing. The response does not appear to address the error in the treatment of energy efficiency.

Normal Year Demand (Dth)									
LDC	CAGR	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Data Source(s)
Connecticut									
Eversource Energy (Yankee Gas Services Company)	2.1%		54,216,952	55,489,545	56,244,024	57,530,869	58,976,319		2018 Demand & Supply Forecast, Exhibit IV-6
UIL (Connecticut Natural Gas Corporation)	1.6%		37,130,123	37,749,722	38,339,131	38,933,703	39,544,148		2018 Demand & Supply Forecast, Exhibit S-1
UIL (Southern Connecticut Gas Company)	1.6%		34,303,038	34,903,270	35,465,714	36,030,125	36,589,736		2018 Demand & Supply Forecast, Exhibit S-1
Massachusetts									
Berkshire Gas Company	0.3%		6,475,839	6,512,826	6,521,058	6,540,414	6,554,604		2018 IRP, Attachment A, pg. 33
Columbia Gas of Massachusetts (Bay State Gas Company)	0.8%	46,336,728	46,722,503	47,023,591	47,351,948	47,874,160			2017 IRP, pg. 79
Eversource Energy (NSTAR Gas)	2.4%	48,299,821	49,932,911	51,951,667	52,421,804	53,187,532			2018 IRP, pg. 16
Without Special Contracts [1]	1.3%	45,988,677	46,526,767	47,148,102	47,628,810	48,394,538			2018 IRP, pg. 16
Liberty Utilities (New England Gas Company)	-0.3%	6,493,119	6,451,255	6,446,599	6,423,892	6,420,053	6,400,322		2018 IRP, pg. 45
National Grid (Boston Gas/Colonial Gas)	1.4%		126,548,155	128,522,675	130,148,177	131,654,619	133,531,509		2018 IRP, pg. 75
Unitil (Fitchburg Gas & Electric)	0.4%		2,215,437	2,220,884	2,215,091	2,226,716	2,250,068		2019 IRP, pg. 7
Maine									
Unitil (Northern Utilities)	1.6%			11,554,979	11,730,231	11,926,464	12,114,577	12,309,135	2019 IRP, pg. IV-69
New Hampshire									
Unitil (Northern Utilities)	1.4%			9,106,127	9,238,468	9,371,594	9,505,494	9,639,921	2019 IRP, pg. IV-69
Rhode Island									
National Grid (Narragansett Electric Company)	0.9%			36,838,000	36,868,000	37,180,000	37,540,000	38,142,000	2019 IRP, Table IV-A
Liberty Utilities (EnergyNorth Natural Gas) - Excl. INATGAS									
	2.3%	14,640,578	14,935,354	15,348,467	15,650,273	16,065,963			
Minimum CAGR									
	-0.3%								
Maximum CAGR									
	2.4%								

Notes:

[1] NSTAR Gas has two special contracts. One of those contracts is with an MIT Cogeneration facility, which was expected to increase its operational capacity in November 2019, which would increase demand from the customer. The other special contract is with INATGAS. NSTAR Gas forecast usage for INATGAS to begin in November 2018.

Design Year Demand (Dth)									
LDC	CAGR	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Data Source(s)
Connecticut									
Eversource Energy (Yankee Gas Services Company)	2.1%		57,202,999	58,542,267	59,287,158	60,611,657	62,220,712		2018 Demand & Supply Forecast, Exhibit IV-6
UIL (Connecticut Natural Gas Corporation)	1.6%		39,942,770	40,632,730	41,258,910	41,904,391	42,568,834		2018 Demand & Supply Forecast, Exhibit S-2
UIL (Southern Connecticut Gas Company)	1.7%		37,196,344	37,888,823	38,504,370	39,136,183	39,762,042		2018 Demand & Supply Forecast, Exhibit S-2
Massachusetts									
Berkshire Gas Company	0.3%		7,244,983	7,286,622	7,298,015	7,321,526	7,336,278		2018 IRP, Attachment A, pg. 40
Columbia Gas of Massachusetts (Bay State Gas Company)	0.8%	50,245,054	50,624,892	50,918,919	51,250,542	51,792,720			2018 IRP, pg. 80
Eversource Energy (NSTAR Gas)	2.4%	53,337,000	55,064,000	57,457,000	57,719,000	58,587,000			2018 IRP, Table G-22D
Without Special Contracts [1]	1.3%	51,025,856	51,657,856	52,653,435	52,926,006	53,794,006			2018 IRP, Table G-22D, pg. 16
Liberty Utilities (New England Gas Company)	0.0%	6,936,973	6,964,654	6,964,334	6,945,373	6,945,769	6,930,652		2018 IRP, pg. 45
National Grid (Boston Gas/Colonial Gas)	1.4%		142,395,261	144,616,011	146,450,900	148,138,086	150,245,148		2018 IRP, pg. 77
Unitil (Fitchburg Gas & Electric)	0.5%		2,416,985	2,424,982	2,421,473	2,435,437	2,461,270		2019 IRP, pg. 36
Maine									
Unitil (Northern Utilities)	1.5%			9,433,818	9,571,900	9,725,720	9,873,040	10,025,830	2019 IRP, pg. V-85
New Hampshire									
Unitil (Northern Utilities)	1.4%			6,863,948	6,961,683	7,059,962	7,158,788	7,257,977	2019 IRP, pg. V-80
Rhode Island									
National Grid (Narragansett Electric Company)	0.9%			41,624,000	41,648,000	42,004,000	42,411,000	43,110,000	2019 IRP, Table IV-A
Liberty Utilities (EnergyNorth Natural Gas) - Excl. INATGAS									
	2.3%	14,640,578	14,935,354	15,348,467	15,650,273	16,065,963			
Minimum CAGR									
	0.0%								
Maximum CAGR									
	2.4%								

Notes:

[1] NSTAR Gas has two special contracts. One of those contracts is with an MIT Cogeneration facility, which was expected to increase its operational capacity in November 2019, which would increase demand from the customer. The other special contract is with INATGAS. NSTAR Gas forecast usage for INATGAS to begin in November 2018.

Design Day Demand (Dth)									
LDC	CAGR	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Data Source(s)
Connecticut									
Eversource Energy (Yankee Gas Services Company)	1.5%		457,753	464,999	470,278	477,745	486,378		2018 Demand & Supply Forecast, Exhibit IV-5
UIL (Connecticut Natural Gas Corporation)	1.5%		351,063	356,683	362,028	367,388	372,932		2018 Demand & Supply Forecast, Exhibit S-4
UIL (Southern Connecticut Gas Company)	1.6%		322,286	327,621	332,688	337,764	342,857		2018 Demand & Supply Forecast, Exhibit S-4
Massachusetts									
Berkshire Gas Company	0.3%		66,424	66,808	66,915	67,133	67,272		2018 IRP, Attachment A, Page 43
Columbia Gas of Massachusetts (Bay State Gas Company)	0.6%	481,155	483,737	485,370	489,425	493,420			2017 IRP, pg. 78
Eversource Energy (NSTAR Gas)	2.0%	506,000	518,000	532,000	538,000	548,000			2018 IRP, Table G-23
Without Special Contracts [1]	1.7%	495,000	504,000	514,000	520,000	530,000			2018 IRP, Appendix-13C, pgs. 2.6,10,14,18; DPU 1-5
Liberty Utilities (New England Gas Company)	0.0%	77,156	77,464	77,110	77,249	77,253	77,085		2018 IRP, pg. 45
National Grid (Boston Gas/Colonial Gas)	1.5%		1,372,000	1,393,000	1,418,000	1,434,000	1,456,000		2018 IRP, Table G23-D
Unitil (Fitchburg Gas & Electric)	0.5%		21,938	22,011	21,982	22,129	22,363		2019 IRP, pg. 37
Maine									
Unitil (Northern Utilities)	1.5%		76,727	77,631	78,772	80,045	81,266	82,530	2019 IRP, pg. IV-82, 88
New Hampshire									
Unitil (Northern Utilities)	1.4%		62,677	63,662	64,568	65,481	66,398	67,319	2019 IRP, pg. IV-82, 88
Rhode Island									
National Grid (Narragansett Electric Company)	1.0%			389,000	392,000	395,000	399,000	404,000	2019 IRP, Chart IV-A
Liberty Utilities (EnergyNorth Natural Gas) - Excl. INATGAS									
	1.9%	157,828	160,320	163,392	164,691	170,367			
Minimum CAGR									
	0.0%								
Maximum CAGR									
	2.0%								

Notes:

[1] NSTAR Gas has two special contracts. One of those contracts is with an MIT Cogeneration facility, which was expected to increase its operational capacity in November 2019, which would increase demand from the customer. The other special contract is with INATGAS. NSTAR Gas forecast usage for INATGAS to begin in November 2018.

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**STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION**

Docket No. DG 17-152

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities
Least Cost Integrated Resource Plan

REBUTTAL TESTIMONY

OF

PAUL J. HIBBARD

October 25, 2019

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Liberty Utilities (EnergyNorth Natural Gas) Corp.
d/b/a Liberty Utilities
Docket No. DG 17-152
Rebuttal Testimony of Paul J. Hibbard
Page 1 of 20

1 **I. INTRODUCTION**

2 **Q. Please state your full name, business address and occupation.**

3 A. My name is Paul J. Hibbard. I am a Principal at Analysis Group, Inc., an economic, finance
4 and strategy consulting firm headquartered in Boston, Massachusetts, where I work on
5 energy and environmental economic and policy consulting. My business address is 111
6 Huntington Avenue, 14th Floor, Boston, Massachusetts.

7 **Q. On whose behalf are you submitting this rebuttal testimony?**

8 A. I am submitting this rebuttal testimony before the New Hampshire Public Utilities
9 Commission (the “Commission” or “NHPUC”) on behalf of Liberty Utilities (EnergyNorth
10 Natural Gas) Corp. d/b/a Liberty Utilities (“Liberty” or the “Company”).

11 **Q. Did you previously submit testimony in this case?**

12 A. Yes, I submitted testimony in Docket No. DG 17-152 on June 28, 2019, (“Hibbard Direct
13 Testimony” or “Direct Testimony”) on behalf of Liberty. My background and
14 qualifications are contained in and attached to the Hibbard Direct Testimony, and remain
15 unchanged from that time.

16 **Q. Would you please provide a brief summary of your Direct Testimony?**

17 A. The purpose of my Direct Testimony was to provide additional environmental impact
18 analysis related to the potential impact on Clean Air Act compliance, and the potential
19 environmental, economic, and health-related impacts of each option proposed by Liberty
20 in its Least Cost Integrated Resource Plan (“LCIRP”), in response to Order No. 26,225
21 (Mar. 13, 2019) (the “Order”). Based on analysis described in my Direct Testimony, I

Liberty Utilities (EnergyNorth Natural Gas) Corp.
d/b/a Liberty Utilities
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Page 2 of 20

1 concluded:

- 2 • Nearly every household and business in New Hampshire requires the use of some
3 type of fuel and/or electricity to meet vital heating, hot water, and process needs
4 (“service needs”), and both options proposed in Liberty’s LCIRP introduce the
5 opportunity for New Hampshire residents and businesses to switch from more
6 polluting fuels (such as oil, propane and wood) to natural gas for meeting service
7 needs.¹
- 8 • These conversions to natural gas resulting from the Company’s proposed projects
9 will benefit New Hampshire’s efforts to comply with the Clean Air Act (“CAA”),
10 providing meaningful reductions in emissions of sulfur dioxide (“SO₂”) for heating
11 and other service needs relative to the status quo, with the Granite Bridge Pipeline
12 providing the greatest level of reductions over time.²
- 13 • These conversions would also reduce emissions of criteria pollutants and reduce
14 costs associated with the harmful effects of pollutant emissions on public health.
15 In addition to the reductions in emissions of SO₂ noted above, the Granite Bridge
16 Pipeline will reduce emissions of nitrogen oxides (“NO_x”), particulate matter
17 (“PM”), and mercury (“Hg”).³ The reductions in SO₂, NO_x, and PM together

¹ Hibbard Direct Testimony at 4.

² Hibbard Direct Testimony at 21.

³ These emission reductions result from conversions of heating systems using more polluting fuels to natural gas that could not occur in a “status quo” scenario absent the Granite Bridge Pipeline.

Liberty Utilities (EnergyNorth Natural Gas) Corp.
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Rebuttal Testimony of Paul J. Hibbard
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1 contribute to health benefits of the Granite Bridge Pipeline of between \$1.06
2 million and \$2.39 million, relative to the status quo. I also found that the options
3 will lead to lower emissions of GHG relative to the status quo scenario, thereby
4 contributing to a lowering of the risks associated with climate change.⁴

- 5 • Finally, the Granite Bridge Pipeline will reduce large truck traffic for deliveries of
6 propane and/or liquefied natural gas (“LNG”), and will further reduce local
7 deliveries of oil and propane to residences and businesses that switch from those
8 fuels to natural gas. These reductions in truck delivery also generate emission
9 reductions and public health benefits relative to the status quo.⁵

10 On August 12, 2019, the Public Utilities Commission (“PUC” or “Commission”) issued
11 Order No. 26,286 in Docket DG 17-152. In that Order the Commission found that
12 Liberty’s supplemental filings (which included the Hibbard Direct Testimony) “compl[ied]
13 with the directive contained in Order No. 26,255” that the Company “submit a
14 supplemental filing to address each of the specific elements required under RSA 378:38
15 and RSA 378:39.”⁶

16 **Q. Have you reviewed the testimony submitted by Staff and interveners in this case?**

17 A. Yes I have. In particular I focused on the Direct Testimony of Terry Michael Clark (“Clark
18 Direct Testimony”), the Direct Testimony of Elizabeth A. Stanton, PhD (“Stanton Direct

⁴ Hibbard Direct Testimony at 28-30.

⁵ Hibbard Direct Testimony at 31-32.

⁶ Commission Order 26,286 at page 6.

Liberty Utilities (EnergyNorth Natural Gas) Corp.
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Testimony”), and the Direct Testimony of Paul Chernick (“Chernick Direct Testimony”).
The Stanton Direct Testimony and Chernick Direct Testimony were filed on behalf of the
Conservation Law Foundation.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to comment on the Clark, Stanton, and Chernick Direct
Testimonies with respect to their viewpoints on the likely environmental and climate
change impacts of the Company’s proposals to meet the LCIRP-identified need, and to
address errors in their analysis of my Direct Testimony.

Q. Would you please summarize your analysis and conclusions?

A. Yes. The intervenor testimonies do not present any evidence that affects the results of my
analysis and findings or the conclusions I draw from them. The intervenor testimonies
merely confuse the issue by presenting a broad set of energy and environmental policy
questions that are outside the scope of the very real and practical questions before the
Commission in this docket: namely, what resources are needed to reliably meet the current
and future heating and other service needs in Liberty’s service territory, and how should
the Company proceed to meet that need at the lowest possible cost to consumers?

The analysis in my Direct Testimony is focused on the obligations and options of Liberty
with respect to reliably meeting these customer service needs, and the CAA,
environmental, and climate implications of Liberty’s choices compared to the status quo.
Rather than focus on present circumstances, the intervenor witnesses wander far off the
mark, and instead postulate a distant future world where: (1) residential and commercial

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1 consumers have only one option for meeting heating and service needs - electric heat
2 pumps; (2) the heat pumps do not require any supplemental heating to meet customer needs
3 on cold New Hampshire days (an assumption contrary to current technology capabilities
4 and expectations); and (3) the electric system in New England has undergone a rapid
5 transition to only low- and zero-carbon forms of generation.

6 The world constructed by the intervener witnesses - and on which their observations are
7 based - is not real. It does not exist now, will not exist over the course of this LCIRP, and
8 may not exist as imagined for many years (if ever). Electric heat pumps are not, and will
9 not soon be, ubiquitous. It is not clear that electric heat pumps are economic, or are
10 sufficient without supplemental heating on cold days. There is little reason to believe the
11 level of heat pump adoption assumed by the intervener witnesses is realizable anytime
12 soon. In addition, generating the electricity to power electric heat pumps involves the
13 combustion of natural gas in power plants, which in New England are on the margin most
14 of the time, and will be for at least a decade, *even if large quantities of renewable resources*
15 *are added over time.*⁷

16 Finally, even if the state of New Hampshire does evolve towards widespread adoption of
17 electric heat pumps, this would not change the conclusions drawn in my Direct Testimony
18 for at least two reasons. First, because natural gas-fired power plants will be on the margin

⁷ ISO-NE, 2017 Economic Study: Exploration of Least-Cost Emissions-Compliant Scenarios, October 29, 2018, (hereafter "ISO-NE 2017 Economic Study"), <https://www.iso-ne.com/committees/planning/planning-advisory/?document-type=Economic%20Studies>, at 50-51.

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1 most of the time in New England for long after the term of this LCIRP, and heat pumps are
2 insufficient to meet all winter demand, meeting heating needs using electric heat pumps is
3 likely higher-emitting than using natural gas for heating. Second, even under wildly
4 optimistic scenarios for adoption of electric heat pumps in New Hampshire, the *last*
5 customers to adopt heat pump technologies should be those in the service territories of
6 natural gas LDCs, who have access to less expensive and lower-emitting natural gas for
7 heating and service needs. In fact, the greatest environmental benefit (and the most
8 beneficial primary focus of conversions to electric heat pumps) should be customers that
9 (a) currently heat with oil, propane, or wood, and (b) do not have access to natural gas
10 service, and thus have no option to reduce emissions through conversion to natural gas.

11 Finally, the interveners failed to recognize that my Direct Testimony is based on an
12 assumption of only a small fraction of customers in Liberty's service territory switching to
13 natural gas for heating. My analysis is highly conservative (i.e., potentially underestimates
14 emission reduction benefits) in that it only estimates benefits from a small number of
15 conversions of customers that have or gain access to natural gas service within Liberty's
16 service territory, representing a small fraction (less than one percent annually) of customers
17 that currently use more polluting fuels in the footprint of Liberty's service territory, and a
18 tiny fraction - about one half of one percent annually - of all residential and commercial
19 customers that currently use more polluting fuels for heating in the State of New
20 Hampshire.

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1 **Q. How have you organized your testimony?**

2 A. In Section II I provide my evaluation of the positions taken by the interveners' witnesses.

3 In Section III I provide my conclusions based on my review.

4 **II. INTERVENER COMMENTS**

5 **Q. Have you reviewed the Direct Testimonies of Dr. Stanton and Mr. Chernick with**
6 **respect to the use of electric heat pumps in New Hampshire?**

7 A. Yes. I have.

8 **Q. Please summarize your understanding of their viewpoint.**

9 A. Dr. Stanton and Mr. Chernick are opposed to Liberty's LCIRP in part on the basis that - in
10 their view - most (or all) new customers' demand and existing customers' conversions in
11 New Hampshire for heating and other service needs will be met through the installation of
12 electric heat pumps. Moreover, Mr. Chernick and Dr. Stanton assert or assume that the
13 total emissions associated with using natural gas for heating is greater than the total
14 emissions associated with the use of electric heat pump technologies to meet the same
15 service needs.

16 **Q. Do you agree with the viewpoints of Dr. Stanton and Mr. Chernick?**

17 A. No, I do not.

18 Dr. Stanton and Mr. Chernick expect that in the coming decades there will be a transition
19 in how the service needs of customers are met, moving away from fossil fuel consumption
20 and towards low- and zero-carbon resources, in order to meet states' GHG reduction
21 requirements and goals. Their testimonies are thus focused on a vision for the future with

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1 technologies that may help achieve states' decarbonization goals two to three decades in
2 the future.

3 However, there are many potential ways for states to meet their long-term GHG reduction
4 goals, and the pathways from here to there have not yet been identified. The interveners'
5 witnesses offer a viewpoint on one potential future, but their vision for the future *does not*
6 reflect circumstances that are in place now or will be anytime soon. Nor do they represent
7 a practical framework for Commission consideration of the Company's LCIRP and its
8 proposed alternatives.

9 This is because the witnesses' discussion of electric heat pumps (a) dramatically overstates
10 any plausible scenario for growth in heat pump use by consumers in New Hampshire over
11 the coming decade, (b) overstates the ability of heat pumps to meet resident and business
12 heating and service needs during New Hampshire winters without supplemental heating,
13 and (c) incorrectly characterizes the operation of the power system - and thus the emissions
14 profile of heat pumps - over this time period.

15 **Q. Please discuss how Dr. Stanton and Mr. Chernick mischaracterize the uptake of**
16 **electric heat pumps in New Hampshire.**

17 A. In my direct testimony I estimate changes in emissions due to incremental displacement of
18 "status quo" heating technologies (oil, propane, electric baseboard, electric heat pump, and
19 wood) with new natural gas service made possible through the Company's proposed
20 alternatives. For the calculation of emission impacts, I estimate that the customers that
21 switch to natural gas do so in proportion to the use of existing fuels for heating in the region

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1 where Liberty operates.⁸ Mr. Chernick and Dr. Stanton argue that rather than heating with
2 technologies in rough proportion to the technologies in current use, residents and
3 businesses will *instead*, on a going forward basis, universally adopt efficient electric heat
4 pumps, without any supplemental heating, for heating and other service needs.

5 **Q. Do you agree with this assumption?**

6 A. No, I do not. The intervener witnesses' viewpoint is aspirational and unrealistic, is focused
7 on long-term GHG reduction targets (for 2040 and 2050), and reflects only one possible
8 pathway towards decarbonization. In contrast, the options reviewed in Liberty's LCIRP
9 are immediate; they are needed to reliably meet fundamental heating and service needs
10 now, and can generate immediate reductions in emissions that, but for their proposed
11 solutions, will not be realized. Liberty's proposal will open the door to customers selecting
12 efficient natural gas technologies for heating. Absent that choice, these customers would
13 select alternative technologies, such as oil, propane, wood, or electricity (baseboard and/or
14 electric heat pumps).

15 While the witnesses may hope or wish that electric heat pumps become the technology of
16 choice for heating and service needs, it simply is *not the case* at this time, and is not likely
17 to be over the term of the Company's LCIRP. Instead, absent the option to select natural
18 gas for heating and service needs, customers will likely select alternative technologies in

⁸ Hibbard Direct Testimony at 6-7.

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rough proportion to their current use in southern New Hampshire.

Q. What are the challenges to increased adoption of electric heat pumps in New Hampshire?

A. There are two challenges to more widespread adoption of electric heat pumps in New Hampshire: they are not currently a least-cost heating option, and they cannot adequately meet customers' heating needs without a supplemental source of heat for cold winter days in New Hampshire.

The most important piece of evidence related to heat pump economics is also the most obvious: if electric heat pumps were a least cost heating option, there would be significantly higher uptake than there has been to date in the state. And while Mr. Chernick asserts that electric heat pumps are economic and sufficient without the support of a supplemental heating source (such as a backup oil/propane furnace, wood stove, and/or baseboard electric heating), he fails to provide any evidence supporting this conclusion other than reference to the fact that there has been some uptake of electric heat pumps in states with different climates, supported by supplemental funding through state grants, rebates, or tax incentives (such as New Jersey, California and Massachusetts). In fact, in each state referenced by Mr. Chernick, the quotes he used specifically reference financial incentives or other support needed to spur increased adoption of electric heat pump technologies,

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1 which support is generally only needed for more costly technologies.⁹

2 Strikingly, the American Council for an Energy-Efficient Economy (“ACEEE”) studies
3 cited by Mr. Chernick in his testimony directly contradict his conclusions. For example,
4 one ACEEE study cited by Mr. Chernick states that heat pumps “have the greatest potential
5 for adoption in cold-climate regions where natural gas is not available for space heating.”¹⁰
6 That same ACEEE study recommends that programs to promote cold-climate heat pumps
7 “should target existing homes that use electricity, propane, or heating oil as their space
8 heating fuel (not utility natural gas),”¹¹ and concludes that “[c]old climate air source heat
9 pumps have been identified for their potential to provide significant energy and cost
10 savings to homeowners without access to natural gas space heating.”¹² Another ACEEE
11 study cited by Mr. Chernick states: “In moderately cold states (as far north as Pennsylvania
12 and Massachusetts)... life-cycle costs for gas furnaces in existing homes will be lower than
13 for heat pumps.”¹³ Thus, even the studies cited by Mr. Chernick do not support the idea
14 that heat pumps are a viable or economic alternative to natural gas in cold climates like
15 New Hampshire.

⁹ Chernick Direct testimony at 17-18.

¹⁰ American Council for an Energy-Efficient Economy, Field Assessment of Cold Climate Air Source Heat Pumps, https://aceee.org/files/proceedings/2016/data/papers/1_700.pdf, at 1-2.

¹¹ Ibid, at 1-13

¹² Ibid. [Emphasis added]

¹³ American Council for an Energy-Efficient Economy, Report A1803, Energy Savings, Consumer Economics, and Greenhouse Gas Emissions Reductions from Replacing Oil and Propane Furnaces, Boilers, and Water Heaters with Air-Source Heat Pumps, July 2018, <https://aceee.org/sites/default/files/publications/researchreports/a1803.pdf>, at 2

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1 Finally, Mr. Chernick's Figure 1 - showing heat pump efficiency and capacity based on the
2 ACEEE Field Assessment, demonstrates the fundamental challenge to using electric heat
3 pumps in New Hampshire. Namely, the heating capacity at ten degrees Fahrenheit is on
4 the order of a third less than the heating capacity of the technology at 50 degrees
5 Fahrenheit, and its capability declines more steeply at lower temperatures - temperatures
6 often realized in New Hampshire.¹⁴ This suggests a clear need for supplemental sources of
7 heat with the use of electric heat pumps.

8 **Q. Is it inappropriate for states to provide incentives for greater installation of electric**
9 **heat pumps?**

10 A. No, it is not. States in New England have adopted aggressive goals and requirements for
11 reducing emissions of GHGs over the next few decades, and have begun the process of
12 exploring various pathways and technologies to support achievement of these goals and
13 requirements. Exploring the *potential* contributions associated with electrification of the
14 heating sector - for example through the establishment of state grants, tax rebates, and/or
15 other incentives for the continued development and installation of electric heating
16 technologies - is an appropriate focus for the consideration in long-term state energy and
17 environmental policy.

¹⁴ Chernick Direct testimony at 12.

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1 **Q. Does this mean greater installation of electric heat pumps is an appropriate focus of**
2 **Liberty's LCIRP?**

3 A. No, it does not, for two reasons. First, as demonstrated in my Direct Testimony, conversion
4 of oil, propane, and wood heating to efficient natural gas heating technologies - where there
5 is access to natural gas supply - can deliver immediate reductions in emissions of GHGs
6 and other harmful pollutants. Second, there is a massive untapped market for any state
7 incentives focused on the installation of electric heat pumps to displace oil, propane and
8 wood heating technologies in communities that do not have access to natural gas supply.
9 This means that if and to the extent the state of New Hampshire considers it appropriate to
10 promulgate policies in support of increased installations of electric heat pumps in
11 residences and businesses, the appropriate primary focus from the perspective of climate,
12 public health, environmental, and energy policy is on incentives for customers that *do not*
13 *have access to natural gas*.

14 **Q. Mr. Chernick argues that electric heat pumps are more beneficial than heating with**
15 **natural gas with respect to emissions of GHGs and other pollutants. Do you agree?**

16 A. No. Efficient natural gas heating is likely less polluting than heating systems that include
17 electric heat pump technology. This is true under the current resource mix and dispatch
18 practices of the New England region's electricity market, and in my view will continue to
19 be the case for many years.

20 **Q. Please provide more detail.**

21 A. Mr. Chernick focuses in his testimony on a lengthy and unnecessarily complicated

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1 discussion of technology efficiencies, and asserts erroneously that the “...energy for
2 marginal electric load like a new heat pump would come mostly from clean renewables or
3 from natural gas.”¹⁵

4 Comparing the emission impacts of electric heat pumps and natural gas for heating is
5 relatively simple. One would compare for household heating needs the emissions from a
6 natural gas furnace (plus upstream emissions and fugitive methane associated with
7 production, processing and transportation of the gas used) with the emissions from the
8 electric system to meet the incremental electricity demand of the heat pump. These
9 marginal emissions from the electric system would include the emissions from the power
10 plant operating on the margin to meet the demand (plus upstream and fugitive emissions
11 associated with production, processing and transportation of the fuel used on the margin,
12 and taking into account the electric system transmission and distribution losses to serve the
13 load). Finally, one would identify the emissions associated with supplemental sources of
14 heat for electric heat pump installations. For example, if the supplemental heating source
15 is a retained oil or propane boiler furnace, the emission impacts of electric heat pump
16 installations could be higher than those of efficient natural gas technology.

¹⁵ Chernick Direct Testimony at 13.

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1 **Q. Mr. Chernick suggests that the mix of resources to generate electricity will change,**
2 **and potentially alter, the emissions associated with electricity generation. Do you**
3 **agree?**

4 A. In part, yes. The New England states and market participants are actively pursuing
5 development and grid integration of a large amount of low/zero-carbon generating
6 resources, including large hydro, wind, and solar power plants. In addition, there continues
7 to be active growth in behind-the-meter solar photovoltaic installations. All of these factors
8 will increase the amount of energy coming annually from low emission resources.

9 However, what matters is the emission profile of units on the margin day to day - in other
10 words, the last power plants turned on to meet the incremental demand from new electric
11 heat pumps. As noted by Mr. Chernick, the marginal energy supply in 2018 was mostly
12 natural gas (70 percent), with the rest taken up by a mix of oil and coal (in small amounts),
13 and other non-emitting resources.¹⁶ My estimates of electricity-based emissions in my
14 Direct Testimony are based on the emissions associated with the region's marginal
15 generation profile.

16 Mr. Chernick implies that this marginal emission profile will change over the term of the
17 LCIRP (or beyond), and this means the emission impacts of electric heat pumps will be
18 reduced. But this is not likely to be the case. While the total annual generation from low-
19 emitting resources will likely increase, there are at least two reasons why it is a mistake to

¹⁶ Chernick Direct Testimony at 13.

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1 conclude this will change the emission profile of the power system - and thus electric heat
2 pumps - over the term of this LCIRP or more generally over the next decade.

3 First, as ISO-NE has found, even with the integration of vast amounts of low-emission
4 generation, the power plants operating on the margin will remain mostly natural gas for a
5 very long time, well beyond the term of the LCIRP.¹⁷ Second, to the extent that states make
6 rapid progress in achieving GHG reductions over the coming decade, this will likely
7 require significant electrification of the transportation sector. This will place strong
8 upward pressure on the demand for electricity, tending to retain or possibly even increase
9 the demand for natural gas generation on the margin.

10 **Q. How does the population of new natural gas conversions you assumed in the Hibbard**
11 **Direct Testimony compare to the broader set of heating customers in New**
12 **Hampshire?**

13 A. The interveners failed to recognize that my Direct Testimony is based on an assumption of
14 only a small fraction of customers in Liberty's service territory switching to natural gas for
15 heating. My analysis is highly conservative (i.e., potentially underestimates emission
16 reduction benefits) in that it only estimates benefits from a small number of conversions of
17 customers that have or gain access to natural gas service within Liberty's service territory,
18 representing a small fraction (less than one percent annually) of customers that currently

¹⁷ In their 2017 Economic Analysis, ISO-NE modeled various scenarios in 2030 where between 5,500 and 13,000 MW of combined offshore and onshore wind come online. Through all of these high renewable integration scenarios, the study notes that, "[...] natural gas generation is mostly on the margin across all scenarios." ISO-NE 2017 Economic Study at 31, 50-51.

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1 use more polluting fuels in the footprint of Liberty's service territory, and a tiny fraction -
2 about one half of one percent annually - of all customers that currently use more polluting
3 fuels for heating in the State of New Hampshire.

4 **Q. Do you have any additional comments on the interveners' testimonies?**

5 A. Yes. In the calculations included in my Direct Testimony I used a 100-year global warming
6 potential ("GWP") of 25 for emissions of methane. Mr. Clark suggests that instead I should
7 use a twenty-year GWP for methane of 84. I disagree with his recommendation.

8 **Q. Why do you disagree with Mr. Clark's recommendation?**

9 A. I recognize that there is debate in the literature on which time frame (e.g., 20 years or 100
10 years) is more appropriate to use for estimating the GWP of methane, depending on the
11 viewpoint of the user and the purpose of the analysis. In my Direct Testimony, I considered
12 it most appropriate to use the 100-year value, as this has been and is the most commonly-
13 used value in regulatory analyses, as noted by the IPCC, EPA, and the New Hampshire
14 DES.¹⁸ In any event, using Mr. Clark's suggested GWP does not qualitatively change my

¹⁸ IPCC, Climate Change 2007 Synthesis Report, https://www.ipcc.ch/site/assets/uploads/2018/02/ar4_syr_full_report.pdf; IPCC, Climate Change 2014 Synthesis Report, https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf; EPA, Emission Factors for Greenhouse Gas Inventories, Last Modified March 9, 2019, https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf; EPA, Understanding Global Warming Potentials, <https://www.epa.gov/ghgemissions/understanding-global-warming-potentials>; New Hampshire Department of Environmental Services, The New Hampshire Climate Action Plan: A Plan for New Hampshire's Energy, Environmental and Economic Development Future, March 2009, https://www.des.nh.gov/organization/divisions/air/tsb/tps/climate/action_plan/documents/nhcap_final.pdf.

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results and would not affect the conclusions drawn in my Direct Testimony.¹⁹

III. CONCLUSIONS

Q. What do you conclude based on your review of the intervenor witnesses' testimonies?

A. Based on my review, I come to the following observations and conclusions:

- The interveners' testimonies do not affect my analysis or the conclusions I drew in my Direct Testimony. The options presented in the Company's LCIRP are likely to generate meaningful public health and environmental benefits relative to the status quo. These benefits include emissions reductions of criteria pollutants, and reductions in costs associated with the harmful effects of these pollutant emissions on public health. I also find that the options will lead to lower emissions of GHG relative to the status quo scenario, and thereby contribute to a lowering of risks associated with climate change.
- The world constructed by the intervenor witnesses - and on which their observations are based - is not real. It does not exist now, will not exist over the course of this LCIRP, and may not exist as imagined for many years (if ever). Electric heat pumps are not, and will not soon be, ubiquitous. It is not clear that electric heat pumps are economic, or are sufficient without supplemental heating on cold days. There is little reason to believe the level of heat pump adoption assumed by the intervenor

¹⁹ Response to Clark Data Requests - Set 5, Request No. Clark 5-9.

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1 witnesses is realizable anytime soon. And generating the electricity to power
2 electric heat pumps involves the combustion of natural gas in power plants, which
3 in New England are on the margin most of the time, and will be for at least a decade,
4 even if large quantities of renewable resources are added over time.

- 5 • Even if the state of New Hampshire does evolve towards widespread adoption of
6 electric heat pumps, this would not change the conclusions drawn in my Direct
7 Testimony for at least two reasons. First, because natural gas-fired power plants
8 will be on the margin most of the time in New England for long after the term of
9 this LCIRP, meeting heating needs with approaches that include electric heat
10 pumps is likely higher-emitting than using natural gas for heating. Second, even
11 under wildly optimistic scenarios for adoption of electric heat pumps in New
12 Hampshire, the last customers to adopt heat pump technologies should be those in
13 the service territories of natural gas LDCs, who have access to less expensive and
14 lower-emitting natural gas for heating and service needs. In fact, the greatest
15 environmental benefit (and the most beneficial first focus of conversions to electric
16 heat pumps) should be customers that (a) currently heat with oil, propane, or wood,
17 and (b) do not have access to natural gas service, and thus have no option to reduce
18 emissions through conversion to natural gas.

- 19 • The interveners failed to recognize that my Direct Testimony is based on an
20 assumption of only a small fraction of customers in Liberty's service territory
21 switching to natural gas for heating. My analysis is highly conservative (i.e.,

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1 potentially underestimates emission reduction benefits) in that it only estimates
2 benefits from a small number of conversions of customers that have or gain access
3 to natural gas service within Liberty's service territory, representing a small
4 fraction (less than one percent annually) of customers that currently use more
5 polluting fuels in the footprint of Liberty's service territory, and a tiny fraction -
6 about one half of one percent annually - of all residential and commercial customers
7 that currently use more polluting fuels for heating in the State of New Hampshire.

8 **Q. Does this complete your testimony?**

9 **A. Yes.**