

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

**Docket No. DG 17-198  
Petition to Approve Firm Supply and Transportation Agreements and the  
Granite Bridge Project**

**DIRECT TESTIMONY OF**

**ELIZABETH A. STANTON, PHD**

**ON BEHALF OF CONSERVATION LAW FOUNDATION**

**APPLIED ECONOMICS CLINIC**

**SEPTEMBER 13, 2019**

1 **I. INTRODUCTION**

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

3 A: My name is Elizabeth A. Stanton, Ph.D. I am the Director and Senior Economist of the Applied  
4 Economics Clinic, 1012 Massachusetts Avenue, Arlington MA 02476.

5 **Q: On whose behalf are you testifying in this proceeding?**

6 A: I am testifying on behalf of Conservation Law Foundation (CLF), 27 North Main Street Concord,  
7 NH 03301. CLF is a private, non-profit organization dedicated to protecting New England's  
8 environment for the benefit of all people.

9 **Q: Dr. Stanton, what is your education and professional background?**

10 A: I am the founder and Director of the Applied Economics Clinic, a non-profit consulting group  
11 and a long-term Visiting Scholar at the Global Development and Environment Institute at Tufts  
12 University. The Applied Economics Clinic ("the Clinic") provides expert testimony, analysis,  
13 modeling, policy briefs, and reports for public interest groups on the topics of energy,  
14 environment, consumer protection, and equity. The Clinic provides training to the next  
15 generation of expert technical witnesses and analysts through applied, on-the-job training to  
16 graduate students in related fields and works proactively to support diversity among both student  
17 workers and professional staff.

18 I am a researcher and analyst with more than 17 years of professional experience as a political  
19 and environmental economist. I have authored more than 150 reports, policy studies, white  
20 papers, journal articles, and book chapters on topics related to energy, the economy, and the  
21 environment.

22 My recent work includes Integrated Resource Plan (IRP) and Demand-Side Management (DSM)  
23 planning review, analysis and testimony of state climate laws as they relate to proposed capacity  
24 additions, and other issues related to consumer and environmental protection in the electric and  
25 natural gas sectors. I have submitted expert testimony and comments in state dockets in New  
26 Hampshire, Massachusetts, Vermont, Indiana, Illinois, Louisiana, and Minnesota as well as  
27 several federal dockets.

28 In my previous position as a Principal Economist at Synapse Energy Economics, I provided  
29 expert testimony in electric and natural gas sector dockets, and led studies examining  
30 environmental regulation, cost-benefit analyses, and the economics of energy efficiency and

1 renewable energy. Prior to joining Synapse, I was a Senior Economist with the Stockholm  
2 Environment Institute's (SEI) Climate Economics Group, where I was responsible for leading  
3 the organization's work on the Consumption-Based Emissions Inventory (CBEI) model and on  
4 water issues and climate change in the western United States. While at SEI, I led domestic and  
5 international studies commissioned by the United Nations Development Programme, Friends of  
6 the Earth-U.K., and Environmental Defense Fund, among others.

7 My articles have been published in *Ecological Economics*, *Climatic Change*, *Environmental and*  
8 *Resource Economics*, *Environmental Science & Technology*, and other journals. I have also  
9 published books, including *Climate Change and Global Equity* (Anthem Press, 2014) and  
10 *Climate Economics: The State of the Art* (Routledge, 2013), which I co-wrote with Frank  
11 Ackerman. I am also coauthor of *Environment for the People* (Political Economy Research  
12 Institute, 2005, with James K. Boyce) and coeditor of *Reclaiming Nature: Worldwide Strategies*  
13 *for Building Natural Assets* (Anthem Press, 2007, with Boyce and Sunita Narain).

14 I earned my Ph.D. in economics at the University of Massachusetts-Amherst, and have taught  
15 economics at Tufts University, the University of Massachusetts-Amherst, and the College of  
16 New Rochelle, among other colleges and universities. My curriculum vitae is attached to this  
17 testimony as EAS-Schedule 1.

18 **Q: Have you previously filed testimony before this Commission?**

19 A: Yes, I testified in Docket DE 11-250, Public Service Company of New Hampshire, Investigation  
20 of Scrubber Costs and Cost Recovery, and I recently filed testimony in Liberty's related case, DG  
21 17-152, its Least Cost Integrated Resource Plan (LCIRP).

22 **A. OVERVIEW**

23 **Q: What is the purpose of your testimony?**

24 A: My testimony addresses the need to evaluate the environmental impacts of new gas infrastructure  
25 in particular as it relates to climate change in the Commission's review of prudence of the  
26 proposed Granite Bridge Project, as well as its consistency with the requirements of the state's  
27 LCIRP law.

28 **Q: What approvals does Liberty seek in this case?**

29 A: In this proceeding, Liberty has requested that the New Hampshire Public Utilities Commission:

- 1 (1) Approve a delivered supply contract with ENGIE Gas & LNG, LLC (“ENGIE”);
- 2 (2) Approve a precedent agreement with Portland Natural Gas Transmission System
- 3 (“PNGTS”) for firm transportation capacity;
- 4 (3) Find to be prudent the Company’s decision to build an in-state pipeline, the Granite Bridge
- 5 Pipeline; and
- 6 (4) Find to be prudent the Company’s decision to build an on-system liquefied natural gas
- 7 (“LNG”) facility, the Granite Bridge LNG facility (together, the Granite Bridge Project).

8 Liberty Petition at 1.

9 In its Order Notice dated February 8, 2018, the New Hampshire Public Utilities Commission noted  
10 that the proposal raises issues

11 ... related to RSA 374:1 and 374:2 (public utilities to provide reasonably safe and  
12 adequate service at "just and reasonable" rates); RSA 374:4 (Commission's duty to keep  
13 informed of the manner in which all public utilities in the state provide for safe and  
14 adequate service); RSA 374:7 (Commission's authority to investigate and ascertain the  
15 methods employed by public utilities to "order all reasonable and just improvements  
16 and extensions in service or methods" to supply gas); RSA 378:7 (rates collected by a  
17 public utility for services rendered or to be rendered must be just and reasonable); and,  
18 by implication, the standards of RSA 378:28 (all utility plant to be included in  
19 permanent rates must be found by the Commission to be prudent, used, and useful).  
20 These issues embrace, but are not limited to, the question of whether Liberty reasonably  
21 investigated and analyzed its long-term supply requirements and the alternatives for  
22 satisfying those requirements.

23 Order of Notice at 2.

24  
25 **Q: You state above that you have also filed testimony in Liberty’s LCIRP case. Please explain**  
26 **how that relates to your testimony in this proceeding.**

27 A: In this case, the Commission must consider whether the proposed investments meet the  
28 requirements of the state energy policy, and determine whether or not the investments are  
29 prudent uses of ratepayer funds, compared to alternatives, over the lifetime of the investment.

30 New Hampshire’s least cost planning law requires that a utility develop least cost integrated  
31 resource plan at least every five years that conforms with the state’s energy policy. That law  
32 states:

1 it shall be the energy policy of this state to meet the energy needs of the citizens and  
2 businesses of the state at the lowest reasonable cost while providing for the reliability  
3 and diversity of energy sources; to maximize the use of cost effective energy efficiency  
4 and other demand side resources; and *to protect the safety and health of the citizens,*  
5 *the physical environment of the state,* and the future supplies of resources, with  
6 consideration of the financial stability of the state's utilities.

7 RSA 378:37 (emphasis added).

8 The LCIRP law goes on to require that utility plans must include:

9 V. An assessment of plan integration and impact on state compliance with the Clean Air Act  
10 of 1990, as amended, and other environmental laws that may impact a utility's assets or  
11 customers.

12 VI. An assessment of the plan's long- and short-term environmental, economic, and energy  
13 price and supply impact on the state.

14 RSA 378:38.

15 In evaluating utility integrated resource plans, New Hampshire law states:

16 In deciding whether or not to approve the utility's plan, the commission *shall consider potential*  
17 *environmental, economic, and health-related impacts of each proposed option.*

18 And:

19 Where the commission determines the options have equivalent financial costs, equivalent  
20 reliability, and equivalent environmental, economic, and health-related impacts, the following  
21 order of energy policy priorities shall guide the commission's evaluation:

22 I. Energy efficiency and other demand-side management resources;

23 II. Renewable energy sources;

24 III. All other energy sources.

25 RSA 378:39.

26 The LCIRP law goes on to require, in section 378:40, that any rate change approved by the  
27 Commission must be consistent with an approved LCIRP, or that a proposed LCIRP is under  
28 review by the Commission.

1 To evaluate the reasonableness and prudence of the proposed investments, the Commission  
2 must assess how the proposal compares to other alternatives, and the environmental and  
3 economic impacts of the proposed investments that would commit ratepayer dollars, potentially  
4 for many decades into the future.

5 **Q: What are your overall conclusions in this docket?**

6 A: The risks of new fossil fuel investments, particularly those proposed to be financed by utility  
7 ratepayers, require the Commission to include in its prudence review impacts related to climate  
8 change. In this case, the Company has not demonstrated that the Granite Bridge Project is a  
9 prudent investment of ratepayer funds. As discussed below, the impacts of climate change  
10 increase the risk of future stranded costs arising from new fossil fuel investments. In addition,  
11 the Commission should not approve the proposed Granite Bridge Project or supply contracts  
12 based on the significant shortcomings in the Company’s pending LCIRP filing, including the  
13 Company’s failure to adequately consider lower cost and cleaner alternatives to additional gas  
14 investments, and the Company’s failure to reasonably investigate and analyze the long-term  
15 supply requirements and alternatives for meeting its customers’ needs.

16 **B. CLIMATE IMPACTS EXPECTED IN NEW HAMPSHIRE**

17 **Q: Please explain how climate impacts of the Granite Bridge Project are part of the**  
18 **Commission’s prudence review.**

19 A: Climate change includes a range of impacts to ecosystems, economy and health that are  
20 reasonable to incorporate in any evaluation of utility plans or projects, particularly those projects  
21 that commit ratepayers to funding a new fossil fuel investment over a long time horizon, such as  
22 the Granite Bridge Project.

23 **Q: Is climate change expected to effect New Hampshire?**

24 A: Yes, climate change is expected to have negative impacts on New Hampshire’s natural  
25 ecosystems, economy, and the health of its residents. Among many other sources, detailed  
26 geographic analysis published in 2017 by the U.S. Global Change Research Program  
27 (USGCRP)—a federal program mandated by the U.S. Congress—provides the most recent  
28 forecasts of climate damages expected in Northeast states (see Table 1).<sup>1</sup>

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<sup>1</sup> U.S. Global Change Research Program (USGCRP), available at  
[https://nca2018.globalchange.gov/downloads/NCA4\\_2018\\_FullReport.pdf](https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf).

1 **Table 1. Impacts of Climate Change in New Hampshire<sup>2</sup>**

<b>Temperature</b>
<ul style="list-style-type: none"><li>• 4°F to 5°F of additional annual average temperature increase is expected in New Hampshire by 2050</li><li>• Observed and projected increases in temperature are changing seasonality</li><li>• The annual average temperature in New England has increased by about 3°F or more since 1901</li></ul>
<b>Precipitation</b>
<ul style="list-style-type: none"><li>• Observed and projected trend towards increases in rainfall intensity, exceeding similar increases elsewhere in the United States</li><li>• Increases in total precipitation expected in winter and spring, little change expected in summer</li><li>• In the worst case scenario (RCP8.5), monthly precipitation between December and April expected to be about 1 inch greater by the end of the century</li><li>• Urban areas are at risk for displaced populations and damaged infrastructure due to extreme precipitation events and recurrent flooding</li></ul>
<b>Ocean and Sea Level Rise</b>
<ul style="list-style-type: none"><li>• Observed and projected increases in temperature, acidification, storm frequency and intensity</li><li>• The warming trend in the ocean has been associated with fish migration northward and to greater depths</li><li>• Sea level rise has amplified storm impacts on the coast, contributing to higher storm surges that reach further inland</li></ul>
<b>Economy</b>
<ul style="list-style-type: none"><li>• New England has a high occurrence of tourism and other natural resource-dependent industries like fishing, farming and forestry—putting livelihoods at greater risk from climate impacts</li><li>• Much of the infrastructure in New England is old, including drainage and sewer systems, flood and storm protection infrastructure, transportation systems and power supply—climate-related disruptions will exacerbate existing age-related issues</li></ul>
<b>Human Health</b>
<ul style="list-style-type: none"><li>• Urban centers tend to have higher temperatures than surrounding regions, due to urban heat island effects</li><li>• Heat-related illness and death are significant public health problems that are expected to worsen</li><li>• The Northeast can expect approximately 650 additional premature deaths per year from extreme heat by 2050</li></ul>

2

3 **Q: What changes to temperature are expected in New Hampshire?**

4 **A:** By 2050, New Hampshire’s annual average temperatures are expected to be 4°F to 5°F higher  
5 than today’s levels.

6 USGCRP presents probable temperature changes ranging from an optimistic case (called “RCP  
7 4.5” in which global emissions rise only slightly over the next three decades and fall rapidly  
8 starting in 2050) to a more pessimistic case (“RCP 8.5” in which global emissions continue to  
9 rise at the same rapid pace as the previous two decades). For 2050, the expected range of  
10 temperature increase is 4°F under the optimistic forecast up to more than 5°F under the more

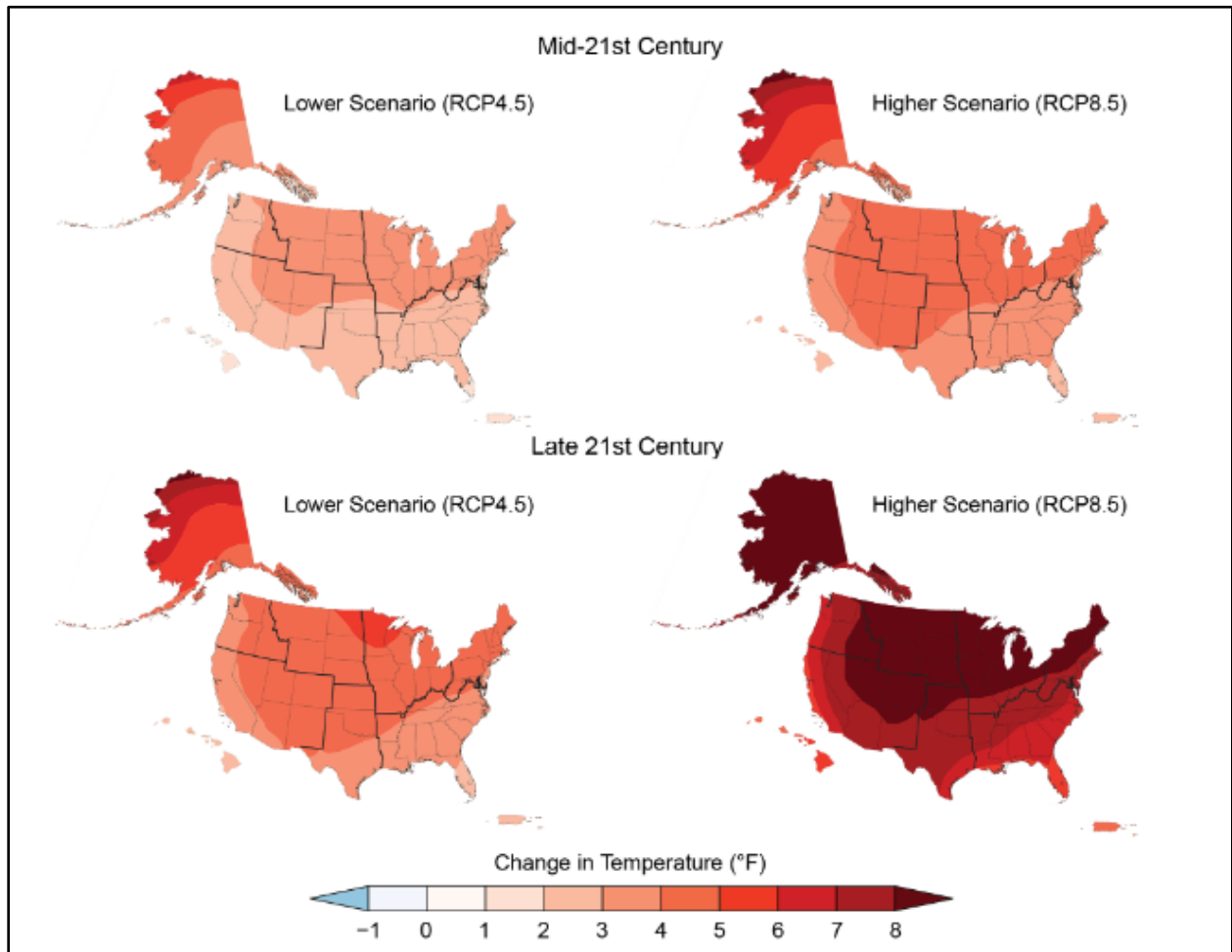
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<sup>2</sup> Id.

1 pessimistic forecast).<sup>3</sup> These temperature changes do not include the 3°F of temperature increase  
2 that has already occurred, bringing New Hampshire's current-day snowmelt 2-5 days earlier than  
3 1960 at lower elevations and more than 10 days earlier at higher elevations.<sup>4</sup>

4 By 2100, New Hampshire's annual average temperatures are expected to increase by 5°F to 8°F  
5 from today's levels (see Figure 1).

6 **Figure 1. Projected Changes to Annual Average Temperatures from 2015 levels<sup>5</sup>**



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8

9 **Q: Is the length of New Hampshire's winter season expected to shrink with climate change?**

<sup>3</sup> Id. at p. 42.

<sup>4</sup> Id. at p. 681.

<sup>5</sup> Id., reproduced from USGCRP 2017 Figure 1.3.



1 **A:** Yes. According to the USGCRP report, from the current day to mid-century, New Hampshire’s  
2 winter season will shrink (and the “freeze-free” season will grow) by 2 to 3 weeks under the  
3 optimistic forecast, and up to 4 to 5 weeks under the more pessimistic forecast.<sup>6</sup>

4 **Q: What changes to precipitation are expected in New Hampshire?**

5 **A:** New Hampshire’s total December to April precipitation is expected to increase by 1 inch by  
6 2050, with little change to summer rain levels.

7 **Q: What changes to sea level are expected in New Hampshire?**

8 **A:** By 2100, New Hampshire’s sea levels are expected to rise 1-2 feet under the optimistic forecast,  
9 and up to 5-6 feet under the more pessimistic forecast of global greenhouse gas emissions.<sup>7</sup>

10 **Q: Does climate change effect ocean temperatures?**

11 **A:** Yes, increased concentrations of greenhouse gases in the atmosphere also raises ocean  
12 temperatures. In the last decade, the sea surface temperature above the Northeast Continental  
13 Shelf has warmed four times faster than the long-term historical trend, and three times faster than  
14 the global average ocean temperature increase.<sup>8</sup>

15 **Q: Does climate change effect the chemical balance of ocean water?**

16 **A:** Yes, increased concentrations of greenhouse gases in the atmosphere also change the pH balance  
17 of ocean waters, making the ocean more acidic and making it more difficult for shell-forming  
18 organisms (lobsters, scallops, crabs, oysters, clams, mussels) to survive. The USGCRP report  
19 states that the coastal waters of the U.S. Northeast are particularly “sensitive to the effects of  
20 ocean acidification.”<sup>9</sup>

21 **Q: Are these climatic changes expected to impact on New Hampshire’s economy?**

22 **A:** Yes. Climate change is expected to have negative impacts on New Hampshire’s tourism, forestry,  
23 farming, and fishing industries with shorter winters, rapid ecosystem changes and decreased  
24 productivity in fisheries. Wetter Springs will make it difficult for farming to benefit from longer  
25 growing seasons. According to the USGCRP report the ecosystems at the greatest risk in New

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<sup>6</sup> Id. at p. 683.  
<sup>7</sup> Id. at p. 43.  
<sup>8</sup> Id. at p. 685.  
<sup>9</sup> Id. at p. 687.

1 Hampshire are Alpine (high elevation), freshwater aquatic, and certain types of forests, which  
2 have a difficult time adapting to shifting seasonality and rising temperatures.<sup>10</sup>

3 **Q: Are these climatic changes expected to impact on human health in New Hampshire?**

4 **A:** Yes. Climate change is expected to have negative impacts on human health in New Hampshire.  
5 Threats to human health include extreme heat, storm flooding, and degradation of air and water  
6 quality. More frequent heat waves will increase the numbers of emergency room visits and  
7 premature deaths. Higher levels of ground-level ozone due to changing weather conditions also  
8 result in hospitalizations and deaths from asthma and related ailments.<sup>11</sup>

9 **Q: Has New Hampshire’s climate been changing more or less rapidly than the global average?**

10 **A:** While global average temperatures have increased about 1.8°F from preindustrial levels, New  
11 England annual average temperatures have increased by 3°F.<sup>12</sup> The pace of New England’s sea  
12 level rise joins northern Alaska and the eastern Gulf Coast as the most rapid in the United States.

13 **Q: Can global action to rapidly reduce greenhouse gas emissions slow climate change?**

14 **A:** Yes, global action to rapidly reduce greenhouse gas emissions can slow—but not reverse—  
15 climate change. In a best-case scenario in which global greenhouse gas emissions begin to fall  
16 rapidly by 2020 (called “RCP 2.6”), New Hampshire’s annual average temperature would  
17 increase only an additional 1°F or less by 2050.<sup>13</sup>

### 18 C. NEW HAMPSHIRE AND GREENHOUSE GAS EMISSION REDUCTIONS

19 **Q: What emissions reductions are necessary to limit further annual average temperature  
20 increases to 1°F in New Hampshire?**

21 **A:** To limit New Hampshire’s future temperature increase to 1°F will require limiting future global  
22 average temperature increases to 0.8°F (not including the 1.8°F global increase that has already  
23 occurred, for a total of approximately 2.6°F from preindustrial times: this scenario is often

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<sup>10</sup> Id. at p. 678-679.

<sup>11</sup> Id. at p. 700.

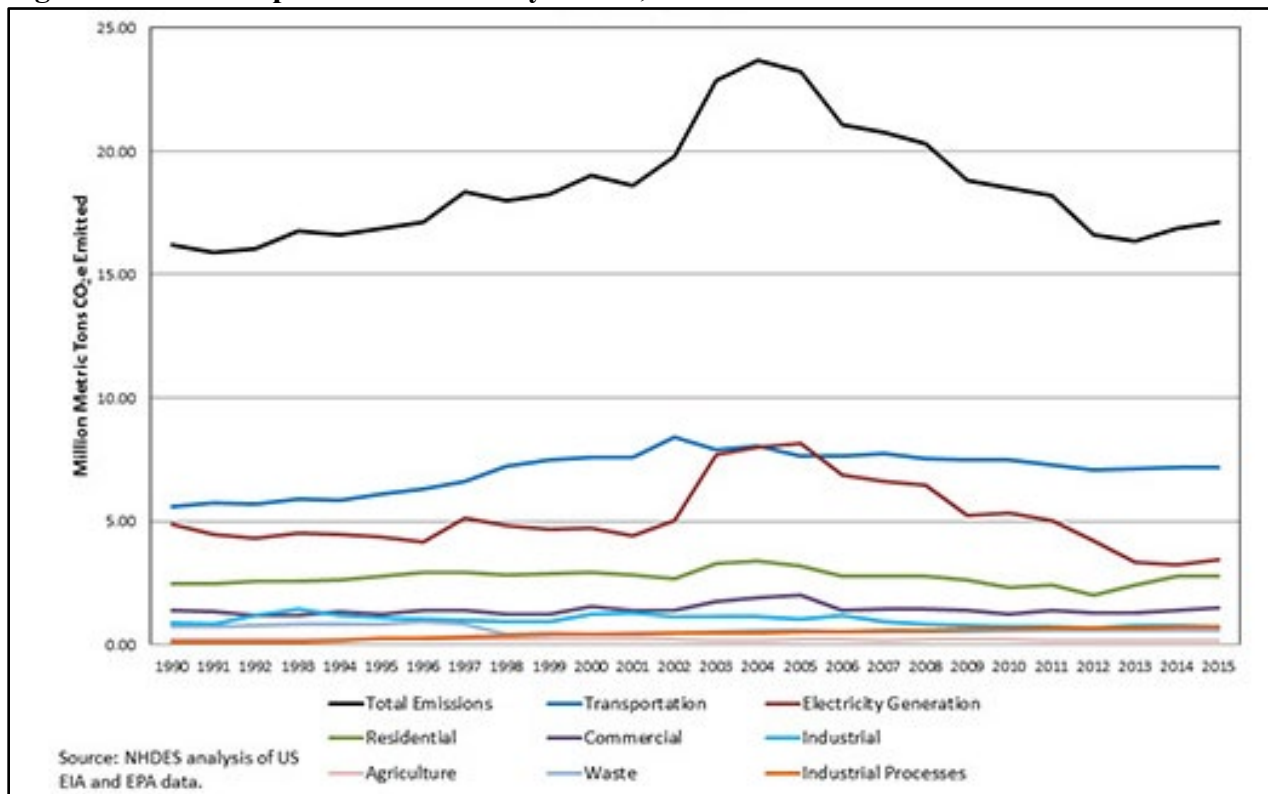
<sup>12</sup> Global Warming of 1.5°C (IPCC 2018 SPM), available at [https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15\\_Full\\_Report\\_High\\_Res.pdf](https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_High_Res.pdf), p. 4.

<sup>13</sup> IPCC SPM 2018 at p. 4, and NOAA State Climate Summaries: New Hampshire (NOAA 2019) <https://statesummaries.ncics.org/chapter/nh/>.

1 referred to as “RCP 2.6”). In this best-case scenario, global emissions fall to half their current  
2 levels by 2040 and to zero net emissions by 2080.<sup>14</sup>

3 For New Hampshire this would be mean that its 2015 greenhouse gas emissions (the latest year  
4 for which a state inventory is available) of 16 million metric tons (MMT) CO<sub>2</sub>-equivalent (CO<sub>2</sub>-  
5 e) (see Figure 2) must fall to 8 MMT by 2040 and 0 MMT by 2080.

6 **Figure 2. New Hampshire Emissions by Sector, 1990-2015<sup>15</sup>**



7  
8

9 **Q: What emission reductions are called for in New Hampshire’s 2009 Climate Action Plan?**

10 **A:** New Hampshire’s 2009 Climate Action Plan sets greenhouse gas emission level targets of 12.7  
11 MMT CO<sub>2</sub>-3 in 2025 and 13.2 MMT in 2050.<sup>16</sup> Assuming a steady pace of reductions between

<sup>14</sup> van Vuuren, Representative Concentration Pathways, 2011, available at [https://unfccc.int/sites/default/files/2\\_vvuuren13sed2\\_amended.pdf](https://unfccc.int/sites/default/files/2_vvuuren13sed2_amended.pdf).

<sup>15</sup> Reproduced from New Hampshire Department of Environmental Services, 2015. *New Hampshire Greenhouse Gas Emissions Inventory*. Available at: <https://www.des.nh.gov/organization/divisions/air/tsb/tps/climate/ghg-emissions.htm>.

<sup>16</sup> NH Climate Action Plan, 2009, available at [https://www.des.nh.gov/organization/divisions/air/tsb/tps/climate/action\\_plan/nh\\_climate\\_action\\_plan.htm](https://www.des.nh.gov/organization/divisions/air/tsb/tps/climate/action_plan/nh_climate_action_plan.htm).

1 and beyond these dates, these targets would result in 2040 emissions of 13.0 MMT and 2080  
2 emissions of 13.8 MMT.

3 **Q: How do New Hampshire’s greenhouse gas emission reduction targets compare to the**  
4 **reductions necessary to limit future temperature increases to 1°F?**

5 **A:** If the state implemented New Hampshire’s 2009 Climate Action Plan, the state’s 2040 emissions  
6 would be 26 percent lower than current-day emissions, compared to the 50 percent reduction  
7 worldwide necessary to limit future temperature increases to 1°F. Under the Climate Action Plan,  
8 New Hampshire’s emissions increase very gradually after 2025. To limit future temperature  
9 increases to 1°F, global emissions must begin to fall rapidly by 2020 and continue this decline  
10 until they reach zero net levels on or before 2080.

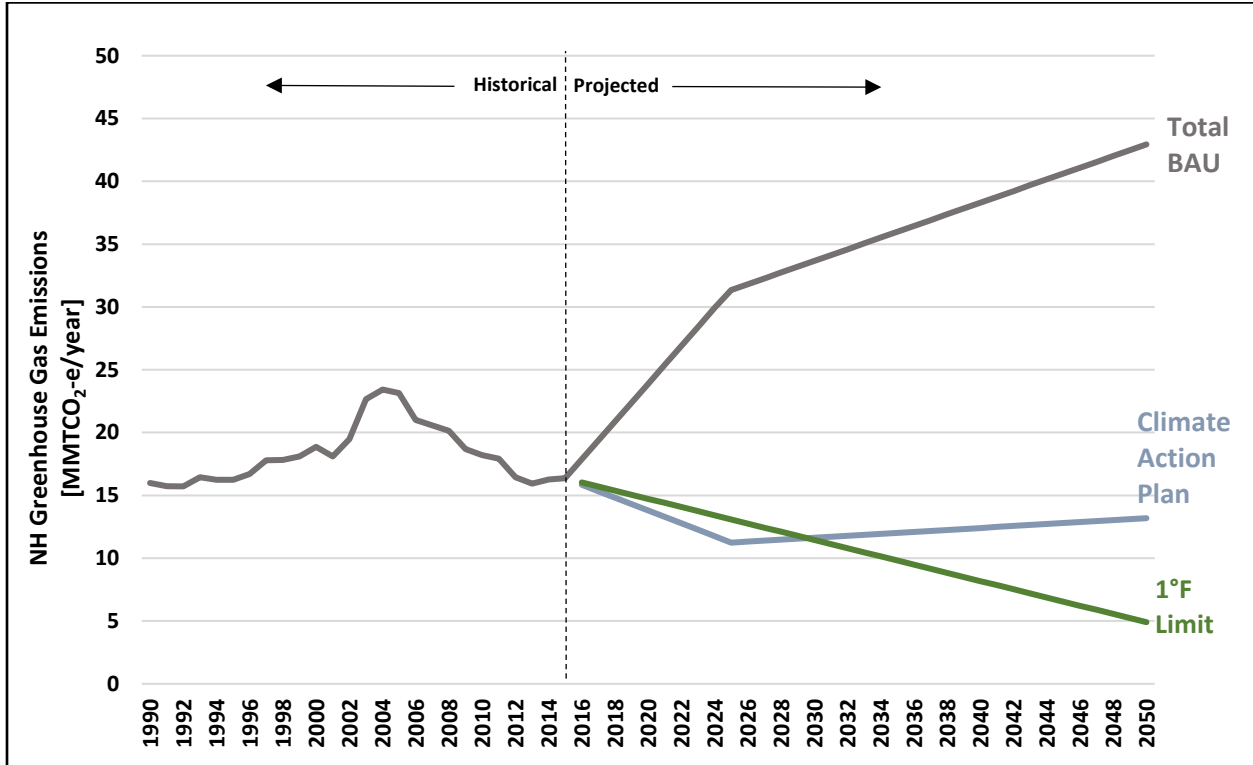
11 Without the emission reduction actions described in the Climate Action Plan, New Hampshire’s  
12 emissions are expected to increase steadily, rising to 31 MMT CO<sub>2</sub>-e in 2025 and 43 MMT in  
13 2050.<sup>17</sup> This pace of growth exceeds the most pessimistic global emissions growth (RCP 8.5)  
14 expected by U.S. and international sources (see Figure 3).<sup>18</sup>

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<sup>17</sup> Id. at p.16.

<sup>18</sup> See van Vuuren at p.8.

1 **Figure 3. New Hampshire Projected Emissions by Scenario<sup>19</sup>**



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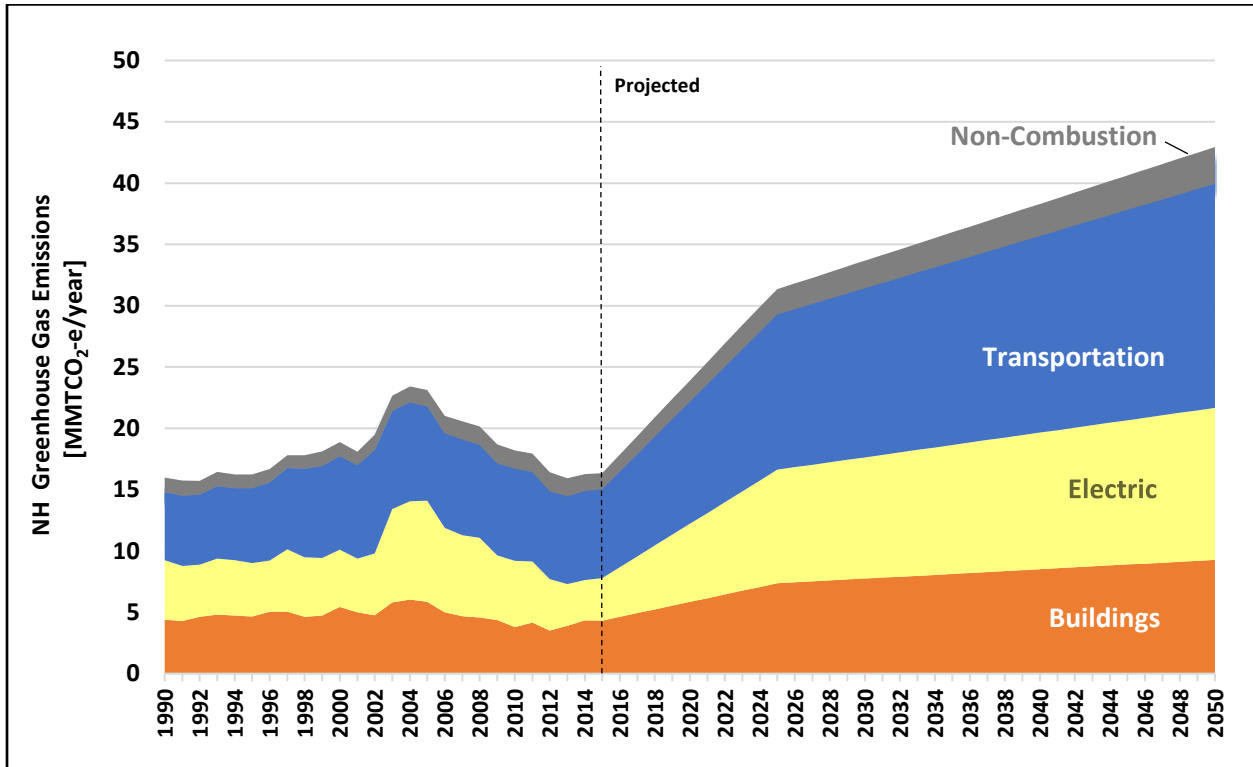
4 **Q: What emissions are expected from the direct use of fuels in homes and businesses in New**  
 5 **Hampshire?**

6 **A:** According to NHDES, direct fuel use (not including electric generation) in New Hampshire’s  
 7 homes and business accounted for 4.3 MMT CO<sub>2</sub>-e in 2015.<sup>20</sup> These emissions are expected to  
 8 grow to 9.3 MTT by 2050 under a business-as-usual scenario without emission reduction policies  
 9 (see “Buildings” in Figure 4).

<sup>19</sup> NH DES 2015 NH Greenhouse Gas Emission Inventory, available at <https://www.des.nh.gov/organization/divisions/air/tsb/tps/climate/ghg-emissions.htm>, Figure 1.3, Table 2.1; NH DES 2015. NH GHG Emissions by Sector.

<sup>20</sup> NH DES 2015 NH Greenhouse Gas Emission Inventory, available at <https://www.des.nh.gov/organization/divisions/air/tsb/tps/climate/ghg-emissions.htm>.

1 **Figure 4. New Hampshire Historical and Business-As-Usual Emissions by Sector<sup>21</sup>**



2  
3 **D. EMISSIONS FROM GRANITE BRIDGE PIPELINE**

4 **Q: What greenhouse gas emissions come from building heating in Liberty's service territory**  
5 **at present?**

6 **A:** According to the testimony of Paul J. Hibbard in DG 17-152,<sup>22</sup> 0.4 MMT CO<sub>2</sub>-e is emitted  
7 annually from heating in the Liberty's service territory. Liberty has not provided any testimony  
8 about the environmental impacts of the Granite Bridge Pipeline, or alternatives to it, in this  
9 docket.

10 **Q: Do you agree with Liberty's claims regarding the emissions impact from the addition of the**  
11 **Granite Bridge pipeline?**

12 **A:** No. According to the testimony of Paul J. Hibbard in DG 17-152, Liberty claims that their  
13 customers' greenhouse gas emissions from heating from sources other than gas would decline  
14 with the development of the Granite Bridge pipeline.<sup>23</sup> This expectation rests on the incorrect

<sup>21</sup> NH Climate Plan, 2009. Table 1.2, Figure 1.3; NH DES 2015. NH GHG Emissions by Sector.

<sup>22</sup> Hibbard Exhibit 2, Bates p.49.

<sup>23</sup> See id.

1 assumption that customers have two and only two heating choices: existing non-gas fossil fuels  
2 (fuel oil, propane) or new gas supplied by Granite Bridge.

3 **Q: Is this a credible evaluation of the emissions impact?**

4 **A:** No. Liberty’s evaluation fails to consider lower emission heating alternatives—such as heat  
5 pumps, and as CLF’s witness Chernick describes, it also fails to adequately consider demand  
6 side resources.

7 **Q: Does Liberty’s claimed emission reduction take into account low-emission alternatives to**  
8 **current heating fuels?**

9 **A:** No. By limiting heating alternatives to two (non-gas fossil fuels and new gas supplied by Granite  
10 Bridge), Liberty effectively “dials in” or “sets” an assumed emission reduction. Energy efficient  
11 electric heat pumps appear to supply a very limited share of heating needs in Liberty’s alternative  
12 to the Granite Bridge pipeline. Testimony submitted by Paul J. Hibbard describes this  
13 methodology and discusses the very low share of heat pumps Liberty has modeled in New  
14 Hampshire’s future heating mix.<sup>24</sup> This very low share is the “status quo” to which Granite  
15 Bridge is compared and includes 59 percent of customers heating with oil, 21 percent with  
16 propane, 11 percent with electric, and 5 percent with wood).

17 **Q: Is Liberty’s claimed emission reduction correct?**

18 **A:** Liberty’s claimed emission reduction is not correct. The claimed emission reduction relies on  
19 electric heat pumps being either non-existent or infeasible—neither of which is the case. Electric  
20 heat pumps are a feasible, lower-emission alternative to non-gas fossil fuel or gas heating, as is  
21 discussed in Mr. Chernick’s testimony.

22 **Q: What is the correct emissions impact from Granite Bridge?**

23 **A:** In comparison to the lowest emission heating alternative for Liberty’s territory (conversion to  
24 electric heat pumps as discussed in Mr. Chernick’s testimony), Granite Bridge increases  
25 emissions. Gas heating is less efficient and more emissions intensive than heating with sources  
26 such as electric heat pumps.

27 **Q: Even if Liberty’s claimed emissions reduction occurred, would it be sufficient to meet the**  
28 **pace of reductions needed to limit New Hampshire’s future temperature rise to 1°F?**

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<sup>24</sup> See id. at p. 21.

1 **A:** No, Even if a new gas pipeline resulted in the Company’s projected reduction – which it does  
2 not – limiting New Hampshire’s future temperature rise to 1°F will require a global emissions  
3 reduction of 50 percent by 2040 and 100 percent by 2080. Liberty evaluates Granite Bridge using  
4 an average life for the investment of 55 years, meaning that the pipeline’s useful life extends into  
5 the 2060s or later.

6 **Q: Can New Hampshire meet its share of emission reductions without reducing gas usage?**

7 **A:** No. As Mr. Chernick’s testimony notes, the proposed promotion and expansion of natural gas  
8 supply fails to advance economically prudent or environmentally sound energy investments.

9

#### 10 **E. LIMITATIONS FOR FUTURE GAS USE**

11 **Q: Can a global emission reduction of 50 percent by 2040 and 100 percent by 2080 be achieved**  
12 **in some way that does not require New Hampshire to meet these worldwide emission**  
13 **reductions?**

14 **A:** The only way in which the global emission reduction necessary to limit New Hampshire’s future  
15 temperature increase to 1°F (50 percent by 2040 and 100 percent by 2080) can be achieved  
16 without New Hampshire itself meeting these emission limits is for other states and countries to  
17 exceed the limits. New Hampshire residents must either do their own share of emission  
18 reductions or rely on others outside of the state to do it for them.

19 **Q: Does conversion to gas heating provide a path for New Hampshire to achieve the needed**  
20 **emission reductions sufficient to limit New Hampshire’s future temperature increase to 1°F**  
21 **(50 percent by 2040 and 100 percent by 2080)?**

22 **A:** No. Even Liberty’s testimony acknowledges a reliance on gas that would extend into the 2060s.  
23 New Hampshire needs a portfolio of measures that reduce emissions by much more than 50  
24 percent (so that the whole portfolio has an average reduction of 50 percent). Expanding gas use  
25 for heating falls far short of this need. Building heating emission reductions must either do their  
26 own share of emission reductions, or rely on other measures (outside of the building sector) to  
27 do it for the sector.

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2 **Q: In terms of climate change, has Liberty provided the analysis necessary for the Commission**  
3 **to find that the Granite Bridge Project will be a prudent investment for its ratepayers,**  
4 **consistent with the requirements of New Hampshire's energy policy and least cost**  
5 **integrated resource planning requirements?**

6 **A:** No. The evaluation fails to adequately address or assess the climate change impacts of the  
7 Company's planned expansion of natural gas, or reasonable alternatives to the Company's  
8 proposed Granite Bridge Project.

9 **Q: Does this conclude your testimony?**

10 **A:** Yes.