

September 8, 2022

**VIA ELECTRONIC MAIL**

Luly E. Massaro, Commission Clerk  
Rhode Island Public Utilities Commission  
89 Jefferson Boulevard  
Warwick, RI 02888

**RE: Docket No. 4978 – 2022 Last Resort Service Procurement Plan  
Proposed Last Resort Service Rates for the Residential, Commercial & Industrial  
Groups For Effect October 2022  
Paul J. Hibbard Testimony**

Dear Ms. Massaro:

On behalf of The Narragansett Electric Company d/b/a Rhode Island Energy (the “Company”), enclosed please find an electronic version<sup>1</sup> of the pre-filed testimony of Paul J. Hibbard for filing in the above-referenced docket.

Mr. Hibbard’s pre-filed testimony was filed on September 1, 2022 in Docket No. 22-20-NG 2022 - Gas Cost Recovery Filing. The Company believes Mr. Hibbard’s testimony is relevant to this Docket No. 4978. The Company anticipates asking a few direct questions to Mr. Hibbard at the hearing to adopt the attached testimony and explain why it is relevant in Docket No. 4798.

Please note that the Company reached out to counsel of the parties to ask whether they had any objections to the attached testimony being filed in this docket. Counsel for the parties indicated they did not have an objection.

Thank you for your attention to this filing. If you have any questions or concerns, please do not hesitate to contact me at 401-784-4263.

Sincerely,



Andrew S. Marcaccio

Enclosures

cc: Docket 4978 Service List  
Christy Hetherington, Esq.  
John Bell, Division

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<sup>1</sup> Per a communication from Commission counsel on October 4, 2021, the Company is submitting an electronic version of this filing followed by six (6) hard copies filed with the Clerk within 24 hours of the electronic filing.

**PRE-FILED DIRECT TESTIMONY**

**OF**

**PAUL J. HIBBARD**

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1 **I. Introduction and Qualifications**

2 **Q. Mr. Hibbard, please state your name and business address.**

3 A. My name is Paul J. Hibbard. My business address is 111 Huntington Avenue, Boston,  
4 MA 02199.

5  
6 **Q. On whose behalf are you testifying in this matter?**

7 A. The Narragansett Electric Company, d/b/a Rhode Island Energy (the “Company” or  
8 “Rhode Island Energy”).

9  
10 **Q. By whom are you employed and in what capacity?**

11 A. I am employed by Analysis Group as a Principal.

12  
13 **Q. Please summarize your professional and educational background.**

14 A. I provide consulting services to clients in the areas of energy and environmental markets,  
15 regulation, and policy. I have been with Analysis Group for approximately sixteen years,  
16 since 2003. First, from 2003 to April 2007, and most recently, from August 2010 to the  
17 present. In between, from April 2007 to June 2010, I served as Chairman of the  
18 Massachusetts Department of Public Utilities (“Department”). While Chairman, I also  
19 served as a member of the Massachusetts Energy Facilities Siting Board, the New  
20 England Governors’ Conference Power Planning Committee, and the NARUC Electricity  
21 Committee and Procurement Work Group. I also served as State Manager for the New

1 England States Committee on Electricity and as Treasurer to the Executive Committee of  
2 the 41-state Eastern Interconnect States' Planning Council.

3  
4 I previously worked in energy and environmental consulting with Lexecon, Inc. from  
5 2000 to 2003. Prior to working with Lexecon, I worked in state energy and  
6 environmental agencies for almost ten years. From 1998 to 2000, I worked for the  
7 Massachusetts Department of Environmental Protection on the development and  
8 administration of air quality regulations, Clean Air Act State Implementation Plans, and  
9 emission control programs for the electric industry with a focus on criteria pollutants and  
10 carbon dioxide, as well as various policy issues related to controlling pollutants from  
11 electric power generators within the Commonwealth of Massachusetts. From 1991 to  
12 1998, I worked in the Electric Power Division of the Department on cases related to the  
13 setting of utility rates, restructuring of the electric industry in Massachusetts and New  
14 England, quantification of environmental externalities, integrated resource planning,  
15 energy efficiency, utility compliance with state and federal emission control  
16 requirements, regional electricity market structure development, and coordination with  
17 other states on electricity and gas policy issues through the staff subcommittee of the  
18 New England Conference of Public Utility Commissioners.

19

1 **Q. Have you ever testified before the Rhode Island Public Utilities Commission**  
2 **(“PUC”) or any other regulatory body?**

3 A. Yes. While I have not testified before the Rhode Island PUC, I have submitted testimony  
4 before the Federal Energy Regulatory Commission (“FERC”) and state public utility  
5 commissions and siting boards on a variety of subject areas. I have testified numerous  
6 times on behalf of the New England Independent System Operator (“ISO-NE”) and the  
7 New York Independent System Operator (“NYISO”) on a range of wholesale electricity  
8 market issues including the setting of capacity market demand curves, changes to  
9 wholesale market designs, and the cost impact of new wholesale market rules. I have  
10 also submitted testimony to FERC on jurisdictional ratemaking issues. I have testified in  
11 state public utility commission natural gas and electric utility proceedings related to  
12 company mergers, the prudence of natural gas system investments, rate design,  
13 environmental impacts, and natural gas and electric integrated resource planning. I have  
14 testified before siting boards related to the proposed siting of new power plant  
15 infrastructure in New England. Finally, I have testified before New England state  
16 legislators on environmental policy and before the U.S. Congress on natural gas-electric  
17 system coordination issues and on interstate transmission. Additional detail regarding my  
18 credentials and experience can be found in my *curriculum vitae*, which is attached as  
19 Attachment PJH-1 to this testimony.

20

1 **II. Purpose and Summary of Testimony**

2 **Q. What is the purpose of your testimony?**

3 A. I have been asked by the Company to provide background on regional and international  
4 factors that affect the pricing of natural gas supply and transportation, as context for the  
5 gas supply costs that underlie the Company's Gas Cost Recovery ("GCR") filing. In  
6 particular, my testimony explains context for the purchase of natural gas in, and delivery  
7 of natural gas to, the New England region; the region's unique reliance on liquefied  
8 natural gas ("LNG") delivery and storage for supply during winter months; and how  
9 recent events have affected the pricing and supply of natural gas to customers in the New  
10 England region.

11

12 **Q. Please summarize your findings.**

13 A. The Company's GCR includes expected increases in rates associated with changes in the  
14 underlying costs to procure, store, and transport natural gas for use in Rhode Island.  
15 These increases are fully consistent with fundamental changes in underlying factors  
16 affecting natural gas supply and demand in the U.S. and, in particular, in New England.  
17 The natural gas market factors driving the increased GCR costs are being experienced by  
18 natural gas (as well as electric) local distribution companies, and are due to at least the  
19 following factors:  
20 (1) New England has a strong winter peak due to (i) widespread use of natural gas for  
21 heating homes and businesses in the region, and (ii) a dependence on spot market

1 purchases of natural gas for operating power plants needed to maintain winter electric  
2 system reliability;

3 (2) New England has significant constraints on the delivery of natural gas for meeting the  
4 combined heating and electricity demand in the winter. The region has no indigenous  
5 sources of natural gas and sits effectively at the end of the pipeline system delivering gas  
6 from the south and west. Although there is a pipeline connection to Eastern Canada, the  
7 primary source of deliveries from Canada historically – Sable Island – shut down in  
8 2018. Finally, the New England region, in recent years, has been unable to develop  
9 additional natural gas supply and transportation infrastructure to alleviate the persistent  
10 winter natural gas transportation constraints. As a result, the natural gas delivery  
11 infrastructure that does exist in the region is at or near capacity on most winter days and  
12 is operating at maximum capacity on many cold winter days each year.

13 (3) Finally, these conditions leave New England strongly dependent on international  
14 shipments of LNG to meet natural gas demand during cold winter periods. Yet since  
15 power plant owners have little incentive to pre-contract for LNG supplies, the availability  
16 of LNG for injection on cold winter days in sufficient quantities to meet combined  
17 heating and electricity demand is relatively expensive and highly uncertain, adding  
18 pricing volatility and uncertainty to the region’s natural gas markets.

19  
20 In a normal year, these conditions can lead to elevated and highly variable natural gas  
21 prices in New England during winter months, and correspondingly high pricing in natural



1 gas futures markets, with relatively minor variations in the conditions of supply and  
2 demand. Yet, this is not a normal year. The impact of the Russian invasion of Ukraine  
3 has fundamentally changed international markets for natural gas, including LNG. The  
4 increased demand for global supplies of natural gas from Europe has increased the price  
5 of natural gas throughout the U.S. and in much of the world, resulting in increasing  
6 exports from the U.S. to Europe and increasing the cost of securing LNG supplies for the  
7 LNG import terminals serving New England.

8  
9 **Q. How is your testimony organized?**

10 A. In **Section III**, I summarize the key factors affecting natural gas prices in New England,  
11 including the nature of the region's demand for natural gas, supply and delivery sources  
12 and challenges, and the pricing dynamics associated with a constrained system and  
13 reliance on imported LNG. In **Section IV**, I describe how the circumstances of supply  
14 and demand, and the impact of recent turmoil in the market for natural gas, have affected  
15 and are affecting the expected cost of natural gas delivered to New England and Rhode  
16 Island, in particular. In **Section V**, I describe how the Company's customers are not  
17 alone – that other natural gas local distribution company ("LDC") customers are and will  
18 see similar impacts, as will electric utility customers. Finally, in **Section VI**, I summarize  
19 my observations and conclusions.

20

1 **III. The Drivers of Natural Gas Pricing in New England**

2 **Q. Please summarize the key drivers affecting the cost of natural gas supply in New**  
3 **England.**

4 A. There are three key drivers of natural gas costs in Rhode Island and, more generally, New  
5 England. The first involves the nature and timing of natural gas demand. The second  
6 relates to the significant constraints on the interstate natural gas infrastructure used to  
7 supply and deliver natural gas to the region. The third involves New England's unique  
8 reliance on LNG to meet winter natural gas demand. While all three of these are related,  
9 I will discuss each separately.

10

11 **Q. Please describe the nature of natural gas demand in New England.**

12 A. There are two main components of natural gas demand in Rhode Island and the rest of  
13 New England. One is LDC demand associated primarily with heating, cooking, and  
14 water heating in homes and businesses across the region. This demand is dominated by  
15 heating, and reaches its highest levels during winter months when heating is needed. The  
16 second is the demand for natural gas to generate electricity in power plants located across  
17 New England. This demand is year-round and strongest in the summer, but as described  
18 below, has a major influence on winter natural gas price levels and volatility.

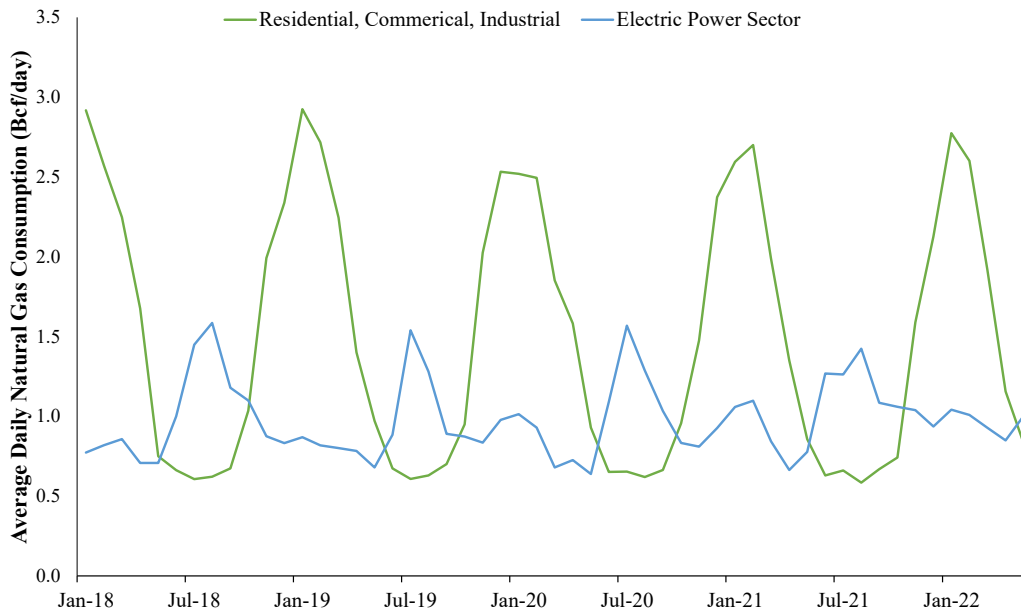
19

20 As can be seen in **Figure 1**, the total demand for natural gas for (primarily) heating,  
21 cooking, and water heating in the residential, commercial, and industrial sectors

1 dominates natural gas demand, reaching peak demand levels of approximately  
2 3.0 Bcf/day on average during the coldest winter months. Electric sector demand for  
3 natural gas in turn peaks in the summer, when electricity demand is highest in the region,  
4 reaching 1.5 Bcf/day on average during the peak months of summer electricity demand.  
5 However, electric sector demand has an important second (albeit lower) peak in the  
6 winter, adding 1.0 Bcf/day on average on top of the natural gas demand served by LDCs  
7 during the cold winter months.

8 **Figure 1: New England Natural Gas Demand by End-Use Sector<sup>1</sup>**

9 **January 2018 – May 2022**



Notes:

[1] Average daily New England natural gas consumption is the sum of monthly consumption across Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont divided by the number of days in the month.

[2] Natural gas use in the transportation sector is minimal and is not included.

10

<sup>1</sup> "Natural Gas Consumption by End Use," EIA, available at [https://www.eia.gov/dnav/ng/ng\\_cons\\_sum\\_deu\\_svt\\_m.htm](https://www.eia.gov/dnav/ng/ng_cons_sum_deu_svt_m.htm).

1 **Q. Please describe how the procurement of natural gas in the electric sector differs**  
2 **from the supply of natural gas to LDCs.**

3 A. Natural gas LDCs have an obligation to reliably meet the demand of their customers, and  
4 thus contract for supply, including pipeline transportation, conventional natural gas, and  
5 LNG, in advance and over the long-term to ensure firm supply and delivery of sufficient  
6 natural gas to meet expected and “design day” peak demand during winter months. This  
7 need for long-term, firm supply and delivery of natural gas, and the associated contracts,  
8 provide the financial basis for investment in the natural gas infrastructure needed to  
9 ensure aggregate LDC regional peak demand can be met on the coldest of winter days.

10  
11 The gas procurement incentives and practices of gas-fired power plants needed to meet  
12 electricity demand are very different. Power plant owners are not subject to rate  
13 regulation, and generally do not have an obligation to reliably meet the electricity needs  
14 of retail customers.<sup>2</sup> Opportunities to earn revenues (and profits) in electricity markets  
15 are instead contingent on being able to supply electricity at the lowest possible cost, with  
16 offers that are lower than those of competing power plants. Power plants cannot earn  
17 revenues in the energy market if they do not offer competitive prices, and the lower the  
18 cost of running the plant, the greater the profit margin. Any increase in the cost to obtain  
19 power plant fuel over short-term commodity prices (from, for example, obtaining firm

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<sup>2</sup> Power plants earn revenues in the capacity market for being available to generate electricity if called upon, but the ability to earn capacity market revenues is not contingent on any obligation to demonstrate forward procurement of the fuel needed to operate.

1 transportation service) by definition increases costs relative to competitors and reduces  
2 (or eliminates) opportunities for profit in electricity markets.

3 Thus, there is little to no incentive for power plant owners to contract for natural gas  
4 supply any sooner than the day before they offer to provide electricity, if doing so would  
5 increase fuel costs and make them less competitive in wholesale electricity markets. As  
6 noted by the New England Independent System Operator (“ISO-NE”):

7 *Because generators have no guarantee for when or how long*  
8 *they’ll be called to run—and there’s no practical way for them to*  
9 *store excess pipeline gas or electricity on site—contracting for*  
10 *pipeline capacity only when needed helps natural-gas-fired*  
11 *generators keep their costs as low as possible to maintain*  
12 *competitiveness in the wholesale electricity markets.*

13 *While that strategy works for most of the year, on cold days the*  
14 *pipelines are running at or near maximum capacity solely to meet*  
15 *heating demand. During several recent winters, this situation has*  
16 *severely limited the delivery of fuel to much of the region’s power*  
17 *plants, which, in turn, threatened the reliable supply of electricity*  
18 *and drove up wholesale electricity prices and air emissions.<sup>3</sup>*

19 This practice of just-in-time natural gas procurement provides little incentive for  
20 the pipeline or LNG supply industry to commit to capital investments to develop  
21 infrastructure needed by the region’s gas-fired power plants.

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22  
<sup>3</sup> “Natural Gas Infrastructure Constraints,” ISO New England, available at  
<https://www.iso-ne.com/about/what-we-do/in-depth/natural-gas-infrastructure-constraints>

1 **Q. How does the status of New England’s supply and transportation infrastructure, in**  
2 **combination with the electric sector’s participation in natural gas markets,**  
3 **influence the levels and volatility of natural gas prices in winter months?**

4 A. The pricing of natural gas in the Northeast in winter months is sensitive to the  
5 circumstances of supply and demand. Unfortunately, these conditions have grown worse  
6 over the last several years due to events related to the loss of a major supply source from  
7 the eastern end of the system and failure to increase interstate pipeline capacity from the  
8 west. As shown in **Figure 2**, several pipelines transport natural gas to New England from  
9 the south and west with additional flows arriving on the pipeline systems connected to  
10 Canada. There are also three LNG import terminals in the area: Everett in Massachusetts,  
11 the Northeast Gateway buoy offshore of Massachusetts, and the St. John facility in New  
12 Brunswick Canada, which is connected into New England by the Maritimes and  
13 Northeast (“MNE”) pipeline.

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Figure 2: New England Natural Gas Infrastructure<sup>4</sup>



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Beginning in 1999 and for many years thereafter, the Sable Offshore Energy Project (“Sable”) in Eastern Canada provided significant injections of natural gas of 12 million cubic meters/day (or approximately 0.4 Bcf/day) or more into the northeastern end of New England (that is, from the opposite direction of the major interstate pipeline supply from the south and west) via the MNE pipeline connecting New England to Eastern Canada. See **Figures 3** and **4**. However, Sable’s production declined relatively quickly, and was shut down completely in December 2018.<sup>5</sup> See **Figure 4**. While there is LNG storage and regasification capacity in Eastern Canada (the St. John facility), it has provided less than 30 Bcf/year (0.08 Bcf/day on average) of natural gas into New

<sup>4</sup> “New England natural gas infrastructure map,” EIA, as of August 26, 2022, available at [https://www.eia.gov/dashboard/new-england-energy-api/archives/202208/20220826\\_new\\_england\\_dashboard.pdf](https://www.eia.gov/dashboard/new-england-energy-api/archives/202208/20220826_new_england_dashboard.pdf).

<sup>5</sup> “Sable Offshore Energy Project,” CNSOPB, available at <https://www.cnsopb.ns.ca/offshore-activity/current-activity/sable-offshore>.

1 England since 2013.<sup>6</sup> Sable was the largest supplier of gas for the MNE pipeline  
2 connecting New England to Eastern Canada, and its declining production and subsequent  
3 closure has switched the MNE pipeline from an importer of Canadian gas to (primarily)  
4 an exporter of U.S. gas.<sup>7</sup> See **Figure 3**. Moreover, other supplies from Canada have not  
5 increased sufficiently to replace the lost production from Sable. For example, although  
6 the Portland Natural Gas Transmission System (“PNGTS”), shown in green in **Figure 2**,  
7 has approximately doubled its capacity in recent years, this increase amounted to less  
8 than 0.2 Bcf/day, less than half of Sable’s production at its peak.<sup>8</sup>  
9

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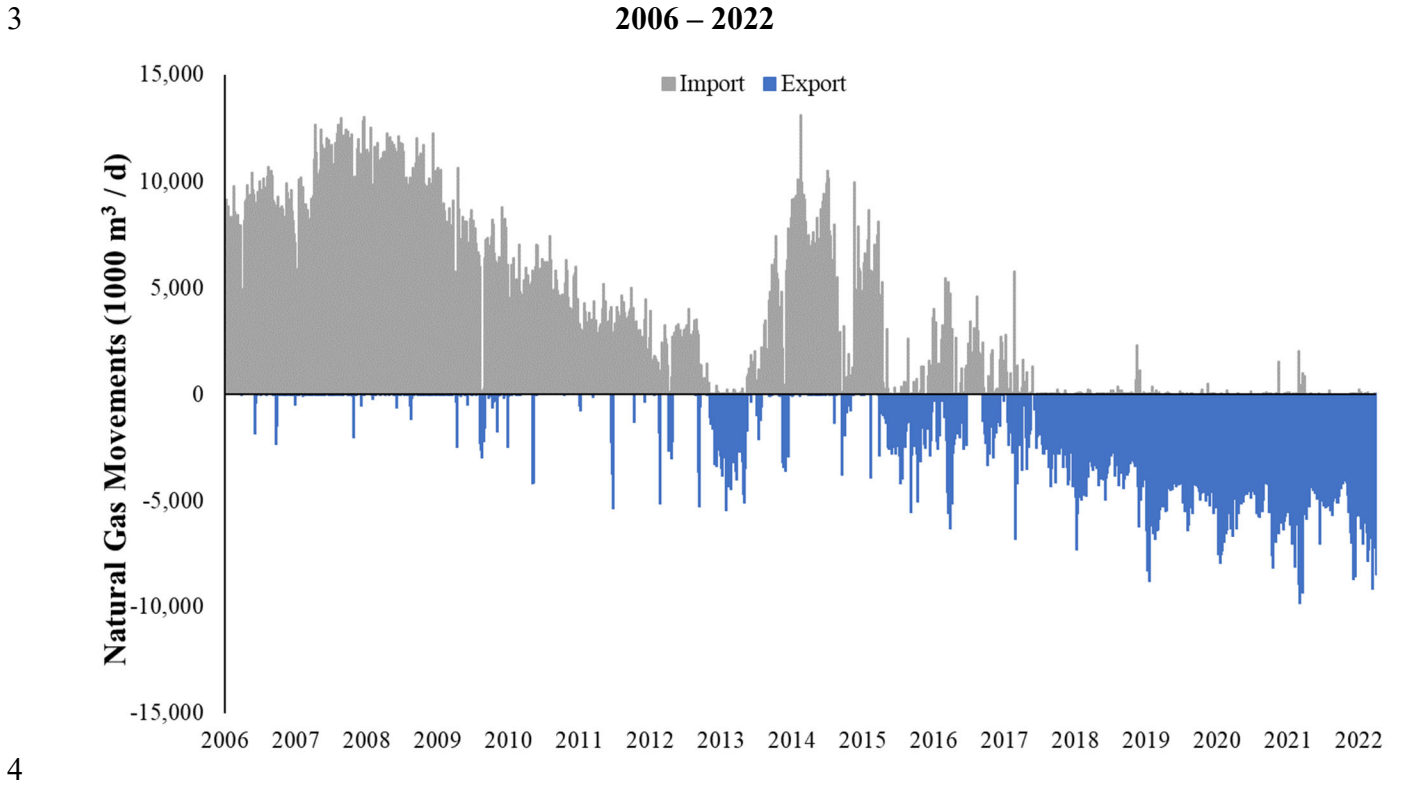
<sup>6</sup> “LNG Imports, Northeast Terminals, 2011-21,” Northeast Gas Association, available at [https://www.northeastgas.org/pdf/lng\\_annual0222.pdf](https://www.northeastgas.org/pdf/lng_annual0222.pdf); “Description of Pipelines/LNG Import Facilities Serving the Northeast Market,” Northeast Gas Association, available at [https://www.northeastgas.org/pdf/lng\\_importers0722.pdf](https://www.northeastgas.org/pdf/lng_importers0722.pdf).

<sup>7</sup> “Market Snapshot: The end of natural gas production in the Maritimes increases reliance on imports,” Canadian Energy Regulator, February 27, 2019, available at <https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/market-snapshots/2019/market-snapshot-end-natural-gas-production-in-maritimes-increases-reliance-imports.html>.

<sup>8</sup> “Portland Natural Gas Transmission System,” TC PipeLines, LP, available at <https://www.tcpipelineslp.com/assets/pngts/>.



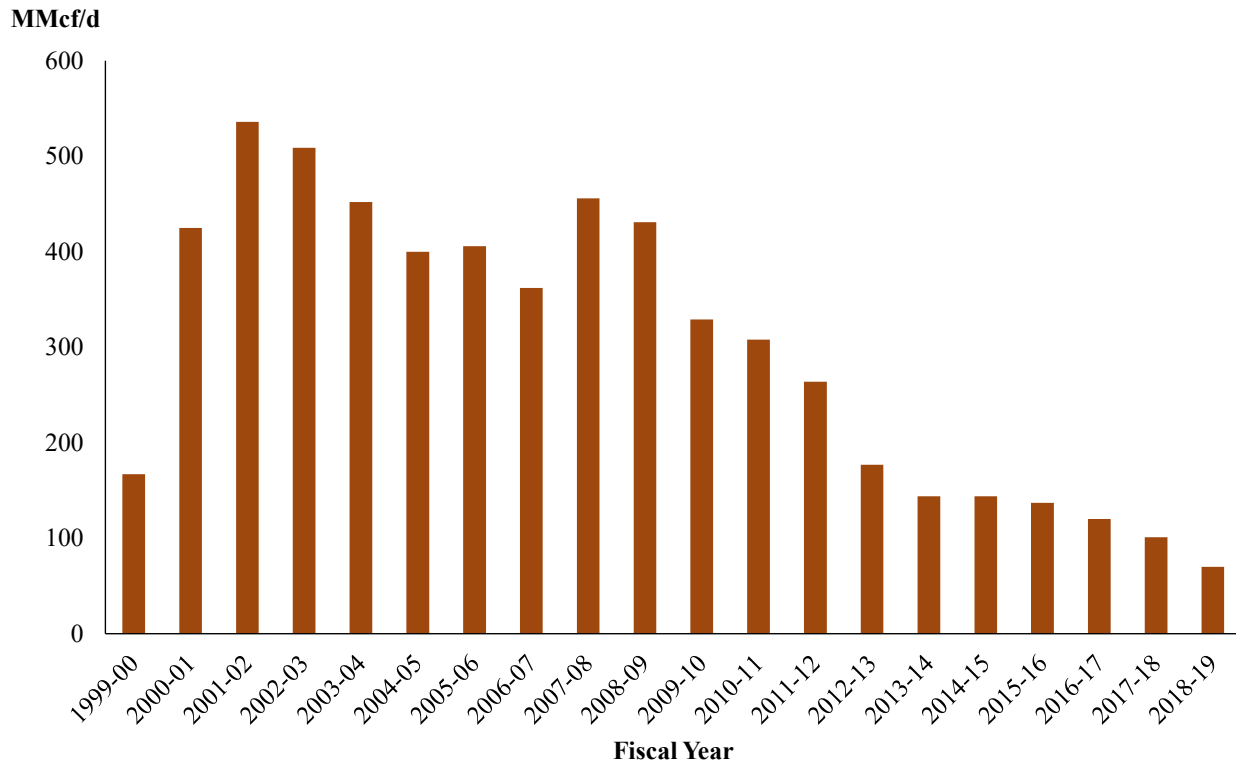
1 Figure 3: Natural Gas Imports to the U.S. from Canada and Exports from the U.S. to  
2 Canada on the MNE Pipeline<sup>9</sup>



<sup>9</sup> “Pipeline Throughput and Capacity Data, Maritimes,” Canada Energy Regulator, available at <https://open.canada.ca/data/en/dataset/dc343c43-a592-4a27-8ee7-c77df56afb34>.

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**Figure 4: Sable Average Gas Production per Day by Fiscal Year<sup>10</sup>  
1999/00 – 2018/19**



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In addition to the loss of Sable, New England has been unable to add natural gas transportation capacity into the region. Most noticeably, in 2016, Kinder Morgan suspended work and spending on a proposed new 430 mile pipeline project to deliver gas through New York and into New England.<sup>11</sup> Similarly, in 2017, Enbridge and its utility partners in New England suspended further work on the Access Northeast pipeline

<sup>10</sup> “SOEP Average Gas Rate by Fiscal Year,” Canada-Nova Scotia Offshore Petroleum Board, available at [https://www.cnsopb.ns.ca/sites/default/files/resource/sable\\_final.pdf](https://www.cnsopb.ns.ca/sites/default/files/resource/sable_final.pdf).

<sup>11</sup> “Kinder Morgan Generates More Than \$1.2 Billion of Distributable Cash Flow for First Quarter 2016,” Kinder Morgan, April 20, 2016, available at <https://ir.kindermorgan.com/news/news-details/2016/Kinder-Morgan-Generates-More-Than-12-Billion-of-Distributable-Cash-Flow-for-First-Quarter-2016/default.aspx>.

1 expansion project, another major pipeline project that would have increased natural gas  
2 transportation capacity into New England from the Pennsylvania shale gas region.<sup>12</sup>

3 The combined impact of growing demand from the electric sector and its reliance on  
4 short-term spot markets for procuring supplies, the potential for significant increases in  
5 demand for natural gas for heating during extreme cold weather events, the loss of supply  
6 from Eastern Canada, and the lack of a meaningful increase in transportation capacity  
7 into New England all combine to put pressure on delivered natural gas price indices  
8 within New England, and make prices very sensitive to relatively small perturbations in  
9 supply and demand.

10  
11 **Q. Please describe the changing role that LNG plays in meeting U.S. energy needs and**  
12 **in meeting New England’s winter supply needs.**

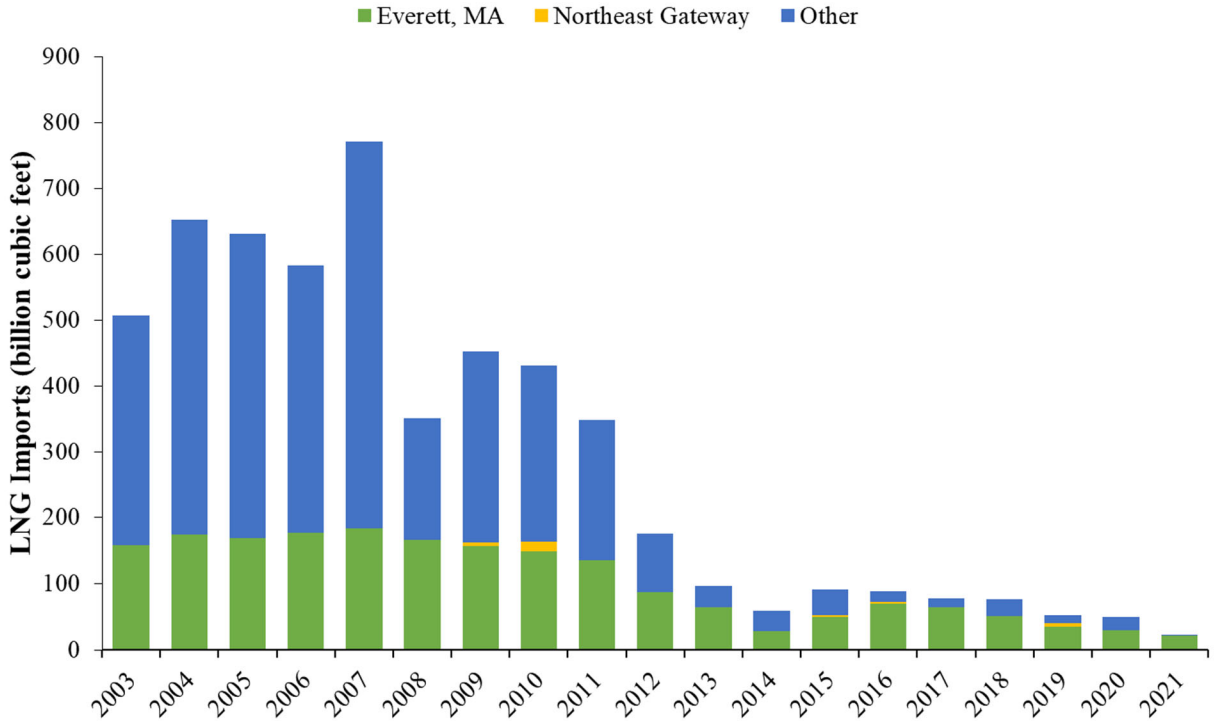
13 A. The U.S., as a whole, has a long history of importing LNG, with peak imports in 2006-  
14 2008, but the emergence of shale gas as a plentiful, relatively low-cost domestic resource  
15 has led to plummeting LNG import volumes over the last ten to twelve years, with the  
16 Everett facility in Massachusetts becoming the primary import terminal. See **Figure 5**.

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<sup>12</sup> “Spectra Energy Partners Reports Second Quarter 2017 Results,” Spectra Energy Partners, August 2, 2017, available at <https://www.spectraenergypartners.com/investors/press-releases?id=122495>.

1  
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Figure 5: U.S. LNG Imports by Import Terminal<sup>13</sup>  
2003 – 2021



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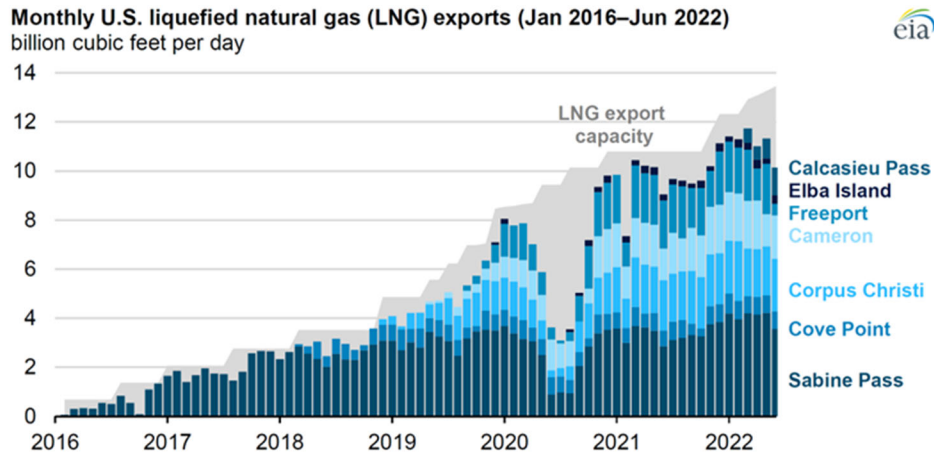
With the growth in shale gas production, the U.S. increased its LNG export capability, with export volumes keeping pace with the growth in export capability over time. See **Figure 6**. In the first half of 2022, U.S. LNG exports increased to 11.2 Bcf/day on average, a 12 percent increase compared to the second half of 2021, making the U.S. the world’s largest LNG exporter.<sup>14</sup>

<sup>13</sup> “US Natural Gas Imports by Point of Entry, Liquefied Natural Gas Volumes,” EIA, available at [https://www.eia.gov/dnav/ng/ng\\_move\\_poel\\_a\\_EPG0\\_IML\\_Mmcf\\_a.htm](https://www.eia.gov/dnav/ng/ng_move_poel_a_EPG0_IML_Mmcf_a.htm).

<sup>14</sup> “The United States became the world’s largest LNG exporter in the first half of 2022,” EIA, July 25, 2022, available at <https://www.eia.gov/todayinenergy/detail.php?id=53159>.

1

**Figure 6: Monthly U.S. LNG exports<sup>15</sup>**



Data source: U.S. Energy Information Administration, *Liquefaction Capacity Table*, and U.S. Department of Energy *LNG reports*  
Note: June 2022 LNG exports are EIA estimates based on tanker shipping data. LNG export capacity is an estimated peak LNG production capacity of all operational U.S. LNG export facilities.

2

3

Despite the major changes in the U.S. LNG import/export picture, LNG imports have continued to play a critical role in meeting New England’s winter natural gas demand.

4

5

According to data from the U.S. Energy Information Administration (“EIA”), New

6

England has been responsible for more than 60 percent of imports each year since 2016

7

and was the recipient of 100 percent of the LNG imports in 2021.<sup>16</sup> See **Figure 5**.

8

9

**Q. Why are these factors important to consider in the context of natural gas pricing in New England?**

10

11

**A.** These conditions – constrained transportation infrastructure, just-in-time procurement of a significant amount of natural gas by power plants needed for winter power system

12

<sup>15</sup> “The United States became the world’s largest LNG exporter in the first half of 2022,” EIA, July 25, 2022, available at <https://www.eia.gov/todayinenergy/detail.php?id=53159>.

<sup>16</sup> “US Natural Gas Imports by Port of Entry, Liquefied Natural Gas Volumes,” EIA, available at [https://www.eia.gov/dnav/ng/ng\\_move\\_poel\\_a\\_EPG0\\_IML\\_Mmcf\\_a.htm](https://www.eia.gov/dnav/ng/ng_move_poel_a_EPG0_IML_Mmcf_a.htm).

1 reliability, and the region’s reliance in the winter on international shipments of LNG –  
2 put upward pressure on natural gas price indices and introduce pricing uncertainty and  
3 volatility to New England’s markets in “normal” years. This upward pressure translates  
4 into higher natural gas supply costs and upward pressure on futures markets that set  
5 prices for longer-term procurements. Perhaps more importantly, *this is not a normal*  
6 *year*. The impact of the Russian invasion of Ukraine has fundamentally changed  
7 international markets for natural gas, including LNG. The increased demand for global  
8 supplies of natural gas from Europe has increased the price of natural gas throughout the  
9 U.S. and in much of the world, resulting in increasing exports from the U.S. to Europe  
10 and increasing the cost of securing LNG supplies for the LNG import terminals serving  
11 New England.

12  
13 **IV. The Impact of Market Factors on Natural Gas Prices in New England**

14 **Q. You have indicated that recent events – in particular the war in Ukraine – are**  
15 **creating an environment for high natural gas prices in New England. Could you**  
16 **please explain in general how these international events and market dynamics affect**  
17 **natural gas prices in this region?**

18 **A.** As discussed above, natural gas prices in New England are typically higher in winter than  
19 in summer due to the demand for heating in winter. Yet as presented in more detail  
20 below, the price of natural gas in spot and forward/futures markets – in particular for this  
21 winter but also next winter – have increased well beyond prices experienced historically.

1 The EIA cites to a number of reasons why natural gas prices in 2022 are elevated relative  
2 to 2021, including the continued economic recovery, limited natural gas production  
3 increases, forecasts that winter 2022-23 will be colder than winter 2021-22, smaller than  
4 average inventories of natural gas in the U.S., and limited switching to coal-fired  
5 generation due to generator retirements, as well as limited stocks of coal and issues with  
6 coal delivery.<sup>17</sup>

7 Yet, an additional major influence on gas pricing for the New England region is related to  
8 the impact of international events on U.S. markets and prices for LNG shipments.

9 Russia's invasion of Ukraine in February 2022 caused – and continues to cause –

10 upheavals in markets for natural gas in Europe, given Europe's heavy dependence on

11 Russia for natural gas supply, Europe's sanctions of Russia, and the ensuing disputes

12 over natural gas supply.<sup>18</sup> Specifically, Russia's pipeline exports to Europe and the

13 United Kingdom in the first seven months of 2022 dropped by almost half compared to

14 the previous five-year average.<sup>19</sup> See **Figure 7**. In turn, prices for natural gas in Europe

15 were trading at over \$100/MMBtu in onshore markets as of August 26, 2022 while spot

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<sup>17</sup> See “Short-Term Energy Outlook: Natural Gas,” EIA, July 12, 2022, available at <https://www.eia.gov/outlooks/steo/archives/Jul22.pdf>; Weber, Maya, “Spot gas prices to top \$8/MMBtu in H2'22 despite production growth, EIA predicts,” S&P Global Market Intelligence, June 7, 2022; Micek, Kassia, “US EIA sees summer power prices climbing on fuel costs, delivery constraints,” S&P Global Market Intelligence, June 17, 2022.

<sup>18</sup> Wallace, Joe and Jenny Strasburg, “Ukraine Reduced Russian Gas Flowing to Europe Through Key Pipeline,” The Wall Street Journal, May 11, 2022; Pancevski, Bojan and Jenny Strasburg, “Europe Fears Widespread Economic Fallout if Russian Gas Outage Drags On,” The Wall Street Journal, July 18, 2022; “Short-Term Energy Outlook: Natural Gas,” EIA, July 12, 2022, available at <https://www.eia.gov/outlooks/steo/archives/Jul22.pdf>.

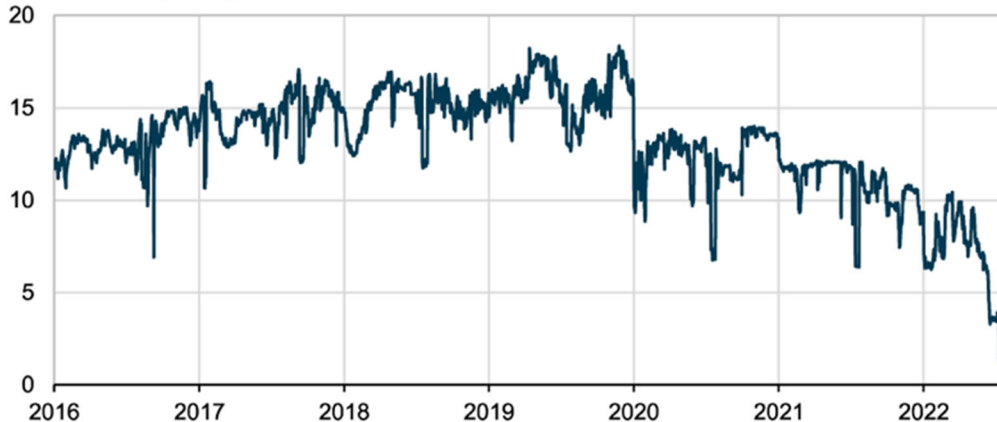
<sup>19</sup> “Russia's natural gas pipeline exports to Europe decline to almost 40-year lows,” EIA, August 9, 2022, available at <https://www.eia.gov/todayinenergy/detail.php?id=53379>.

1 LNG import prices in Europe set a record for the third day in a row at \$74.49/MMtu  
2 “putting pressure on U.S. LNG export terminals to step up production.”<sup>20</sup>

3 **Figure 7: Daily Natural Gas Pipeline Exports from Russia to Europe<sup>21</sup>**

**Daily natural gas pipeline exports from Russia to Europe (Jan 1, 2016–Jul 31, 2022)**

billion cubic feet per day



Data source: Refinitiv Eikon, based on data provided by the European Transmission System Operators

Note: Russia's natural gas exports by pipeline include exports to the European Union and the United Kingdom as measured by daily flow volumes at the main entry points in Germany, Slovakia, and Poland.

4  
5 Europe's efforts to replace Russian natural gas supplies with supplies from other sources  
6 increase the price of natural gas in the U.S. given the increasing expansion of U.S. LNG

<sup>20</sup> “US LNG export terminals stage production push as European gas prices top \$100/MMBtu,” S&P Global Commodity Insights, August 26, 2022, available at <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/natural-gas/082622-us-lng-export-terminals-stage-production-push-as-european-gas-prices-top-100mmbtu>.

<sup>21</sup> “Russia's natural gas pipeline exports to Europe decline to almost 40-year lows,” EIA, August 9, 2022, available at <https://www.eia.gov/todayinenergy/detail.php?id=53379>.



1 export capability, discussed above (see **Figure 6**).<sup>22</sup> As demand for natural gas in Europe  
2 strengthens, so does the price Europeans are willing to pay for natural gas, which  
3 strengthens the incentive for U.S. producers to export natural gas to Europe.<sup>23</sup> With more  
4 domestic supply going to Europe, the price of natural gas delivered in the U.S. increases,  
5 including in New England. For example, in the first quarter of 2022, the U.S. supplied 47  
6 percent of the European Union’s LNG imports, representing a 235 percent increase in  
7 year-on-year LNG exports from the U.S. to the European Union.<sup>24</sup> Similarly, the EIA  
8 expects that total LNG exports from the U.S. in 2022 will be 22 percent higher than in  
9 2021.<sup>25</sup>

10 Moreover, New England’s expected and realized natural gas prices are tied in part to the  
11 region’s critical dependence on LNG for reliable winter gas supply. Yet for this supply,

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<sup>22</sup> See, e.g., Weber, Maya, “‘Uncomfortable questions’ seen ahead for global gas supply dynamics,” S&P Global Market Intelligence, July 15, 2022; “Short-Term Energy Outlook: Natural Gas,” EIA, July 12, 2022, available at <https://www.eia.gov/outlooks/steo/archives/Jul22.pdf> (“LNG prices in Europe remain high amid supply uncertainties because of Russia’s invasion of Ukraine and the need to replenish Europe’s natural gas inventories, which has kept Europe’s demand for LNG elevated... The Henry Hub spot price averaged \$6.07 per million British thermal units (MMBtu) in 1H22, rising steadily from an average of \$4.38/MMBtu in January to \$8.14/MMBtu in May... The increase through May resulted from continued demand for LNG exports, increased demand in electric power generation as a result of limited natural gas-to-coal switching, and decreased production compared with the end of 2021.”).

<sup>23</sup> “Short-Term Energy Outlook: Natural Gas,” EIA, July 12, 2022, available at <https://www.eia.gov/outlooks/steo/archives/Jul22.pdf> (“Strong natural gas demand and high LNG prices in Europe and Asia drove the continued growth in U.S. LNG exports in the first half of this year.”).

<sup>24</sup> “Quarterly Report on European Gas Markets,” European Commission, Vol. 15, Issue 1, Q1 2022, available at [https://ec.europa.eu/info/sites/default/files/energy\\_climate\\_change\\_environment/quarterly\\_report\\_on\\_european\\_gas\\_markets\\_q1\\_2022.pdf](https://ec.europa.eu/info/sites/default/files/energy_climate_change_environment/quarterly_report_on_european_gas_markets_q1_2022.pdf), p.16. See also Weber, Maya, “‘Uncomfortable questions’ seen ahead for global gas supply dynamics,” S&P Global Market Intelligence, July 15, 2022 (“In the first half of 2022, [the International Energy Agency’s] report showed European LNG imports rose by more than 50% compared to last year, while two-thirds of the increase in global LNG trade came from the U.S. alone.”).

<sup>25</sup> Weber, Maya, “Spot gas prices to top \$8/MMBtu in H2’22 despite production growth, EIA predicts,” S&P Global Market Intelligence, June 7, 2022.

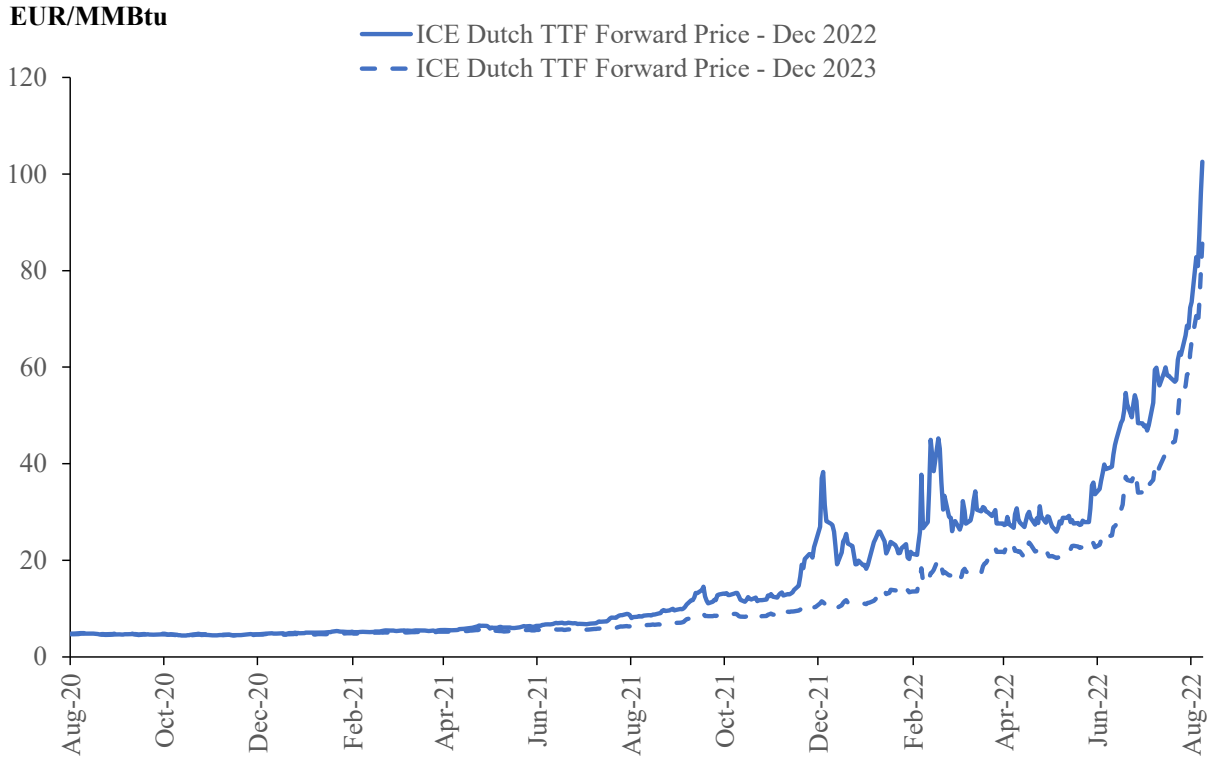
1 New England competes for LNG cargoes in a global market where buyers in Western  
2 Europe are moving aggressively to secure supplies given the uncertainty over gas supply  
3 from Russia, at the same time that demand from Asian utilities for LNG cargoes is also  
4 increasing.<sup>26</sup> This means that New England natural gas suppliers have been, and over the  
5 next year, will be, competing for LNG cargoes in a market of rapidly-increasing  
6 international prices. See **Figures 8** and **9** for the prices of Dutch TTF natural gas forward  
7 contracts in Europe and spot LNG prices in Asia, respectively.

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<sup>26</sup> Benjamin Storrow, “How the Ukraine war could make New Englanders shiver,” E&E News, May 10, 2022, available at <https://www.eenews.net/articles/how-the-ukraine-war-could-make-new-englanders-shiver/>.

1  
2

**Figure 8: Forward Prices for Natural Gas in Europe<sup>27</sup>  
December 2022 and December 2023 Contracts**



**Note:** The unit of measurement has been converted from the original EUR/MWh to EUR/MMBtu

3

<sup>27</sup> "Dutch TTF Gas Futures," Intercontinental Exchange, available at <https://www.theice.com/products/27996665/Dutch-TTF-Gas-Futures/data?marketId=5419234>.

1 **Figure 9: Asian Spot LNG Prices<sup>28</sup>**  
2 **January 2022 – August 2022**



3 Source: S&P Global Commodity Insights

4  
5 **Q. Please describe how the factors you have been describing are affecting U.S. and New**  
6 **England spot prices for natural gas.**

7 A. Spot prices for natural gas at the Henry Hub more than doubled over the past year.  
8 Specifically, spot prices at Henry Hub went from \$3.86/MMBtu on August 19, 2021 to  
9 \$9.42/MMBtu on August 19, 2022.<sup>29</sup> Spot prices at Henry Hub have not been above  
10 \$8/MMBtu since 2008.<sup>30</sup> Similarly, the spot price at the Algonquin City Gate increased

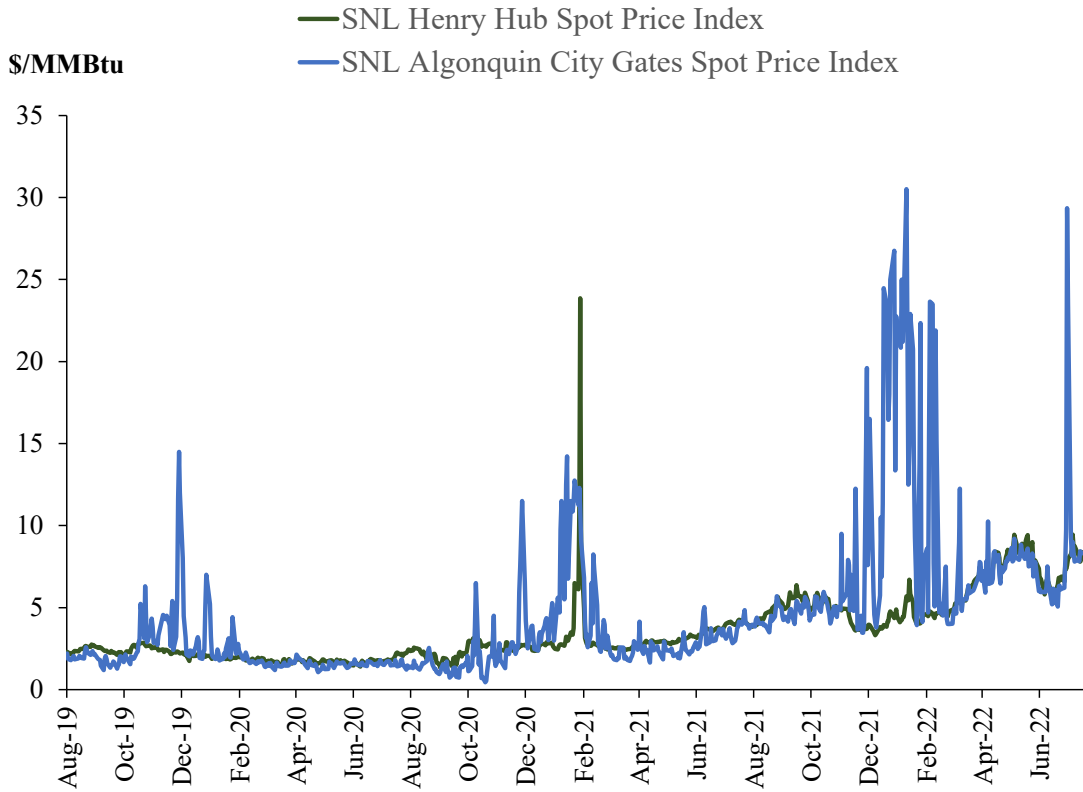
<sup>28</sup> “Asia’s LNG winter procurement activity heats up despite strengthening prices,” S&P Global Commodity Insights, August 18, 2022, available at <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/natural-gas/081822-asias-lng-winter-procurement-activity-heats-up-despite-strengthening-prices>.

<sup>29</sup> “SNL Henry Hub Spot Natural Gas Index,” S&P Global Market Intelligence.

<sup>30</sup> “U.S. monthly average Henry Hub spot price nearly doubled in 12 months,” EIA, July 14, 2022, available at <https://www.eia.gov/todayinenergy/detail.php?id=53039>.

1 by over two hundred percent over a one year period, increasing from \$3.86/MMBtu on  
2 August 19, 2021, to \$8.85/MMBtu on August 19, 2022.<sup>31</sup> See **Figure 10**.

3 **Figure 10: U.S. and New England Natural Gas Spot Prices<sup>32</sup>**  
4 **August 2019 – August 2022**



5

6

<sup>31</sup> “SNL Algon Gates Spot Natural Gas Index” and “SNL Henry Hub Spot Natural Gas Index,” S&P Global Market Intelligence.

<sup>32</sup> “SNL Algon Gates Spot Natural Gas Index” and “SNL Henry Hub Spot Natural Gas Index,” S&P Global Market Intelligence.

1 **Q. Are forward prices for the U.S. and New England showing similar trends?**

2 A. Yes. On August 4, 2022, the Henry Hub front-month natural gas futures contract settled  
3 at \$8.12/MMBtu, rising from \$2.39/MMBtu on July 1, 2022.<sup>33</sup> On two days in June 2022  
4 the front-month natural gas futures price topped \$9.00/MMBtu.<sup>34</sup> Forward prices and  
5 expectations are even more severe for New England. Winter gas prices in New England  
6 are hitting record highs in recent trading; Algonquin City Gate peak-winter gas prices for  
7 the upcoming season have more than doubled since the start of this year.<sup>35</sup> The January  
8 2023 contract is now priced at a record high of over \$40/MMBtu, while the December  
9 2022 contract recently settled at a new high of over \$34/MMBtu.<sup>36</sup> The pace of change  
10 in forward prices has been significant; as of October 4, 2021 the forward price for  
11 December 2022 was \$10.05/MMBtu; by August 11, 2022, the price had more than tripled  
12 to \$31.54/MMBtu.<sup>37</sup> See **Figure 11**. This trend is consistent both with the influence of  
13 this past year's events, with the expectation that New England prices will be driven in  
14 part by competition for LNG cargoes with Europe, and with the high price of natural gas

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<sup>33</sup> "Short-Term Energy Outlook: Natural Gas Market Review," EIA, August 9, 2022, available at <https://www.eia.gov/outlooks/steo/marketreview/natgas.php>.

<sup>34</sup> "Short-Term Energy Outlook: Natural Gas Market Review," EIA, August 9, 2022, available at <https://www.eia.gov/outlooks/steo/marketreview/natgas.php>.

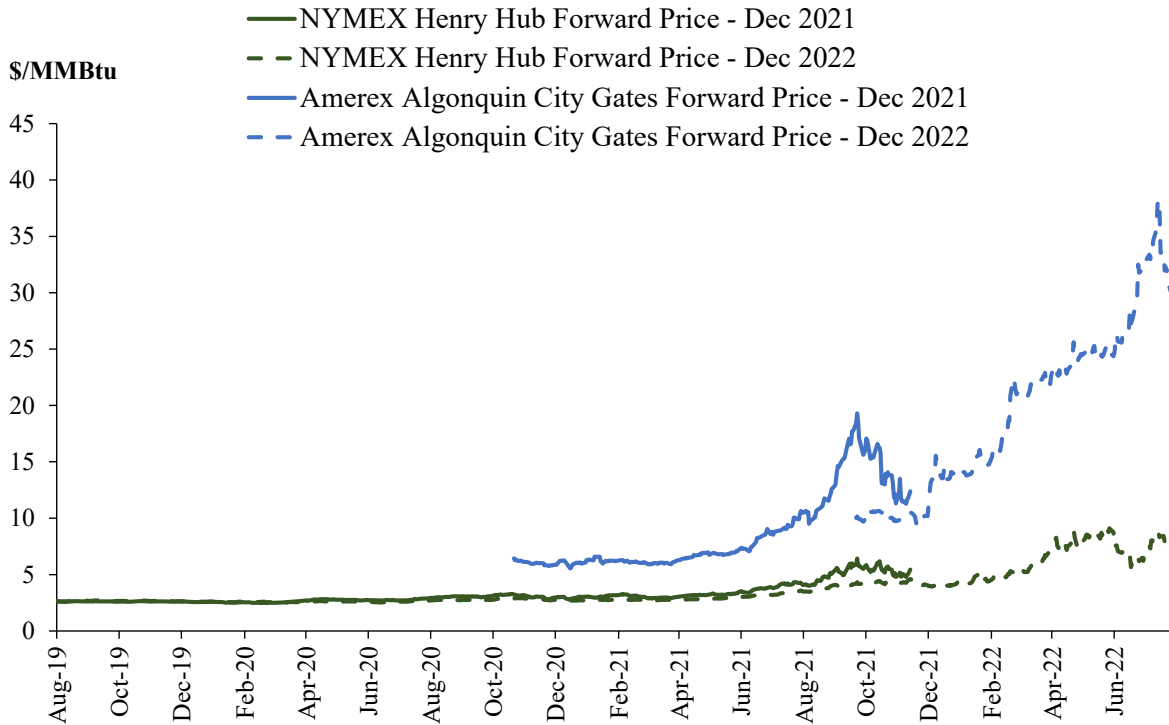
<sup>35</sup> "New England winter natural gas prices top \$40 as global LNG market tightens," S&P Global Commodity Insights, July 22, 2022, available at <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/natural-gas/072222-new-england-winter-natural-gas-prices-top-40-as-global-lng-market-tightens>.

<sup>36</sup> "New England winter natural gas prices top \$40 as global LNG market tightens," S&P Global Commodity Insights, July 22, 2022, available at <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/natural-gas/072222-new-england-winter-natural-gas-prices-top-40-as-global-lng-market-tightens>.

<sup>37</sup> "Amerex Algon Gates Natural Gas Full Value Monthly," S&P Global Market Intelligence.

1 contracts at the Dutch TTF hub in Europe, which are now trading at more than 100  
2 Euro/MMBtu for December 2022. See **Figure 8**.

3 **Figure 11: U.S. and New England Natural Gas Forward Prices<sup>38</sup>**  
4 **December 2021 and December 2022 Contracts**



5

6

<sup>38</sup> “NYMEX Henry Hub Natural Gas Futures” and “Amerex Algon Gates Natural Gas Full Value Monthly,” S&P Global Market Intelligence.

1 **Q. What do you conclude based on your review of changes in regional, national, and**  
2 **international markets for the supply of natural gas?**

3 A. The cost to supply natural gas to retail customers in Rhode Island has always varied – at  
4 times significantly – with changes in the forces of supply, demand, and pipeline  
5 transportation utilization.

6 In addition to the better-known risks affecting natural gas prices – such as regional  
7 supply and transportation limitations and the ever-present risk of severe weather – this  
8 past year introduced into the equation extreme forces outside of the control of natural gas  
9 suppliers in Rhode Island and New England. Russia’s invasion of Ukraine and  
10 intentional restriction of natural gas exports to Europe have thrown international markets  
11 for natural gas and LNG, and the U.S. balance of supply and demand, into disarray. As a  
12 result, over the past year, natural gas purchasers in the U.S., and in particular in New  
13 England, have faced extreme and sustained increases in the cost of natural gas. These  
14 factors and the impact they have had on natural gas markets in the U.S. and New England  
15 are fully consistent with and responsible for the increase in supply costs that underlie the  
16 Company’s GCR filing.

17



1 V. **The Regional Impact of Market Factors on Prices of Natural Gas in Other States**  
2 **and on the Price of Electric Power**

3 Q. **Is the Company's need to adjust rates to incorporate the rising cost of natural gas**  
4 **unique?**

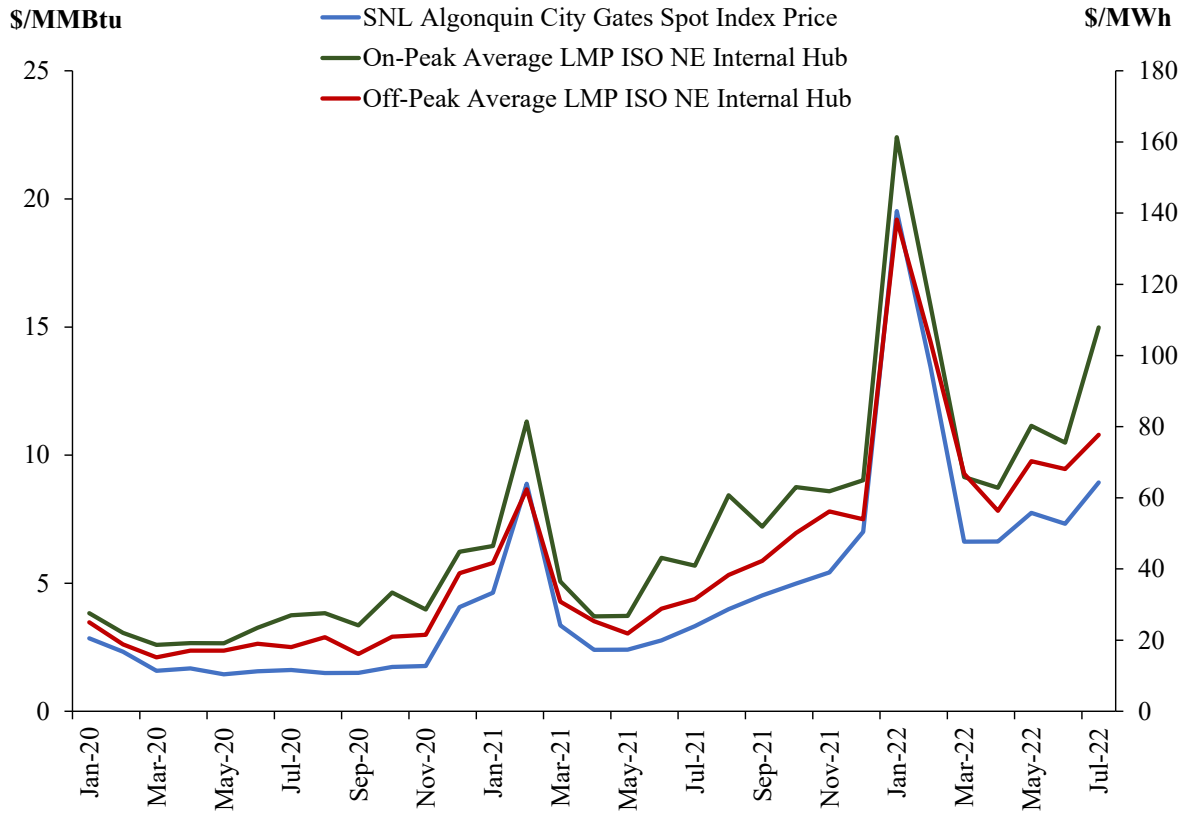
5 A. No. To the contrary, not only are all natural gas LDCs going to need to adjust rates to  
6 address increasing natural gas supply costs, but this is also likely to be the case for  
7 electric utilities.

8  
9 Q. **Please describe how the price of electricity has been changing over the past year.**

10 A. Since natural gas is the fuel on the margin most hours of the year in New England's  
11 wholesale electricity markets, and because power plant owners in New England largely  
12 secure natural gas through spot market transactions, wholesale electricity market prices  
13 have increased in lock step with increases in the cost to procure natural gas over the past  
14 year. See **Figure 12**.

1  
2

**Figure 12: Spot Prices for Natural Gas and Electricity in New England<sup>39</sup>  
January 2020 – August 2022**



**Note:** The prices shown are monthly averages.

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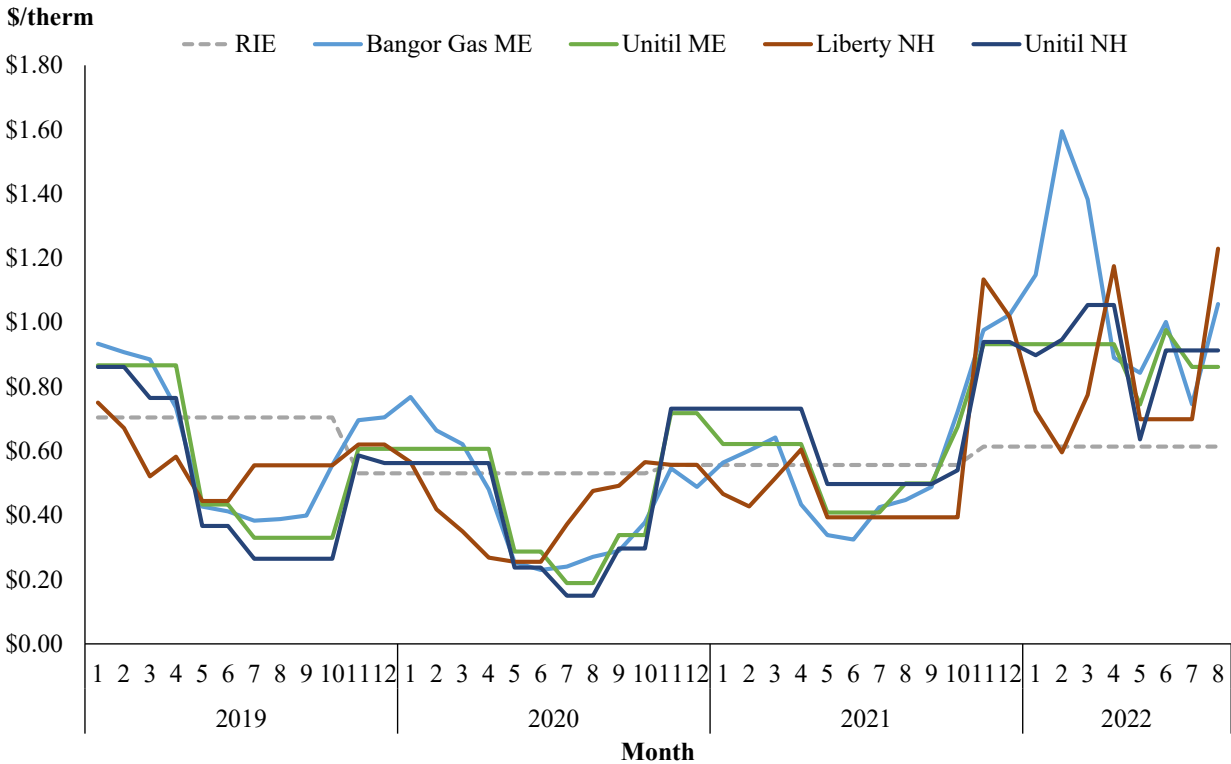
**Q. Have you reviewed whether other natural gas LDCs are experiencing and/or have requested similar increases in rates to cover increases in gas supply costs?**

**A. Yes.** It is important to recognize that it is difficult to construct a true apples-to-apples comparison of natural gas LDC supply costs. This is because the New England states

<sup>39</sup> “SNL Algon Gates Spot Natural Gas Index,” S&P Global Market Intelligence; “Day-Ahead and Real-Time Monthly LMP Index Report,” ISO New England.

1           have different requirements for recovery of fixed and variable costs; different states and  
2           utilities have different timelines for supply planning, procurement and contracting;  
3           companies change rates at different times and with different frequencies; and different  
4           costs are often collected over different time frames. Nevertheless, for purpose of  
5           illustration at a high level, I compared natural gas supply rates for several LDCs in New  
6           England. As can be seen in **Figure 13**, while there are meaningful differences month to  
7           month and season to season, utilities across New England are dealing with the same set of  
8           market impacts on their costs to acquire natural gas for service to their customers. In  
9           particular, it is clear that underlying market forces over the past year are leading to  
10          substantial increases in costs, and thus in rates, across the region.

1 **Figure 13: Natural Gas Supply Rates for Select New England Utilities 2019-2022<sup>40</sup>**



2

3

<sup>40</sup> RIPUC Docket No. 4872, Order No. 23693; RIPUC Docket No. 5040 and Docket No. 5066, Order No. 23963; RIPUC Docket No. 5165 and Docket No. 5180, Order No. 24275; “Understanding Natural Gas Rates,” Summit Natural Gas Maine, available at <https://www.summitnaturalgasmaine.com/rates-tariff>; “Natural Gas Costs,” Bangor Natural Gas, available at <https://www.bangorgas.com/about-us/natural-gas-costs/>; “ME Historical Gas Supply Rates (Excel),” Until, available at <https://unitil.com/suppliers/energy-supplier-resources#historical>; Maine PUC Docket No. 2021-00249; Maine PUC Docket No. 2022-00044; “NH Historical Gas Supply Rates (Excel),” Until, available at <https://unitil.com/suppliers/energy-supplier-resources#historical>; “New Hampshire Monthly Cost of Gas Report, Winter Period, December 2021 Summary, Table 1” Northern Utilities, available at [https://www.puc.nh.gov/Regulatory/Docketbk/2021/21-131/LETTERS-MEMOS-TARIFFS/21-131\\_2021-12-21\\_NORTHERN\\_DEC-COG-RPT.PDF](https://www.puc.nh.gov/Regulatory/Docketbk/2021/21-131/LETTERS-MEMOS-TARIFFS/21-131_2021-12-21_NORTHERN_DEC-COG-RPT.PDF); NPUC Docket No. DG 21-131, Order No. 26,539; “New Hampshire Monthly Cost of Gas Report, Summer Period, April 2022 Summary, Table 1” Northern Utilities, available at [https://www.puc.nh.gov/Regulatory/Docketbk/2021/21-131/LETTERS-MEMOS-TARIFFS/21-131\\_2022-04-22\\_NORTHERN\\_APRIL-COG-RPT.PDF](https://www.puc.nh.gov/Regulatory/Docketbk/2021/21-131/LETTERS-MEMOS-TARIFFS/21-131_2022-04-22_NORTHERN_APRIL-COG-RPT.PDF); NPUC Docket No. DG 21-131, Order No. 26,627; “Gas Archive,” Liberty Utilities NH, available at <https://new-hampshire.libertyutilities.com/allenstown/residential/rates-and-tariffs/archive-natural-gas.html>; NPUC Docket No. DG 20-141, Calculation of the Projected Over or Under Collection of the 2020 - 2021 Winter Cost of Gas Filing.

1 VI. **Conclusions**

2 Q. **Please summarize your findings.**

3 A. The Company's GCR includes expected increases in rates associated with changes in the  
4 underlying costs to procure, store, and transport natural gas for use in Rhode Island.

5 These increases are fully consistent with fundamental changes in underlying factors  
6 affecting natural gas supply and demand in the U.S. and, in particular, in New England.

7 The natural gas market factors driving the increased GCR costs are being experienced by  
8 natural gas (as well as electric) local distribution companies, and are due to at least the  
9 following factors:

10 (1) New England has a strong winter peak due to (i) widespread use of natural gas for  
11 heating homes and businesses in the region, and (ii) a dependence on spot market  
12 purchases of natural gas for operating power plants needed to maintain winter electric  
13 system reliability;

14 (2) New England has significant constraints on the delivery of natural gas for meeting the  
15 combined heating and electricity demand in the winter. The region has no indigenous  
16 source of natural gas, and sits effectively at the end of the pipeline system delivering gas  
17 from the south and west. Although there is a pipeline connection to Eastern Canada, the  
18 primary source of deliveries from Canada historically – Sable Island – shut down in  
19 2018. Finally, the New England region, in recent years, has been unable to develop  
20 additional natural gas supply and transportation infrastructure to alleviate the persistent  
21 winter natural gas transportation constraints. As a result, the natural gas delivery

1 infrastructure that does exist in the region is at or near capacity on most winter days, and  
2 is operating at maximum capacity on many cold winter days each year;

3 (3) Finally, these conditions leave New England strongly dependent on international  
4 shipments of LNG to meet natural gas demand during cold winter periods. Yet since  
5 power plant owners have little incentive to pre-contract for LNG supplies, the availability  
6 of LNG for injection on cold winter days is sufficient quantities to meet combined  
7 heating and electricity demand is relatively expensive and highly uncertain, adding  
8 pricing volatility and uncertainty to the region's natural gas markets;

9  
10 In a normal year, these conditions can lead to elevated and highly variable natural gas  
11 prices in New England during winter months, and correspondingly high pricing in natural  
12 gas futures markets, with relatively minor variations in the conditions of supply and  
13 demand. Yet, this is not a normal year. The impact of the Russian invasion of Ukraine  
14 has fundamentally changed international markets for natural gas, including LNG. The  
15 increased demand for global supplies of natural gas from Europe has increased the price  
16 of natural gas throughout the U.S. and in much of the world, resulting in increasing  
17 exports from the U.S. to Europe and increasing the cost of securing LNG supplies for the  
18 LNG import terminals serving New England.

19  
20 **Q. Does this complete your testimony?**

21 **A. Yes.**



Attachment PJH-1

*Curriculum Vitae* of Paul J. Hibbard



**PAUL J. HIBBARD**  
**Principal**

Direct: 617 425 8171  
Fax: 617 425 8001  
paul.hibbard@analysisgroup.com

111 Huntington Avenue  
14th Floor  
Boston, MA 02199

Mr. Hibbard is an expert on economics, strategy, regulation, and policy in the electric and natural gas industries. He has a comprehensive background merging business development, technical analysis, resource planning and development modeling, economics, and public policy in the energy and environmental fields. Mr. Hibbard has provided technical and strategic advice to government, industry, business, public interest groups, and trade organizations on energy market structure, electric and natural gas infrastructure planning and siting, utility resource solicitation and procurement, emission allocation and environmental policy, renewable resource program design and administration, transmission pricing, climate change policy, utility ratemaking practices, and the transfer of US federal and state emission control programs to other countries.

Prior to joining Analysis Group, Mr. Hibbard was chairman of the Massachusetts Department of Public Utilities. During his tenure, he carried out a forward-looking ratemaking and policy agenda to advance energy efficiency and renewable resources, coordinate regional efforts in the development of energy resources and associated infrastructure, and promote the administration of fair and efficient transmission pricing models in regional and national contexts. He also has provided testimony on resource planning, competitive electricity markets, and transmission pricing in hearings before committees of the Massachusetts legislature and the US House of Representatives, the Federal Energy Regulatory Commission (FERC), and state and regional planning councils. Mr. Hibbard has also served as a member of many energy-related boards and committees.

**EDUCATION**

- M.S. Energy and resources, University of California, Berkeley  
*Thesis: Safety and Environmental Hazards of Nuclear Reactor Designs*  
*(Ph.D. coursework in nuclear engineering)*
- B.S. Physics, University of Massachusetts Amherst

**PROFESSIONAL EXPERIENCE**

- 2010–Present **Analysis Group, Inc.**  
*Principal (2015–Present)*  
*Vice President (2010–2015)*
- 2007–2010 **Massachusetts Department of Public Utilities**  
*Chairman*  
*Member, Energy Facilities Siting Board*  
*Manager, New England States Committee on Electricity (NESCOE)*  
*Treasurer, Executive Committee, Eastern Interconnect States' Planning Council*

- 2007–2010     **Massachusetts Department of Public Utilities** (continued)  
*Representative, New England Governors' Conference (NEGEC)*  
*Power Planning Committee*  
*Member, National Association of Regulatory Utility Commissioners (NARUC)*  
*Electricity Committee, Procurement Work Group*
- 2003–2007     **Analysis Group, Inc.**  
*Vice President (2005–2007)*  
*Manager (2003–2005)*
- 2000–2003     **Lexecon Inc.**  
*Senior Consultant (2002–2003)*  
*Consultant (2000–2002)*
- 1998–2000     **Massachusetts Department of Environmental Protection**  
*Environmental Analyst*
- 1991–1998     **Massachusetts Department of Public Utilities**  
*Senior Analyst, Electric Power Division*
- 1988–1991     **University of California, Berkeley**  
*Research Assistant, Safety/Environmental Factors in Nuclear Designs*

#### **SELECTED PUBLIC-SECTOR EXPERIENCE (MASSACHUSETTS)**

- ***Chairman, Department of Public Utilities***
  - Chaired the state's public utilities commission during a period of aggressive change in state policies affecting the electricity and natural gas industries, including initial implementation of several new state energy laws and initiatives restructuring the setting of utility rates, promoting the expansion of energy efficiency and demand response, facilitating the retail and wholesale market integration of renewable and low-carbon resources, and revising state policy on the siting of major generation and transmission infrastructure.
  - Oversaw the issuance of initial regulations and policy related to revenue decoupling, net metering, long-term contracting for renewables, and power system emergency planning and outage restoration.
  - Led Massachusetts's work with regulators across the Northeast to pursue large-scale renewable resource development through coordinated procurement strategies to develop coordinated positions related to national transmission development proposals and establish a regional presence on transmission-related provisions in federal legislation.
  - As chairman, served as the administrative and policy head of an agency of nearly 150 employees, and was responsible for agency management and growth, budgeting, legislative matters, press inquiries, and policy agenda-setting.
  - Oversaw the completion of all dockets jurisdictional to the department, including rate cases and associated tariff matters, forecast and supply planning for electric and natural gas industries, and state oversight of natural gas pipeline safety and public transit authorities.
  - Responsible for all interaction with the governor's office, legislature, and Executive Office of Energy and Environmental Affairs, as well as representing the state in regional deliberations related to electric and natural gas utility policy, electricity market design and oversight, and regional power system reliability issues.

- ***Member, Energy Facilities Siting Board***  
Sitting member of the state board responsible for reviewing all proposals for major generation and transmission infrastructure projects within the state, as well as state intervention in federal review of natural gas pipeline infrastructure. Review involved technical, environmental, and economic evaluation of jurisdictional power plants, transmission lines, and other energy infrastructure, as well as ruling on proposals for exemption from state and local zoning ordinances.
- ***Manager, NESCOE***  
State representative of the regional group chartered to develop New England regional policy positions on electricity market and transmission planning issues. Responsibilities included consideration of group development issues, input into regional determinations of the Installed Capacity Requirement, consideration of regional approaches to transmission planning and the consideration of non-transmission alternatives, and coordinated development of a regional RFP/RFI for the solicitation of renewable power under long-term contracts for the New England states.
- ***Treasurer, Executive Committee, Eastern Interconnection States' Planning Council***  
Elected treasurer of the steering committee for the state council formed under a US Department of Energy (DOE) grant to coordinate with power system operators on developing long-range plans for a transmission system spanning 41 states in the eastern US. Coordinated New England states' approach to policy issues stemming from council efforts.
- ***Representative, NEGC Power Planning Committee***  
Represented the governor's office in all discussions related to regional energy/environmental issues, including transmission cost allocation, regional energy policy coordination, and development of mechanisms for and approaches to procurement of renewable power through long-term contracts with sources in New England and eastern Canada. Engaged in collaborative discussions with counterparts representing the Eastern Canadian Premiers.

## SELECTED CONSULTING EXPERIENCE

### Government, Foundations, Commissions, and Cooperatives

- ***For the Natural Resources Defense Council (NRDC)*** – Coauthored a public report on the Clean Electricity Payment Program's (CEPP) positive impact on the US economy if adopted (2021).
- ***For Advanced Energy Economy (AEE)*** – Coauthored a public report on the potential economic impacts of applying stimulus funds to electrification of the US transportation sector using estimated spending levels from President Biden's American Jobs Plan (2021).
- ***For AEE*** – Coauthored a public report on the potential economic impacts of applying stimulus funds to develop advanced energy technologies, products, and services in the US using estimated spending levels from President Biden's American Jobs Plan (2021).
- ***For the Coalition for Green Capital*** – Coauthored a white paper examining the potential of the federally authorized Clean Energy and Sustainability Accelerator that could address economic and climate crises (2021).
- ***For AEE*** – Coauthored a series of public reports on the economic impacts in select states of potential stimulus spending on clean and advanced energy resources (2020).
- ***For a municipal association*** – Drafted a white paper related to the fuel mix and emission characteristics of the portfolio of generating assets and power contracts used by municipal electric light companies in Massachusetts (2020).
- ***For the Wellesley Municipal Light Plant (WMLP)*** – Coauthored two white papers on the greenhouse gas (GHG) impacts of the WMLP power portfolio, and considerations for the WMLP associated with achieving continued reductions in carbon emissions over the ensuing decades (2020).

- ***For the Georgetown Climate Center*** – Conducted a bill impact analysis related to Virginia’s proposed implementation of a carbon cap-and-trade program (2018).
- ***For Energy New England*** – Provided strategic assistance on energy market and public policy issues in New England (2017).
- ***For the Environmental Defense Fund*** – Coauthored a white paper related to historical power system emission trends (2015).
- ***For the Massachusetts Attorney General*** – Coauthored a report evaluating electric and natural gas infrastructure in New England from the perspectives of reliability, cost, and GHG emissions (2015).
- ***For AEE*** – Coauthored a report on the status of the electric industry in the State of Ohio, and developed recommendations on state energy policy in consideration of the state’s market and technological circumstances at the time.
- ***For the Energy Foundation and industry groups*** – Coauthored multiple white papers on the reliability, cost, and market efficiency impacts of the US Environmental Protection Agency’s (EPA’s) proposed regulations to control emissions of carbon dioxide from existing electric generating facilities. Presented results in numerous conference, stakeholder, and regulatory settings.
- ***For a foundation*** – Led a study of the economic impacts of a state clean energy policy (2013–2014).
- ***For the Massachusetts Department of Energy Resources*** – Provided testimony on the ratepayer and social benefits of reducing methane leaks from a local natural gas distribution company’s system (2013).
- ***For AEE*** – Facilitated a regional symposium for the New England Conference of Public Utility Commissioners and staff related to advanced energy technology development and commercialization, and the legal and regulatory structures needed to facilitate integration of emerging technologies (2013).
- ***For the Regional Greenhouse Gas Initiative (RGGI)*** – Conducted a bill impact analysis related to changes to retail customer electric bills in New England, New York, and RGGI Pennsylvania, New Jersey, and Maryland Interconnection (PJM) states associated with various changes considered by RGGI to program cap level and use of allowance revenues (2012).
- ***For AEE*** – Participated in a project advising AEE with respect to its national program to support public utility commission consideration of policies and regulations related to the development and integration of advanced energy technologies (2012–2013).
- ***For the Merck Family Fund*** – Developed an interactive tool to compare the impacts of energy, economic, environmental, legislative, and regulatory policies and programs across the US (2012).
- ***For AEE*** – Coauthored a report on the perspectives of CEOs at advanced energy companies doing business in California on California’s energy policies. Conducted over 30 interviews with energy business leaders to get perspectives and recommendations for policy changes (2012).
- ***For the Barr Foundation*** – Coauthored a report on the benefits and costs associated with reducing natural gas leaks on natural gas distribution systems through implementation of targeted infrastructure replacement ratemaking mechanisms in Massachusetts, Rhode Island, and Ohio. Developed a cost-benefit model to quantify the impacts of such programs (2012–2013).
- ***For the American Clean Skies Foundation*** – Developed a dispatch price and emissions model to forecast power system outcomes in the PJM Interconnection, Midwest Independent System Operator, and Southwest Power Pool regions (2012).
- ***For a national environmental organization*** – Conducted a comprehensive national review of energy efficiency monitoring and verification programs in order to support development of a protocol that

could be used to allow energy efficiency to be used as a compliance tool in national carbon emission control regimes (2012–2013).

- ***For the Merck Family Fund*** – Co-led a project to carry out an analysis of the economic impacts of the Northeast states’ use of revenues collected from the auctioning of carbon allowances associated with RGGI (2011).
- ***For AEE*** – Developed background on electric industry structure, regional planning and market structures and operations, and state energy policy organization and initiatives. Assisted with the development of a web-based information platform (2011).
- ***For the American Clean Skies Foundation*** – Authored a paper on the redesign of wholesale electricity market structures to efficiently integrate a higher level of variable resources (2012). Coauthored a white paper examining electric reliability and air emission issues associated with the potential retirement of the Potomac River Generating Station in Alexandria, Virginia (2011).
- ***For the Public Service Commission of Colorado*** – Coauthored a white paper on the design of incentives for the photovoltaic (PV) solar energy market (2011).
- ***For a national environmental organization*** – Conducted an economic analysis of key US cities that were or had been in nonattainment under the National Ambient Air Quality Standards, to explore relationships between air quality control requirements and the local economy (2011).
- ***For a national environmental organization*** – Completed a comprehensive report on the full scope of energy efficiency and demand response programs administered by New York electric utilities and the New York Independent System Operator (NYISO). Assessed the potential for additional innovative programs to improve energy efficiency and demand response in New York City (2010).
- ***For the North Carolina Attorney General*** – Managed a project in support of expert testimony on the economic and financial feasibility of requiring the installation of controls to reduce emissions of sulfur dioxide, nitrogen oxides, and mercury from coal-fired power plants owned by the Tennessee Valley Authority (TVA). The project was in the context of a public nuisance lawsuit brought by the North Carolina Attorney General against TVA (2006).
- ***For the National Commission on Energy Policy*** – Authored white papers on (1) the implications for US energy infrastructure of the damage to Gulf Coast energy facilities from Hurricanes Katrina and Rita (2006); (2) the practical and economic implications of various mechanisms for the allocation of carbon dioxide emission allowances to the electric sector under potential federal carbon control regimes (2005); and (3) national energy infrastructure needs for the electricity, natural gas, and petroleum industries, and for addressing the long-term impacts of energy production and use associated with spent nuclear fuel and carbon dioxide (2004).
- ***For the Massachusetts Health and Educational Facilities Authority (MHEFA) PowerOptions Program*** – Managed several projects providing regulatory, economic, and strategic advice to PowerOptions to assist in their selection and pricing of retail electricity products from competitive electricity suppliers. Over a three-year period, projects included analyses of forward prices and wholesale markets for capacity and reserves; analysis of contract price options, terms, and conditions; and analysis of congestion pricing implications for retail supply (2002–2004).
- ***For the Energy Foundation*** – Coauthored a report (with Dr. Susan Tierney) documenting best practices in energy facility siting regulations in the US, and analyzing in particular the impact of California’s energy facility siting process on that state’s electricity crisis (2002). Supported a foundation-based program to provide international assistance to China’s efforts to privatize and restructure its electric industry, and to develop regulations to control air emissions from power plants in that country (2000–2003).
- ***For the Massachusetts Technology Collaborative (MTC)*** – Managed projects in support of the MTC’s renewable and premium power programs, including the (1) creation of a standard financial

pro-forma for wind and landfill gas technologies in New England under various assumptions related to capital and operating costs, financing, discount rates, and the impact of state and federal policies to support renewable development; (2) development of an economic model to determine the financial impact on potential wind and combined heat and power facilities of proposed changes to utility standby service tariffs; and (3) research, strategic, and regulatory support of MTC's efforts to advance distributed generation in Massachusetts to promote renewable resources and improve power reliability for commercial and industrial customers (2000–2002).

## ENERGY INDUSTRY STAKEHOLDERS

- **For PECO Energy** – Provided testimony on traditional ratemaking principles as applied to PECO's cost of providing gas delivery service (2021).
- **For the Hingham Municipal Lighting Plant (HMLP)** – Conducted an internal evaluation of the impact of decarbonization of residential and commercial energy use in the town, and its effect on HMLP's investments and operations (2020).
- **For a natural gas interstate pipeline company** – Coauthored a white paper and presentation showing options to decarbonize the company's operations. The study included an analysis of its GHG footprint, identification of options and pathways to reduce net GHG emissions from operations to zero over time, and the development of recommendations for senior management (2020).
- **For Oracle Corporation** – Conducted an analysis of and report on the GHG emission reduction impacts of various types of energy efficiency programs and measures, with a focus on the comparison of structural and behavioral energy efficiency programs (2020).
- **For NYISO** – Conducted a study of the parameters used as the basis to set the NYISO's installed capacity demand curves for the four capability years beginning with the summer 2021 capability period (2020).
- **For NYISO** – Conducted an internal study of the potential reliability impacts on the electric grid due to changes in system mix and operations associated with a changing climate, and with state programs to address climate change (2020).
- **For NYISO** – Conducted a study of the potential risks to New York power system operations associated with an increased reliance on natural gas for power generation (2020).
- **For Commonwealth Edison** – Provided testimony on issues associated with a request for a certificate of public convenience and necessity by NextEra related to the proposed acquisition of the transmission assets of Rochelle Municipal Utilities (2020).
- **For Repsol Energy North America** – Provided strategic assistance related to the potential impacts of electric system market rules and public policy on the potential marketability of liquefied natural gas (LNG) in New England (2020).
- **For Liberty Utilities** – Provided testimony on the need for and economic and environmental impacts of the proposed Granite Bridge pipeline and LNG project in the State of New Hampshire (2020).
- **For NYISO** – Coauthored a white paper for NYISO on the potential impacts of a proposed carbon pricing mechanism in New York on power prices; energy policy; and economic, environmental, and public health impacts in New York (2020).
- **For NTE Energy** – Provided testimony before the Connecticut Siting Council on the need for and potential benefits associated with a proposed new natural gas-fired power plant in the State of Connecticut (2020).
- **AltaGas** – Provided testimony before the Maryland and District of Columbia public utility commissions on the potential environmental impacts of a proposed merger between AltaGas and Washington Gas (2017–2018).

- ***For Calpine Corporation*** – Coauthored a white paper on the design of a proposed carbon trading mechanism in Massachusetts (2017).
- ***For Vermont Gas*** – Provided testimony on the prudence of Vermont Gas’ decisions and investments with respect to the Addison natural gas project (2017).
- ***For the Vermont Electric Power Company (VELCO)*** – Coauthored a white paper on VELCO’s capital structure associated with its transmission assets and operations (2016).
- ***For the Merck Family Fund*** – Coauthored a white paper on economic principles associated with the trading of emission allowances associated with RGGI (2016).
- ***For a consortium of solar companies*** – Developed a white paper on the appropriate evaluation and treatment of behind-the-meter solar PV generation from the perspective of net metering policies in Massachusetts (2015).
- ***For a group of owners of electric generating facilities*** – Developed a comprehensive quantitative and qualitative critique of a utility proposal to invest in electricity storage capability in the State of Texas. Drafted a report for circulation to legislative, regulatory, and market interests stating the results of the critique and analysis (2015).
- ***For an energy resource developer*** – Conducted a financial and ratepayer analysis of the benefits of a project to develop a power plant and natural gas pipeline in the State of Maine. Submitted testimony to the Maine Public Utilities Commission describing the results (2014–2015).
- ***For an energy storage company*** – Developed an optimization analysis to evaluate the security, reliability, economic, and environmental benefits and costs of multiple battery storage installations across the Hawaiian Islands in different industry settings (renewable generator, island utility, military base, hotel/resort). Drafted a report presenting the results, considering the state’s unique energy price and fuel security context (2014–2015).
- ***For NYISO*** – Developed a model to compare cost, resource, and emission outcomes of alternative designs for a capacity market in the State of New York. Coauthored a report presenting the results of the analysis and a comprehensive review of the benefits and drawbacks of moving from a spot to a forward capacity market (FCM) structure. Presented results to NYISO senior management and several meetings of New York electricity market participants and stakeholders (2014–2015).
- ***For multiple regional transmission organizations (RTOs)*** – Provided strategic support at the board-of-director and senior-management levels for considering the changing structures of retail regulation and wholesale market incentives within their regions (2014–2015).
- ***For Calpine Corporation*** – Provided testimony on the costs and benefits of different proposals for generation capacity in Florida (2014).
- ***For an RTO*** – Conducted an internal analysis of the financial risk associated with the RTO’s position in administering the trading of power system transmission rights (2014).
- ***For a regional transmission operator*** – Conducted a top-to-bottom review of the content and design of the RTO’s Rate Schedule 1 tariff for the collection of operational costs from market participants. Presented results of the analysis to the RTO’s board of directors and senior management (2014).
- ***For a retail electricity supplier*** – Provided analytic and strategic support with respect to the supplier’s participation in a state regulatory proceeding related to changing the nature of and rate structure for electric distribution service (2014).
- ***For Ambri Inc.*** – Led a study of the economic feasibility of using battery storage in conjunction with wind and solar for a micro-grid application (2013–2014).
- ***For Calpine Corporation*** – Provided testimony on the costs and benefits of different proposals for generation capacity in Minnesota (2013).

- ***For the New England Independent System Operator (ISO-NE)*** – Assisted on several projects related to addressing the codependence of electric and natural gas systems in New England through a mix of short- and long-term market rule changes and administrative actions. Assistance included review of market structures to improve unit performance, particularly under stressed natural gas system conditions; quantification of the costs of potential natural gas and electric system infrastructure, and contractual responses to market rules and administrative actions (e.g., dual-fuel capability, new pipeline investment, LNG purchasing, and firm natural gas transportation agreements); and assistance with a series of discussions between ISO-NE and regional electricity and natural gas market participants. Also quantified the potential benefits of improved performance associated with reduced system interruptions (2012–2013).
- ***For the ISO-NE*** – Developed an economic supply/demand model of the FCM to estimate the cost impact of integrating a new long-term performance incentive design element into the FCM auctions and pricing structure (2012–2013).
- ***For Calpine Corporation*** – Filed a report with the EPA on the impact of emergency generation demand response programs on the costs and emissions associated with power system dispatch in the PJM electricity market (2012).
- ***For the ISO-NE*** – Organized and helped lead a strategic planning initiative to address unit retirement, fuel mix, operational performance, and wind resource integration issues. Oversaw comprehensive generating unit performance analysis and electric-gas system risk review. Conducted a thorough internal risk assessment and key-challenge solution development. Facilitated meetings and developed organizational and concept documents to explore outcomes and assist in deliberations with states and regional industry stakeholders, and participated in external meetings to gain input and feedback (2010–2012).
- ***For an RTO*** – Conducted a top-to-bottom review of its external market monitoring function and a comprehensive best-practices survey of all internal and external market monitoring functions at US RTOs and independent system operators (ISOs) (2012).
- ***For a wind power development company*** – Conducted a regional review of wind power development projects and an assessment of potentially valuable projects for acquisition based on power system location and siting viability (2012).
- ***For an energy services company*** – Oversaw and conducted an analysis of business, legal, and regulatory conditions related to a legal dispute over the legitimacy of a contract for energy and water management services. Coauthored a report to be used in the development of legal strategy and legal proceedings (2012).
- ***For an international power company*** – Conducted a review of a regional utility’s compliance with the FERC requirements for transmission open access, and developed strategies for the filing of complaints of anticompetitive conduct before the FERC (2011–2012).
- ***For an RTO*** – Comprehensively reviewed and suggested changes to the design of regional market structures; oversaw data review and analysis related to key market design features and asset performance (2011).
- ***For Direct Energy*** – Assisted with the development of strategies to increase retail choice in Pennsylvania, including the design of an opt-in descending-clock auction to increase migration from default service to competitive supply. Prepared comments and analysis on utility contract structures. Provided testimony before the Pennsylvania Public Utilities Commission (2011).
- ***For Algonquin Gas*** – Submitted affidavits and testified in bankruptcy court on the impact on power plant value of changes in market rules related to the FCM in New England. Also provided testimony on the impact on power system reliability of the availability of firm transportation contracts for natural gas supplied to power plants in New England (2010).



- ***For an RTO*** – Conducted a best-practices and performance metrics analysis to benchmark the ISO’s performance against industry peers with respect to responsiveness to consumers, stakeholders, and policymakers. Drafted a report with comprehensive benchmarking and performance metric recommendations; participated in stakeholder discussions (2010).
- ***For a power generators trade association*** – Developed and facilitated an all-day group discussion concerning key economic, environmental, legal, and policy challenges to the economic viability of existing and new power generation capacity in regional wholesale electricity markets (2010).
- ***For a coalition of electric companies*** – Coauthored the report “Ensuring a Clean, Modern Electric Generating Fleet while Maintaining Electric System Reliability,” which reviewed the impact on power plant operations of proposed EPA rules to reduce emissions of sulfur dioxide, nitrogen oxides, mercury, and other hazardous air pollutants. Presented findings to numerous regional and national industry and regulatory groups (2010).
- ***For an industry coalition*** – Conducted a study and coauthored a white paper (with Dr. Susan Tierney) for the New England Energy Alliance on New England energy infrastructure needs and policy issues (e.g., facility siting policies, RGGI/climate change) influencing the future addition of energy infrastructure in the region (2006).
- ***For an interstate pipeline company and offshore LNG developer*** – Authored a report related to recent developments in the supply and demand for natural gas in New England, and surveyed the development, regulatory, and commercial status of proposed LNG projects across the US (2006); coauthored a report (with Susan Tierney) providing an overview of Northeastern natural gas markets and conditions, and an assessment of natural gas supply and demand conditions (2005).
- ***For independent system operators*** – Managed several projects and coauthored reports or analyses for the Northeast region’s ISOs/RTOs related to ISO/RTO annual strategic plans; market monitoring and mitigation best practices; and the links between wholesale electricity markets and local distribution company retail prices (2002–2006).
- ***For electric utilities*** – Managed or participated in numerous engagements with wires-only as well as vertically integrated electric utilities within New England and across the country related to rate case strategy and regulatory support; strategic planning; power supply resource planning and procurement (including the role of independent monitor of utility procurements); price and environmental analyses related to the siting of new high-voltage transmission lines; and evaluation of the allocation of SO<sub>2</sub> and NO<sub>x</sub> emission allowances under the EPA Clean Air Interstate Rule (CAIR) program (2001–2006).
- ***For a developer of a land-based LNG facility*** – Assisted in the preparation of confidential reports on US natural gas supply/demand conditions, market pricing indices, US LNG facilities’ status, Northeast interstate and intrastate pipeline infrastructure conditions and prospects, and LNG supply contract prices, terms, and conditions (2006).
- ***For retail energy providers*** – Managed projects and authored or coauthored confidential reports on the experience with retail competition in the US, a benefit/cost analysis of wholesale electricity competition, and comparative analyses of retail electricity prices for utility and competitive retail suppliers in select states (2004–2006).
- ***For merchant generating companies/coalitions*** – Managed production cost dispatching analyses for strategic planning related to the construction of new generating capacity in New England; assisted in the development of regulatory proposals for new wholesale market organizations and policies in New England (2001–2002).
- ***For a major interstate pipeline owner/operator*** – Modeled the electrical load characteristics of pipeline operations and utility rate structures to quantify the extent to which the company was being overcharged for electricity services. Supported company intervention in public utility commission proceedings and with analytical support in settlement negotiations (2002).

- ***For a renewable power developer association*** – Provided testimony on the potential negative effects – and remedial policy options – related to the impact of locational marginal pricing on the development and operation of renewable generating resources in New England (2001).

## **OTHER PROFESSIONAL ACTIVITIES**

### **AEE**

*Advisory Board* (2011)

## **SELECTED REPORTS, TESTIMONY, PUBLICATIONS, AND PRESENTATIONS**

Prepared Answering Testimony of Paul J. Hibbard before FERC, Docket No. ER20-2441-002 on behalf of McKenzie Electric Cooperative, Inc. (July 15, 2022)

Testimony of Paul J. Hibbard before the U.S. District Court, Southern District of Florida, Ft. Lauderdale Division on behalf of Simon Property Group et al., Case No. 0:20-cv-60981-AMC (June 6, 2022)

*Methane Reduction Technology Electricity and Abatement Costs: The Cost to Power Zero-Emission Pneumatic Controllers and Pumps in Grid-Connected and Remote Locations*, with Scott Ario and Elisa Gan (May 6, 2022)

Affidavit of Paul Hibbard and Charles Wu before FERC, Docket No. ER22-772-000 on behalf of NYISO (January 5, 2022)

*Modifications to the BSM Construct in the NYISO Capacity Market: Analysis of Potential Capacity Market Competitiveness and Reliability Outcomes*, with Charles Wu (December 2021)

*Economic Impact of a Clean Electricity Payment Program*, with Pavel Darling and Luke Daniels (September 2021)

“Why Hydrogen?,” presentation during the EBC Energy Resources Webinar: Future of Green Hydrogen – Earthshot Effort to Meet the Needs of Climate Change (September 30, 2021)

“Decarbonization and The Power System,” presentation during the Northeast Public Power Association RodE&O Conference and Expo, Engineering Track (September 22, 2021)

“Net Zero Carbon: What Is It and What Should It Be?,” presentation during the LDC Gas Forum (September 14, 2021)

“Net Zero Carbon: What Is It and What Should It Be?,” presentation during the NEPPA Annual Conference, General Session (August 23–24, 2021)

“Motivating Customers to Decarbonize with an Eye Toward Equity,” presentation during the 2021 NARUC Summer Policy Summit (July 18, 2021)

*Economic Impact of Stimulus Investment in Advanced Energy for America*, with Pavel Darling (June 2021)

*Economic Impact of Stimulus Investment in Transportation Electrification*, with Pavel Darling (June 2021)

“A Step Through the Looking Glass – Outlook for Natural Gas in the Northeast,” Webinar for the Northeast Gas Association (NGA) Regional Market Trends Forum, What are the Market Pathways and Their Various Implications (April 29, 2021)

*Accelerating Job Growth and an Equitable Low-Carbon Energy Transition: The Role of the Clean Energy Accelerator*, with Susan F. Tierney (January 2021)

“Carbon Pricing: This Is the Way,” presentation on a plenary panel to the New England Restructuring Roundtable (December 11, 2020)

“Approaches to Meeting Decarbonization Mandates: Important Decisions with Cost, Equity, and Reliability Implications,” presentation during the EUCI Decarbonization Summit on state decarbonization opportunities (December 9, 2020)

“Approaches to Meeting Decarbonization Mandates: Important Decisions with Cost, Equity, and Reliability Implications,” presentation during the New England Energy Summit on state decarbonization opportunities (November 23, 2020)

Affidavit of Paul J. Hibbard before FERC, Docket No. ER21-502-000 on behalf of NYISO (November 30, 2020)

*Economic Impact of Stimulus Investment in Advanced Energy* (series of 10 state-specific reports), with Pavel G. Darling (September–October 2020)

*Climate Change Impact and Resilience Study – Phase II: An Assessment of Climate Change Impacts on Power System Reliability in New York State*, with Charles Wu, Hannah Krovetz, Tyler Farrell, and Jessica Landry (September 2020)

Presented virtually at the Annual NECA Conference on how New England can transition away from fossil fuels, as well as the costs, reliability, and societal implications of moving toward low-carbon alternatives (September 30, 2020)

*Independent Consultant Study to Establish New York ICAP Demand Curve Parameters for the 2021/2022 through 2024/2025 Capability Years – Final Report*, with Todd Schatzki, Charles Wu, Christopher Llop, Matthew Lind, Kiernan McInerney, and Stephanie Villarreal (September 9, 2020)

*Utility energy efficiency program performance from a climate change perspective: A comparison of structural and behavioral programs*, with Jonathan Baker, Mona Birjandi-Feriz, and Hannah Krovetz (August 2020)

“Energy Efficiency for Climate, Not Ratepayers,” presentation on a plenary panel to the American Council for an Energy-Efficient Economy (ACEEE) Summer Study Session (August 19, 2020)

For the New England Power Generators Association (NEPGA), coauthored a report assessing the potential use of carbon pricing in New England; the analysis applied tested industry models to identify effective and efficient economy-wide pricing of carbon dioxide (CO<sub>2</sub>) emissions consistent with New England states’ GHG emission reduction targets (June 23, 2020)

*Carbon Pricing for New England: Context, Key Factors, and Impacts*, with Joseph Cavicchi (June 2020)

“Decarbonization and Wholesale Markets in New England – Looking Ahead: Achieving 80% GHG Reduction by 2050,” presentation on a plenary panel to the Association of Energy Engineers Conference, “ISO-NE in 2050: Getting to an advanced energy future in New England,” Boston, MA (March 18, 2020)

“Decarbonization and Natural Gas in the Northeast,” panel moderator and presenter at the EUCI conference on Natural Gas Decarbonization, Denver, CO (January 22–23, 2020)

*Fuel and Energy Security in New York State: An Assessment of Winter Operational Risks for a Power System in Transition*, with Charles Wu (November 2019)

*Clean Energy in New York State: The Role and Economic Impacts of a Carbon Price in NYISO’s Wholesale Electricity Markets*, with Susan F. Tierney (October 2019)

“Natural Gas in Power Generation: Role Going Forward,” 7th Annual Maine Natural Gas Conference to discuss power generation in the New England region. Falmouth, ME (October 3, 2019)

Direct Testimony of Paul J. Hibbard before the New Hampshire Public Utilities Commission on the need for and economic and environmental impacts of proposed Liberty Utilities Granite Bridge pipeline and LNG project, Docket No. DG 17-152 (June 28, 2019)

Rebuttal Testimony on Reopening of Paul J. Hibbard before the Illinois Commerce Commission on Behalf of Commonwealth Edison, Docket No. 18-0843 (May 31, 2019)

Pre-filed Testimony of Paul J. Hibbard before the Connecticut Siting Council on behalf of NTE Connecticut LLC, Docket No. 470 (January 18, 2019)

*Vehicle Fuel-Economy and Air Pollution Standards: A Literature Review of the Rebound Effect*, with Susan F. Tierney, Benjamin Dalzell, Grace Howland, Jonathan Baker, Tom Beckford, Sarah Centanni, Asie Makarova, and Scott Ario (June 28, 2018)

“An Expanding Carbon Cap-and-trade Regime? A Decade of Experience with RGGI Charts a Path Forward,” with Susan F. Tierney and Pavel G. Darling, *The Electricity Journal* (June 2018)

Testimony of Paul J. Hibbard before the District of Columbia on behalf of AltaGas, Case No. 1142 (May 25, 2018)

*The Economic Impacts of the Regional Greenhouse Gas Initiative on Nine Northeast and Mid-Atlantic States*, review of RGGI’s third three-year compliance period (2015–2017), with Susan F. Tierney, Pavel G. Darling, and Sarah Cullinan (April 2018)

Post-Settlement Testimony of Paul J. Hibbard before the Maryland Public Service Commission on behalf of AltaGas, Case No. 9449 (January 5, 2018)

Rebuttal Testimony of Paul J. Hibbard before the Public Service Commission of the District of Columbia on behalf of AltaGas, Formal Case No. 1142 (October 27, 2017)

*Capacity Resource Performance in NYISO Markets: An Assessment of Wholesale Market Options*, with Todd Schatski and Sarah Bolthrunis (November 2017)

*RGGI and Emissions Allowance Trading: Options for Voluntary Cooperation Among RGGI and Non-RGGI States*, with Ellery Berk (July 2017)

“Analytical Issues in Linking,” presentation on Virginia and the Regional Greenhouse Gas Initiative, Virginia Commonwealth University, Richmond, VA (July 12, 2017)

*Electricity Markets, Reliability and the Evolving U.S. Power System*, with Susan Tierney and Katherine Franklin (June 2017)

“Storage and Microgrids – New Applications,” panel presentation during the Electricity Advisory Committee’s Energy Storage Session (June 8, 2017)

Supplemental Affidavit of Paul J. Hibbard before FERC, Docket No. ER17-386-000 on behalf of NYISO (December 18, 2016)

Affidavit of Paul J. Hibbard before FERC, Docket No. ER17-386-000 on behalf of NYISO (November 18, 2016)

*Evaluation of Vermont Transco, LLC Capital Structure*, with Craig Aubuchon and Mike Cliff (October 2016)

Rebuttal Testimony of Paul J. Hibbard before the State of Vermont Public Service Board on behalf of Vermont Gas Systems Inc., Docket Nos. 8698 and 8710 (September 26, 2016)

*RGGI and CO<sub>2</sub> Emissions Trading Under the Clean Power Plan: Options for Trading Among Generating Units in RGGI and Other States*, Susan Tierney and Ellery Berk (July 12, 2016)

Affidavit of Paul J. Hibbard before the FERC, Docket No. ER16-1751-000 on behalf of the NYISO (May 20, 2016)

Declaration of Paul J. Hibbard and Andrea M. Okie in the US Court of Appeals for the District of Columbia Circuit, Case No. 15-1363 (and consolidated cases) on behalf of multiple parties (December 8, 2015)

*Power System Reliability in New England: Meeting Electric Resource Needs in an Era of Growing Dependence on Natural Gas*, report for the Massachusetts Office of the Attorney General, with Craig Aubuchon (November 2015)

Testimony of Paul J. Hibbard before the Senate Committee on Global Warming and Climate Change, *Power System Reliability in New England: Meeting Electric Resource Needs in an Era of Growing Dependence on Natural Gas* (November 24, 2015)

*The Economic Impacts of the Regional Greenhouse Gas Initiative on Nine Northeast and Mid-Atlantic States*, review of RGGI’s Second Three-Year Compliance Period (2012–2014), with Andrea Okie, Susan Tierney, and Pavel Darling (July 14, 2015)

*Electric System Reliability and EPA’s Clean Power Plan: The Case of MISO*, report for the Energy Foundation, with Susan Tierney and Craig Aubuchon (June 8, 2015)

*Net Metering in the Commonwealth of Massachusetts: A Framework for Evaluation* (May 2015)

*NYISO Capacity Market: Evaluation of Options*, report for the NYISO, with Todd Schatzki, Craig Aubuchon, and Charles Wu (May 2015)

*Ohio's Electricity Future: Assessment of Context and Options*, report for Advanced Energy Economy, with Andrea Okie (April 2015)

*Electric System Reliability and EPA's Clean Power Plan: The Case of PJM*, report for the Energy Foundation, with Susan Tierney and Craig Aubuchon (March 16, 2015)

*Electric System Reliability and EPA's Clean Power Plan: Tools and Practices*, report for the Energy Foundation, with Susan Tierney and Craig Aubuchon (February 2015)

*Tools States Can Utilize for Managing Compliance Costs and the Distribution of Economic Benefits to Consumers Under EPA's Clean Power Plan*, Electricity Forum, with Andrea Okie and Susan Tierney (February 2015)

*The Economic Potential of Energy Efficiency*, report for the Environmental Defense Fund, with Katherine Franklin and Andrea Okie (December 2014)

*Assessment of EPA's Clean Power Plan: Evaluation of Energy Efficiency Program Ramp Rates and Savings Levels*, report for the Environmental Defense Fund and National Resources Defense Council, with Andrea Okie and Katherine Franklin (December 2014)

"EPA's Proposed Clean Power Plan and States' Planning for Implementation," presentation to the Power-Gen International Annual Conference (December 2014)

"Storage/Renewables Valuation: A Case Study Hitting Multiple Perspectives," presentation to the Caribbean Renewable Energy Forum 2014 (October 2014)

"Electric Industry Transformation: A New World, or a Step Through the Looking Glass?" presentation to the New England Independent System Operator Quarterly Meeting (September 2014)

"Consumers, Markets, and Infrastructure: New England at a Crossroads," presentation to the New England Consumer Liaison Group (September 2014)

"Columbia River Treaty Hydropower: Perspectives on Power Benefits," presentation to the LSI Conference on the Columbia River Treaty (September 2014)

Direct Testimony of Paul J. Hibbard on Behalf of Calpine Construction Finance Company, L.P., before the Florida Public Service Commission, Docket No. 140110-E1 (July 2014)

"States in Control: EPA's Clean Power Plan and State Implementation," presentation at the National Association of Regulatory Utility Commissioners Summer Meetings (July 2014)

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*Summary of Quantifiable Benefits and Costs Related to Select Targeted Infrastructure Replacement Programs*, with Craig Aubuchon, report for the Barr Foundation, (January 2013)

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“US Electric Power Transmission: The Battle of the Jurisdictions,” comments to CERAWEEK 2010 (March 2010)

“New England Blueprint and the Federal Context,” presentation to the New England Independent System Operator Consumer Liaison Group Meeting, Westborough, MA (February 2010)

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“Transmission for Renewables - Risks and Opportunities for the Northeast,” presentation to the Governor’s Clean Energy Innovation Forum, New Brunswick, NJ (October 2009)

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“Wind, Transmission, and Federal Legislation,” comments to the MIT Wind Group, Cambridge, MA (Fall 2009)

“National Transmission Policy,” comments to The Energy Daily’s Transmission Siting Policy Summit, Washington, DC (September 2009)

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“Roadmap to New Renewable Resources in New England,” comments on the New England Governors’ Blueprint to the New England Conference of Public Utilities Commissioners Annual Symposium, Newport, RI (May 2009)

“Comments of Chairman Paul Hibbard,” presentation to the EBC Energy Seminar: New Transmission – The Key to Renewable Resource Integration in New England, Boston, MA (April 2009)

“Coordinating Wind and Transmission Development – Who Pays?” comments to the 2009 Platts Wind Power Development Conference, Chicago, IL (March 2009)

“Integrating Energy and Environmental Regulations in Massachusetts,” presentation to the Northeast Sustainable Energy Association Building Energy Conference, Boston, MA (March 2009)

“One Reason for the GCA: Energy Pricing in Massachusetts,” presentation to the South Shore Coalition, Hingham, MA (January 2009)

“Non-Reliability Transmission: State Choice and Control,” presentation to the New England Conference of Public Utility Commissioners Transmission Group, Chelmsford, MA (January 2009)

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“Conversation with Chairman Hibbard,” presentation to the New England Energy Alliance, Boston, MA (September 2008)

“Creating the Path: Delivering Clean Energy through Transmission Improvements,” presentation to the New England Independent System Operator Lights, Power, Action Conference, Boston, MA (September 2008)

“Distributed Resources, the Decoupling Model, and the Green Communities Act,” presentation to the Raab Restructuring Roundtable, Boston, MA (September 2008)

“Resource Planning: The Contribution of Efficiency and Renewables in Massachusetts,” presentation to the Law Seminars International Renewable Energy in New England Conference, Boston, MA (September 2008)

“Remarks to Economic Studies Working Group,” ESWG Committee Meeting, Westborough, MA (July 2008)

“Power Trade: Market Context and Opportunities,” presentation to the New England Governors’ Council/Eastern Canadian Premiers’ Energy Dialogue, Montreal, Canada (May 2008)

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“Generation and Demand Outlook for New England,” presentation to NECA Dinner Meeting, Cambridge, MA (September 2007)

“Comments on ISO’s Draft Regional System Plan,” presentation to the Independent System Operator Planning Advisory Committee, Boston, MA (September 2007)

“Regulatory Pressures, Policy Opinions,” presentation to the Environmental Business Council, Boston, MA (July 2007)

“Is New England Ensuring the Adequacy and Cost Effectiveness of the Region’s Transmission Grid?” panel moderator, New England Conference of Public Utility Commissioners Annual Symposium, Mystic, CT (June 2007)

“Energy Regulation in Massachusetts – Concerns and Options,” presentation to the Raab Restructuring Roundtable, Boston, MA (June 2007)

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“Energy for New England – The Demand, Supply and Price Context,” presentation to Massachusetts Municipal Wholesale Electric Cooperative Annual Meeting, Boylston, MA (May 2007)

“Demand Resources in New England: New Opportunities and Future Directions,” presentation to the New England Independent System Operator Annual Demand Resources Summit, Westborough, MA (May 2007)

“Power Supply for the New England Region,” presentation to the Boston Bar Association, Boston, MA (March 2007)

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“Consumers and Politicians Claim They Want Cheap, Reliable and Clean Energy – Do They Have the Will to Make That Happen?” presentation to the National Association of Energy Service Companies New England Regional Meeting (September 28, 2006)

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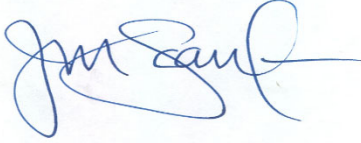
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I hereby certify that a copy of the cover letter and any materials accompanying this certificate was electronically transmitted to the individuals listed below.

The paper copies of this filing are being hand delivered to the Rhode Island Public Utilities Commission and to the Rhode Island Division of Public Utilities and Carriers.



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Joanne M. Scanlon

September 8, 2022

Date

**Docket No. 4978 – Narragansett Electric Co. d/b/a Rhode Island Energy –  
2021 Last Resort Service Procurement Plan  
Service List updated 8/29/2022**

<b>Name/Address</b>	<b>E-mail Distribution</b>	<b>Phone</b>
<b>The Narragansett Electric Company d/b/a Rhode Island Energy</b>  Andrew Marcaccio, Esq. Celia B. O’Brien, Esq. 280 Melrose Street Providence, RI 02907	<a href="mailto:AMarcaccio@pplweb.com">AMarcaccio@pplweb.com</a> ;	401-784-4263
	<a href="mailto:COBrien@pplweb.com">COBrien@pplweb.com</a> ;	
	<a href="mailto:JHutchinson@pplweb.com">JHutchinson@pplweb.com</a> ;	
	<a href="mailto:JScanlon@pplweb.com">JScanlon@pplweb.com</a> ;	
	<a href="mailto:BLJohnson@pplweb.com">BLJohnson@pplweb.com</a> ;	
	<a href="mailto:SBriggs@pplweb.com">SBriggs@pplweb.com</a> ;	
	<a href="mailto:JOliveira@pplweb.com">JOliveira@pplweb.com</a> ;	
	<a href="mailto:NSUcci@RIEnergy.com">NSUcci@RIEnergy.com</a> ;	
	<a href="mailto:JMRouland@pplweb.com">JMRouland@pplweb.com</a> ;	
<b>National Grid</b>	<a href="mailto:James.Ruebenacker@nationalgrid.com">James.Ruebenacker@nationalgrid.com</a> ;	
	<a href="mailto:James.Calandra@nationalgrid.com">James.Calandra@nationalgrid.com</a> ;	
	<a href="mailto:Theresa.Burns@nationalgrid.com">Theresa.Burns@nationalgrid.com</a> ;	
	<a href="mailto:Scott.McCabe@nationalgrid.com">Scott.McCabe@nationalgrid.com</a> ;	
	<a href="mailto:Daniel.Gallagher@nationalgrid.com">Daniel.Gallagher@nationalgrid.com</a> ;	
<b>Division of Public Utilities</b> Gregory S. Schultz, Esq. Dept. of Attorney General 150 South Main St. Providence, RI 02903	<a href="mailto:gSchultz@riag.ri.gov">gSchultz@riag.ri.gov</a> ;	401-274-4400
	<a href="mailto:Christy.Hetherington@dpuc.ri.gov">Christy.Hetherington@dpuc.ri.gov</a> ;	
	<a href="mailto:Margaret.L.Hogan@dpuc.ri.gov">Margaret.L.Hogan@dpuc.ri.gov</a> ;	
	<a href="mailto:John.Bell@dpuc.ri.gov">John.Bell@dpuc.ri.gov</a> ;	
	<a href="mailto:Al.Mancini@dpuc.ri.gov">Al.Mancini@dpuc.ri.gov</a> ;	
	<a href="mailto:Al.Contente@dpuc.ri.gov">Al.Contente@dpuc.ri.gov</a> ;	
	<a href="mailto:Paul.Roberti@dpuc.ri.gov">Paul.Roberti@dpuc.ri.gov</a> ;	
	<a href="mailto:Machaela.Seaton@dpuc.ri.gov">Machaela.Seaton@dpuc.ri.gov</a> ;	
<a href="mailto:Michelle.Barbosa@dpuc.ri.gov">Michelle.Barbosa@dpuc.ri.gov</a> ;		



	<a href="mailto:Thomas.kogut@dpuc.ri.gov">Thomas.kogut@dpuc.ri.gov</a> ; <a href="mailto:EGolde@riag.ri.gov">EGolde@riag.ri.gov</a> ;	
<b>Office of Energy Resources</b>  Joseph Keough, Jr. Keough & Sweeney, Ltd. 41 Mendon Ave. Pawtucket, RI 02861  Albert Vitali, Esq. Division of Legal Services One Capitol Hill, Fourth Floor Providence, RI 02908  Christopher Kearns	<a href="mailto:jkeoughjr@keoughsweeney.com">jkeoughjr@keoughsweeney.com</a> ; <a href="mailto:Albert.vitali@doa.ri.gov">Albert.vitali@doa.ri.gov</a> ; <a href="mailto:Christopher.Kearns@energy.ri.gov">Christopher.Kearns@energy.ri.gov</a> ; <a href="mailto:steven.chybowski@energy.ri.gov">steven.chybowski@energy.ri.gov</a> ; <a href="mailto:jkeoughjr@keoughsweeney.com">jkeoughjr@keoughsweeney.com</a> ; <a href="mailto:Nancy.Russolino@doa.ri.gov">Nancy.Russolino@doa.ri.gov</a> ; <a href="mailto:jdalton@poweradvisoryllc.com">jdalton@poweradvisoryllc.com</a> ;	401-724-3600
<b>Good Energy LLC</b> James G. Rhodes, Esq. 205 Governor St. Providence, RI 02906	<a href="mailto:jamie.rhodes@goodenergy.com">jamie.rhodes@goodenergy.com</a> ;	401-225-3441
<b>RI Attorney General Office</b> Nicholas Vaz, Esq. Alison B. Hoffman, Esq. 150 South Main St. Providence, RI 02903	<a href="mailto:nvaz@riag.ri.gov">nvaz@riag.ri.gov</a> ;  <a href="mailto:AHoffman@riag.ri.gov">AHoffman@riag.ri.gov</a> ;	247-4400 Ext. 2297  Ext. 2116
<b>George Wiley Center</b> Jennifer L. Wood, Executive Director R.I. Center for Justice R.I. Center for Justice 1 Empire Plaza, Suite 410 Providence, RI 02903	<a href="mailto:jwood@centerforjustice.org">jwood@centerforjustice.org</a> ;  <a href="mailto:georgewileycenterri@gmail.com">georgewileycenterri@gmail.com</a> ;  <a href="mailto:camiloviveiros@gmail.com">camiloviveiros@gmail.com</a> ;	
<b>File an original &amp; 9 copies w/:</b> Luly E. Massaro, Commission Clerk John Harrington, Counsel Public Utilities Commission 89 Jefferson Blvd. Warwick, RI 02888	<a href="mailto:Luly.Massaro@puc.ri.gov">Luly.Massaro@puc.ri.gov</a> ;  <a href="mailto:Alan.Nault@puc.ri.gov">Alan.Nault@puc.ri.gov</a> ; <a href="mailto:Emma.Rodvien@puc.ri.gov">Emma.Rodvien@puc.ri.gov</a> ; <a href="mailto:Todd.Bianco@puc.ri.gov">Todd.Bianco@puc.ri.gov</a> ; <a href="mailto:John.Harrington@puc.ri.gov">John.Harrington@puc.ri.gov</a> ;	401-780-2017
Victoria Scott, Governor's Office	<a href="mailto:Victoria.Scott@governor.ri.gov">Victoria.Scott@governor.ri.gov</a> ;	
Marc Hanks, Direct Energy	<a href="mailto:Marc.Hanks@directenergy.com">Marc.Hanks@directenergy.com</a> ;	