

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

**Docket No. DG 21-008  
Petition for Approval of a Firm Transportation Agreement with  
Tennessee Gas Pipeline Company, LLC**

**DIRECT TESTIMONY OF**

**DAVID G. HILL, PH.D.**

**ON BEHALF OF CONSERVATION LAW FOUNDATION**

**ENERGY FUTURES GROUP**

**JUNE 25, 2021**

1 **I. INTRODUCTION AND QUALIFICATIONS**

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

3 A: My name is David G. Hill, Ph.D. I am a Managing Consultant with Energy Futures Group,  
4 Inc. located in Hinesburg, Vermont.

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  
7 Concord, NH 03301. CLF is a non-profit organization dedicated to protecting New  
8 England’s environment for the benefit of all people.

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

10 A: I joined Energy Futures Group (“EFG”) in January of 2020. My work since then has  
11 included expert testimony on the Dominion Energy South Carolina’s 2020 Integrated  
12 Resource Plan; a critical analysis for the need of a proposed natural gas pipeline expansion  
13 in New York City; support for testimony on the partial transfer of ownership of a coal fired  
14 power plant in Montana; analysis of the customer economics for strategic electrification in  
15 Illinois; scenario modeling for statewide greenhouse gas (“GHG”) reduction strategies in  
16 Massachusetts; and analysis of cost recovery for utility efficiency and demand response  
17 initiatives in Maryland.

18 EFG is a clean-energy consulting firm headquartered in Hinesburg, Vermont, with offices  
19 in Boston and New York. EFG designs, implements, and evaluates programs and policies  
20 to promote investments in efficiency, renewable energy, other distributed resources, and  
21 strategic electrification. EFG staff have delivered projects on behalf of energy regulators,  
22 government agencies, utilities, and advocacy organizations in 40 states, 8 Canadian  
23 provinces, and several countries in Europe. EFG brings to its work a unique combination  
24 of technical, economic, program, and policy expertise. EFG is currently engaged or has  
25 recently provided expert testimony and analysis on proposed gas infrastructure, pilot  
26 programs, and future planning in Illinois, New York, Rhode Island, and Massachusetts.

27 Prior to joining EFG, I worked for the Vermont Energy Investment Corporation (“VEIC”)  
28 for 22 years, starting in 1998 as an analyst, subsequently holding several positions over the  
29 decades, and serving my last five years as Director of Distributed Resources and Policy

1 Fellow. As the Director of Distributed Resources and a Policy Fellow at VEIC, I was  
2 responsible for advancing sustainable energy program design and evaluation. For two  
3 decades, I regularly led major consulting assignments at VEIC, being best known for my  
4 work in distributed energy resources, particularly solar energy. I provided expert testimony  
5 and regulatory support on renewable energy and energy efficiency in six jurisdictions in  
6 Canada and the United States. I was regularly engaged as an expert on renewable energy  
7 market design and regulatory issues at international, national, and regional conferences and  
8 workshops. I served on national, state, and local level boards. I also led policy committees  
9 and conferences, and comprehensive studies of the economic, technical, and achievable  
10 potentials for sustainable energy programming. My work also supported detailed level  
11 program budget planning and implementation.

12 Over the years, I have led or significantly contributed to the design and development of  
13 more than six large programs, with annual budgets of \$100+ million, for initiatives in New  
14 Jersey, New York, Vermont, Arizona, and Maryland. My clients are in more than a dozen  
15 states and provinces, and six countries outside North America. I have conducted work for  
16 several international organizations, including the World Bank. I have also created and led  
17 the launch of Sun Shares, a subsidiary of VEIC that develops and provides community  
18 solar services to employers and their employees.

19 I have provided testimony in regulatory hearings on more than a dozen occasions and have  
20 participated in scores of technical workshops and working groups on behalf of many  
21 clients. My recent and current work includes several assignments relating to gas  
22 infrastructure, pilot programs, and planning. In early 2020, I led an EFG team, and was the  
23 lead author for a critical assessment of National Grid's long-term needs assessment of gas  
24 supplies and proposed pipeline infrastructure investments for their downstate New York  
25 service territories.<sup>1</sup> I was also the lead author for a whitepaper, prepared for CLF, which  
26 assessed critical issues for gas system infrastructure investments in Rhode Island.<sup>2</sup> This  
27 year, I have filed expert witness testimony with the Illinois Commerce Commission on  
28 three proposed gas pilot programs in Illinois on behalf of Citizen's Utility Board,

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<sup>1</sup> Exhibit DGH-2.

<sup>2</sup> Exhibit DGH-3.

1 Environmental Defense Fund, and the Natural Resources Defense Council.<sup>3</sup> Other recent  
2 work related to long term energy planning and the future of gas include leading a team  
3 conducting building sector analyses and integrated scenario planning for the Massachusetts  
4 Decarbonization Roadmap in 2019 and 2020, and the recent initiation of a subcontract to  
5 serve as a lead on the technical consultant team advising the Vermont Climate Council on  
6 their Roadmap to meet the requirements of the Global Warming Solutions Act.

7 In the electric sector, recent work includes submitting and defending expert testimony on  
8 the characterization and analysis of energy efficiency and demand response in Dominion  
9 Energy South Carolina's 2020 Integrated Resource Plan on behalf of the Southern  
10 Environmental Law Center and the Coastal Conservation League. In 2019, I presented at a  
11 technical workshop on efficiency portfolio diversification and submitted supporting  
12 testimony in Nova Scotia on behalf of EfficiencyOne. In 2018, I provided testimony on  
13 behalf of the Ecology Action Centre to the Nova Scotia Utility and Review Board  
14 regarding NS Power's Advanced Metering Infrastructure project. For the last decade, I  
15 have provided ongoing expert review and testimony on EmPOWER Maryland's energy  
16 efficiency portfolio on behalf of that state's Office of People's Counsel.

17 In addition, I have written, presented, and/or defended written analyses and/or testimony  
18 for regulatory workshops, commission staff, and legislative hearings on efficiency,  
19 alternative rate design, net metering and interconnection of distributed energy systems, and  
20 strategies for sustainable development of solar markets. This has included my work in New  
21 York, Pennsylvania, Vermont, Arizona, Michigan, and New Jersey.

22 I earned my Ph.D. in Energy Management and Policy Planning at the University of  
23 Pennsylvania. Further details on my work experience and education are provided in my  
24 professional resume, included as Exhibit DGH-1.

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

26 A: Yes, I testified in Docket No. DE 20-092, 2021-2023 Triennial Energy Efficiency Plan.

27 **II. OVERVIEW**

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<sup>3</sup> Illinois Commerce Commission, Dockets No. 21-0098 and 20-0722.

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

2 A: My testimony provides a critical analysis of Liberty Utilities’ (“Liberty” or the  
3 “Company”) petition for approval of the proposed Tennessee Gas Pipeline (“TGP”)  
4 capacity contract in conjunction with the on-system enhancements that Liberty claims are  
5 necessary to optimize the contract. I raise concerns that the Company’s petition is based on  
6 promotional and sales activities that are in the Company’s best interests, but that are not  
7 demonstrated to be prudent, aligned with ratepayers’ best interests, or consistent with  
8 existing or potential future greenhouse gas emissions reduction goals. I identify and  
9 consider the stranded cost, equity, and environmental impact risks associated with approval  
10 of the petition based on the justifications provided by the Company and I recommend  
11 analyses of alternative options necessary before the petition for the capacity contract is  
12 approved.

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

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

16  
17 A 20-year, 40,000 Dth per day firm transportation agreement that Liberty has  
18 entered into with Tennessee Gas Pipeline (“TGP contract”).

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

21  
22 related to whether the proposed firm transportation agreement is prudent,  
23 reasonable, and consistent with the public interest; and whether the testimony  
24 provided with the petition addressing resource requirements, evaluation of  
25 resource alternatives, possible future capital investment to fully utilize the  
26 capacity, and TGP contract risks and risk mitigation, supports approval of the  
27 agreement. Those issues relate to RSA 374:1 and 374:2 (public utilities to provide  
28 reasonably safe and adequate service at “just and reasonable” rates); RSA 374:4  
29 (the Commission’s duty to keep informed of the manner in which all public  
30 utilities in the state provide for safe and adequate service); RSA 374:7  
31 (Commission authority to investigate and ascertain the methods employed by  
32 public utilities to “order all reasonable and just improvements and extensions in

1 service or methods” to supply gas); and RSA 378:7 (rates collected by a public  
2 utility for services rendered or to be rendered must be just and reasonable).<sup>4</sup>

3 Liberty claims that it does not seek approval in this docket for the approximately \$45  
4 million in on-system enhancements that are also discussed in its testimony. However,  
5 because Liberty has stated that these on-system enhancements are necessary to optimize  
6 and utilize the additional capacity of the TGP contract, the Commission should consider  
7 these investments and whether they are prudent in this docket.

8 **Q: What is the scope of your testimony?**

9 A: I review the Direct Testimony of Francisco C. DaFonte and William R. Killeen, filed  
10 January 20, 2021, and the justification they provide in support of the proposed long-term  
11 supply contract with TGP and associated on system enhancements. I provide a critical  
12 analysis of this justification, and of the Company’s implicit assumption that continued  
13 promotional efforts to grow sales and service territory are prudent and in ratepayers’ best  
14 interests. I provide examples of alternative options to the supply contract that are not  
15 considered in the Company’s testimony, and I discuss the risks of approving the supply  
16 contract if such alternatives are not analyzed.

17 **Q: What are your overall conclusions and recommendations in this docket?**

18 A: My conclusions are that the Company’s testimony does not provide sufficient evidence to  
19 support approval of the long-term supply contract. I do not reach a definite conclusion on  
20 whether with more analysis and evidence the proposed long-term contract should be  
21 approved or disallowed. Before making such a decision, I recommend the Commission  
22 require:

- 23 1. Liberty conduct, and present for stakeholder review, a transparent deficiency analysis  
24 that:
  - 25 a. Removes promotional activities from the load forecast;
  - 26 b. Includes analysis of enhanced energy efficiency at a level equal to, or  
27 exceeding, the cost-effective initiative proposed by Liberty for the Joint Utility  
28 Triennial Plan;

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<sup>4</sup> Order of Notice at 2.

- 1 c. Includes analysis of a gas demand response initiative including tariff, direct  
2 control, and load coordination options;
- 3 d. Accounts for market trends and potential for increased promotion of  
4 electrification using high efficiency cold climate heat pumps and heat pump  
5 water heaters as a substitute for gas; and
- 6 e. Uses one in thirty-year historical weather data as the basis for design day  
7 calculations.
- 8 2. I also recommend the Commission explicitly deny Liberty’s proposed plan of action to  
9 proceed with on-system distribution enhancements required to optimize the new  
10 contracted supply, without pre-approval. The Commission should clearly require any  
11 proposals for gas system expansion, or enhancements be considered in relation to their  
12 long-term GHG impacts, the potential for stranded costs, and equity impacts. To fully  
13 address these issues such proposals would need to:
- 14 a. Consider future scenarios in which state and regional greenhouse gas emissions  
15 are reduced by 50 percent by 2030, and by 80 percent or more by 2050;
- 16 b. Examine the best use of existing gas infrastructure and supplies to serve New  
17 Hampshire’s ratepayers and economy;
- 18 c. Analyze the resource potential and costs of renewable natural gas from biogenic  
19 resources;
- 20 d. Analyze the potential and costs for electrification, primarily for space and water  
21 heating to displace gas demand;
- 22 e. Analyze the potential and cost effectiveness of expanded energy efficiency and  
23 demand response initiatives for meeting gas and electric system needs.
- 24 3. Further, prior to Commission approval of the TGP contract, the Commission should  
25 require Liberty to update its 2017 Least Cost Integrated Resource Plan (“LCIRP”) to  
26 include the TGP contract and the required analyses under New Hampshire’s LCIRP  
27 statutes, which are consistent with my above recommendations regarding the analyses  
28 that Liberty must perform.

1 These recommendations are aligned with the tenets of least cost integrated resource  
 2 planning, and if adopted will contribute to a more meaningful comparison of alternatives  
 3 for supply contracts and proposed system upgrades.<sup>5</sup> As proposed, the Company's petition  
 4 for approval of the long-term supply contract presents a risk of stranded costs (with the  
 5 Company proposing to depreciate associated system enhancements over a **BEGIN**  
 6 **CONFIDENTIAL** [REDACTED] **END CONFIDENTIAL** horizon) and fails to adequately  
 7 consider cleaner alternatives such as energy efficiency, and electrification. These  
 8 oversights create tangible economic and environmental risks for New Hampshire's  
 9 ratepayers and are not consistent with the LCIRP statutes.

10 **III. DEMAND GROWTH BASED ON PROMOTIONAL SALES AND MARKETING**  
 11 **ACTIVITIES**

12 **Q: What factors does the Company cite as driving the forecast need for the TGP contract**  
 13 **and the associated on-system enhancements?**

14 A: The Company's demand forecast is based on a July 2020 update to the econometric model  
 15 used by the Company in Docket No. DG 17-198 in support of its 2017 LCIRP.<sup>6</sup> Referring  
 16 to the Company's 2017 LCIRP filing, the estimated total demand forecast from the  
 17 econometric model, which includes some level of historical fuel conversions to natural gas,  
 18 was 0.9% per year for the 2017/2018 to 2021/22 time-period.<sup>7</sup> In addition, as described in  
 19 the LCIRP and in the testimony of Mr. DaFonte and Mr. Killeen, an out of model  
 20 adjustment was made to account for the promotional activities provided by the Company's  
 21 Sales and Marketing Group. These activities include new customers in legacy territory,  
 22 and targets for expansion of customer and sales in new service territories. The out of  
 23 model adjustment for these promotional activities results in a tripling of the econometric  
 24 model's forecast demand growth increasing the compound annual growth rate from 0.9% to  
 25 2.7%.<sup>8</sup> In describing the out of model adjustments in the LCIRP, the Company states:  
 26 "The Company recently expanded its sales and marketing efforts and expects to continue to

<sup>5</sup> The Commission may wish to initiate a "Future of Gas" study, in a subsequent docket, with participation from the utilities and stakeholders, to investigate these issues in greater detail.

<sup>6</sup> Direct Testimony of Francisco C. DaFonte and William R. Killeen, footnote 12, Bates p. 16.

<sup>7</sup> Liberty Utilities Least Cost Integrated Resource Plan, Table 20, Bates p. 25.

<sup>8</sup> *Id.*, Table 23, Bates p. 28.

1 do so throughout the Forecast Period”.<sup>9</sup> In testimony on behalf of CLF, witness Paul  
2 Chernick of Resource Insight noted that the promotional activities accounted for 68 percent  
3 of the forecast load growth.<sup>10</sup>

4 For a regional comparison, the 2.7% CAGR forecast by the Company is greater than the  
5 forecast growth rate for twenty-one of the twenty-three gas distribution companies in New  
6 England from a study conducted by ICF for ISO-NE.<sup>11</sup> In New Hampshire, the forecast  
7 CAGR for Unitil (Northern Utilities Inc.) was 0.9% over 2015 to 2030, which is  
8 significantly lower than Liberty’s econometric model forecast and would be consistent with  
9 a Liberty econometric model forecast that did not include its promotional activities.

10 **Q: Are the Company’s demand forecasts based on the promotional activities an**  
11 **appropriate justification for the proposed TGP supply contract and on-system**  
12 **enhancements?**

13 A: No. The Company’s internal department sales and marketing targets are just that. They  
14 do not account for ratepayers’ interests, and they are not based on a comparison of  
15 alternatives. Internal sales and marketing targets are not sufficient justification for  
16 proposed supply contracts, or system expansions. They also do not substitute for analysis  
17 of supply alternatives such as enhanced energy efficiency, demand response, flexible load  
18 management or strategic electrification.

19 The current petition is based on promotional activities that are in the Company’s best  
20 interest, but not in ratepayers’ best interest. These are not compared or contrasted with  
21 alternatives including reduced or eliminated promotional activities, increasing cost  
22 effective energy efficiency, demand response (including flexible load management), and  
23 strategic electrification.

24 This is a particular concern since the supply contract is then used as a basis for distribution  
25 system capital investments to “optimize” the distribution of the new supply. The

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<sup>9</sup> *Id.*, Bates p. 26.

<sup>10</sup> Direct Testimony of Paul Chernick on behalf of Conservation Law Foundation, Docket DG17-198, September 13, 2019, Bates page 8.

<sup>11</sup> *New England LDC Gas Demand Forecast Through 2030: Prepared for ISO-New England*, ICF International, at Slide 9 (October, 2016), available at <https://www.iso-ne.com/static-assets/documents/2016/12/iso-ne-ldc-demand-forecast-03-oct-2016.pdf>. This study is now five years old, and so does not reflect recent regional trends on greenhouse gas planning and electrification that are likely to decrease estimated growth rates.

1 Company’s rationale bases approval of the contract and associated capital investments on  
2 continued promotional and marketing activities and goals. It also compares the supply  
3 contract to other unfavorable supply options, rather than comparison to a portfolio of  
4 available, cost-effective demand side management alternatives. These are not sufficient  
5 bases for the requested approval of the supply contract.

6 **IV. LIBERTY’S LEAST COST INTERGRATED RESOURCE PLAN**

7 **Q: How does Liberty’s least cost integrated resource plan relate to this proceeding?**

8 A: Liberty’s proposal here must be consistent with the LCIRP statutes, RSA 378:37-378:40.  
9 RSA 378:37 provides that it is the:

10 energy policy of this state to meet the energy needs of the citizens and businesses  
11 of the state at the lowest reasonable cost while providing for the reliability and  
12 diversity of energy sources; to maximize the use of cost-effective energy  
13 efficiency and other demand side resources; and to protect the safety and health of  
14 the citizens, the physical environment of the state, and the future supplies of  
15 resources, with consideration of the financial stability of the state’s utilities.

16 Further, RSA 378:38 requires natural gas utilities to develop a least cost integrated  
17 resource plan at least every five years, and that such plan shall include, in relevant part,  
18 the following:

- 19 I. A forecast of future demand for the utility’s service area.
- 20 II. An assessment of demand-side energy management programs, including  
21 conservation, efficiency, and load management programs.
- 22 III. An assessment of supply options including owned capacity, market  
23 procurements, renewable energy, and distributed energy resources.
- 24 . . .
- 25 V. An assessment of plan integration and impact on state compliance with the  
26 Clean Air Act of 1990, as amended, and other environmental laws that may  
27 impact a utility’s assets or customers.
- 28 VI. An assessment of the plan’s long- and short-term environmental, economic,  
29 and energy price and supply impact on the state.

30 Next, RSA 378:39 provides that in deciding whether or not to approve a utility’s least cost  
31 integrated resource plan, the Commission shall consider “potential environmental,  
32 economic, and health-related impacts of each proposed option” and that where the  
33 Commission finds that different options have “equivalent financial costs, equivalent

1 reliability, and equivalent environmental, economic, and health-related impacts, the  
2 following order of energy policy priorities shall guide the commission's evaluation: I.  
3 Energy efficiency and other demand-side management resources; II. Renewable energy  
4 sources; III. All other energy sources.”

5 Finally, RSA 378:40 provides as follows:

6 No rate change shall be approved or ordered with respect to any utility that does  
7 not have on file with the commission a plan that has been filed and approved in  
8 accordance with the provisions of RSA 378:38 and RSA 378:39. However,  
9 nothing contained in this subdivision shall prevent the commission from  
10 approving a change, otherwise permitted by statute or agreement, where the utility  
11 has made the required plan filing in compliance with RSA 378:38 and the process  
12 of review is proceeding in the ordinary course but has not been completed.

13 Liberty’s petition for approval of the TGP contract is improperly based on promotional  
14 marketing and sales activities, that should not be considered by the Commission, and does  
15 not adequately comply with several elements of New Hampshire’s LCIRP statutes. For  
16 example, the petition does not consider new cost-effective efficiency, demand response, or  
17 strategic electrification as alternatives, and it does not address environmental and economic  
18 impacts, as required under New Hampshire’s LCIRP states. These are discussed in further  
19 detail in the following sections.

20 **V. INCREASED ENERGY EFFICIENCY, DEMAND RESPONSE, AND**  
21 **ELECTRIFICATION**

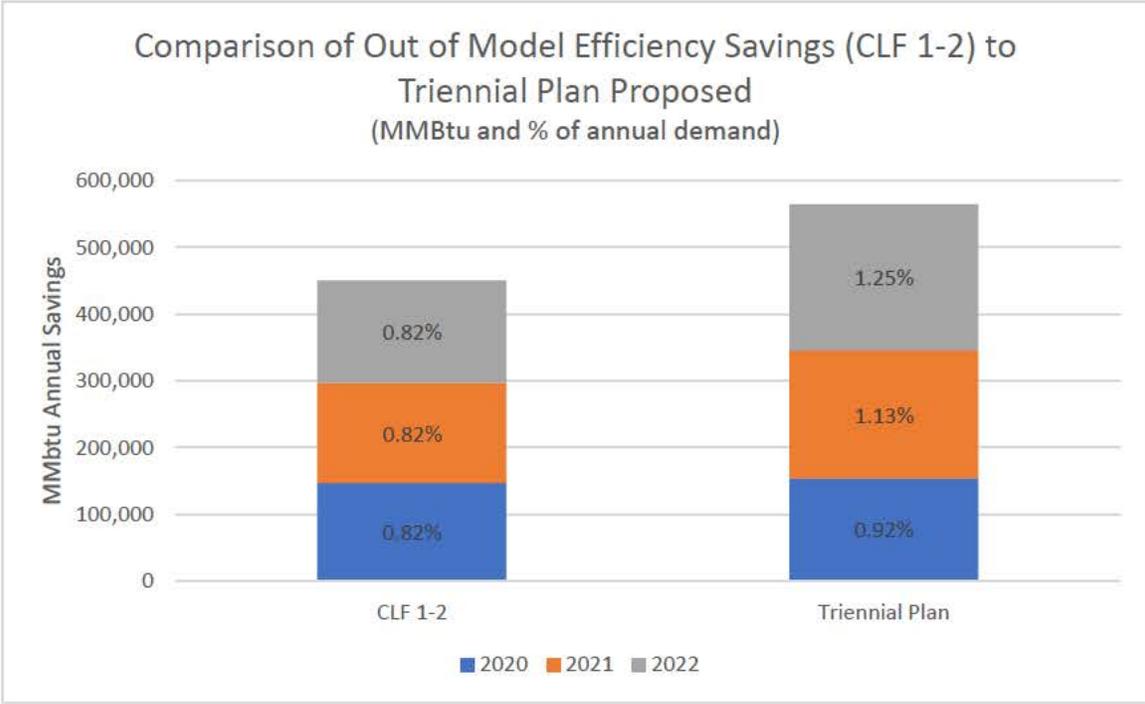
22 **Q: Did Liberty evaluate additional energy efficiency as an alternative to the TGP**  
23 **contract and on-system enhancements?**

24 A: No. Efficiency is accounted for, but it is based on historic and static efficiency as opposed  
25 to expanded levels of cost-effective energy efficiency. To account for energy efficiency,  
26 the Company makes an out-of-model adjustment to the demand forecast based on historic  
27 2017 to 2020 energy efficiency efforts, and an assumption that future efficiency savings  
28 would continue at 2020 levels. The Company’s data response to CLF 2-1 indicates the  
29 estimated efficiency savings are 0.67% of demand for the residential sector, 0.9% of  
30 demand for the C&I sector, and 0.82% of total demand for the two sectors combined. The  
31 level of savings forecast as a percent of sales remains constant through 2039. This results  
32 in an increase in absolute efficiency savings, but these are directly proportional to the

1 increased demand forecast, and do not reflect or represent enhanced or expanded energy  
2 efficiency savings.

3 **Q: Has Liberty conducted a cost effectiveness evaluation of a portfolio with an enhanced**  
4 **level of energy efficiency?**

5 A: Yes. In Docket DE 20-092 Liberty filed a three-year gas efficiency plan with a Granite  
6 State Test cost effectiveness benefit to costs ratio of 2.40 and a total program budget of  
7 roughly \$30.7 million.<sup>12</sup> Liberty’s proposed Triennial Gas Efficiency Plan increased  
8 annual incremental savings as a percent of demand to 1.25% by 2022, with cumulative 3-  
9 year savings equaling more than 565,000 MMBtus, almost 115,000 MMBtus more than the  
10 efficiency as evaluated in this proceeding. Figure 1 illustrates this comparison.



11  
12 **Figure 1: Annual EE Savings Comparison – Response to CLF 1-2 and Triennial Plan**

13 Figure 1 illustrates how the Company has identified significant cost-effective energy  
14 efficiency savings beyond those considered in their petition for approval of the TGP supply  
15 contract.

<sup>12</sup> NH Saves Joint Utility Triennial Plan Volume 4, Bates page 000840.

1 **Q: Is energy efficiency relevant to Liberty’s planning regarding the TGP contract?**

2 A: Yes, New Hampshire’s LCIRP statutes create several requirements regarding energy  
3 efficiency when conducting gas planning. RSA 378:37 states that amongst other policies, it  
4 is the energy policy of the state to “maximize the use of cost-effective energy efficiency  
5 and other demand side resources.” RSA 378:38 requires natural gas utilities to file least  
6 cost integrated resource plans that include “an assessment of demand-side energy  
7 management programs, including conservation, efficiency, and load management  
8 programs.” Further, under RSA 378:39, where proposals have equivalent financial costs  
9 and equivalent environmental, economic, and health-related impacts, the Commission is  
10 required to prioritize “energy efficiency and other demand-side management resources”  
11 over other energy policy priorities.

12 **Q: Has Liberty provided any evaluation in either this docket or the LCIRP docket, DG**  
13 **17-152, to demonstrate that it has considered increased energy efficiency as an**  
14 **alternative to the TGP contract?**

15 A: No. While Liberty provided general testimony regarding energy efficiency in the LCIRP  
16 docket, it provided no new testimony or data in this docket to guide the Commission’s  
17 analysis of whether increased energy efficiency would obviate the need for the TGP  
18 contract.

19 **Q: Would increased levels of cost-effective energy efficiency reduce the need for the TGP**  
20 **contract?**

21 A: Yes, increased cost-effective energy efficiency at or above the levels proposed in the  
22 Triennial Plan would reduce the need for the proposed TGP contract. In conjunction with  
23 other demand response, strategic electrification, and the reduction or elimination of  
24 promotional activities, increased cost-effective efficiency may eliminate the need for the  
25 proposed TGP contract and system upgrades.

26 **Q: Does Liberty offer, or did they evaluate demand response tariffs or initiatives as an**  
27 **alternative to the TGP contract and on-system enhancements?**

1 A: In response to CLF data request 1-7, Liberty indicated “the Company does not have any  
2 demand reduction programs or tariffs in place”.<sup>13</sup> As for evaluation of demand response as  
3 an option, the response to CLF 1-7 further states the Company is aware of and monitoring  
4 at least three gas demand reduction pilots (SoCal Gas, National Grid NY, and ConEd) all of  
5 which have “inconclusive results at this point in terms of ability to produce meaningful  
6 reductions in peak gas load.”

7 **Q: Are you aware of the demand response pilots referenced by the Company?**

8 A: Yes, for a whitepaper I co-authored in early 2020 we reviewed the early results from the  
9 pilots mentioned by Liberty. I disagree with Liberty’s position that results were  
10 inconclusive in terms of ability to produce meaningful reductions in gas peak load. The  
11 initial results from these pilots were promising, tending to exceed design expectations for  
12 savings and participation. Based on these early, but promising results, we estimated that a  
13 20% demand reduction within a five-year horizon was a reasonable expectation. I have not  
14 had time to update my research on further results from these pilots, but I include the 2020  
15 Whitepaper as an Exhibit.<sup>14</sup> Further exploration of the demand response potential should  
16 be required of the Company through this docket.

17 **Q: How would a 20 percent demand reduction impact the Company’s projected need for**  
18 **the TGP contract?**

19 A: The updated base case design day resource shortfall presented in Table 2 of Mr. DaFonte  
20 and Mr. Killeen’s testimony estimates a design day demand of 193,952 Dth in 2025/2026  
21 with current design day resources of 155,033 Dth. A 20 percent reduction equates to  
22 155,161 Dth design day demand, coming very close to eliminating the forecast deficiency.  
23 This strongly suggests the Company’s cursory dismissal of demand response as another  
24 one of the alternative options to the proposed TGP contract is inappropriate, and that  
25 demand response needs to be more carefully investigated.

26 **Q: Did Liberty evaluate whether increased electrification would reduce annual or design**  
27 **day natural gas demand?**

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<sup>13</sup> Liberty response to CLF Data Request 1-7.

<sup>14</sup> See Exhibit DGH-2. Section 3.2, pages 16-21, discusses the demand response pilots and their early results.

1 A: No, Liberty’s proposal does not address the availability, competitiveness, and potential  
2 increasing market shares for cleaner and lower cost resources, such as greater use of heat  
3 pumps and other electric technologies.<sup>15</sup> The econometric demand forecast as described in  
4 the Company’s LCIRP filing does not have independent variables to represent the  
5 technology or market advances in electric heat pumps, nor the comparative costs for space  
6 and water heating with electric heat pump versus gas equipment.<sup>16</sup> The growing market  
7 shares for cold-climate efficient air source heat pumps and heat pump water heaters in the  
8 Northeast are a factor that should be included in Liberty’s demand forecast. A reduction in  
9 the demand forecast to account for existing growth trends in electrification would reduce  
10 the need for the TGP supply contract. In addition, Liberty should investigate the potential  
11 for accelerated promotion and adoption of electrification technologies as non-pipe  
12 alternatives to the on system-enhancements proposed as necessary to optimize the TGP  
13 supply contract.

14 **Q: Is Liberty required to consider increased electrification as an alternative to the TGP**  
15 **contract proposal?**

16 A: Yes, RSA 378:39 requires the Commission to consider “potential environmental,  
17 economic, and health-related impacts of each proposed option.” Consequently, to inform  
18 the Commission’s analysis, Liberty should evaluate strategic electrification as an  
19 alternative supply option as an alternative to the proposed TGP contract. For the supply as  
20 well as the demand alternatives under consideration the potential environmental, economic  
21 and health related impacts should be assessed.

22 **Q: Would increased use of electric technologies reduce the need for the TGP contract**  
23 **over its 20-year period?**

24 A: Yes, increased adoption of electric technologies, either based on current market trends not  
25 reflected in the demand forecast, or on increased adoption due to promotion by the electric  
26 or gas companies would reduce the need for the TGP contract. Geographically targeted  
27 promotion of electrification can reduce peak demands and the need for on-system  
28 distribution enhancements.

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<sup>15</sup> Liberty Response to CLF Data Request No. 1-8.

<sup>16</sup> Liberty Utilities Least Cost Integrated Resource Plan, Table 2, Bates pages 015-017.

1 **VI. DESIGN DAY TEMPERATURE ESTIMATION**

2 **Q: What method does the Company use for estimating the design day requirements?**

3 A: The Company's method for design day and design year temperature estimation is described  
4 in the 2017 LCIRP is to use historical weather data from Manchester, NH (KMHT weather  
5 station) from 1979 to 2016 as the basis for a Monte Carlo analysis of the statistical  
6 distribution of the coldest day of each calendar year. The Company's design standard then  
7 subtracts two standard deviations from the mean coldest day estimate to determine the  
8 design day conditions.<sup>17</sup>

9 **Q: Do you have any comments or recommendations on this approach?**

10 A: Yes. The method used by Liberty is relatively conservative, and assuming a normal  
11 distribution for historic mean temperatures results in 97.725% of the expected years to have  
12 a design day warmer than the estimate. Given observed and expected trends in warming  
13 average and extreme temperatures in the Northeast, I recommend a design day based on  
14 historic 30-year observed minimum average temperatures be compared to the current  
15 design day standard as a sensitivity analysis, and that it may be prudent to adopt the  
16 historical 30-year observed design day conditions as reasonable for consideration of the  
17 proposed supply contract and future gas system investments.<sup>18</sup>

18 **VII. COMPARISON OF ALTERNATIVES**

19 **Q: You have indicated above that the Company did not consider enhanced energy**  
20 **efficiency, demand response, increasing electrification or reduced promotional**  
21 **activities as alternatives to the proposed TGP supply contract. What alternatives did**  
22 **the Company compare the proposed contract to?**

23 A: The evaluation of resource alternatives presented in the testimony Mr. DaFonte and Mr.  
24 Killeen is limited to comparisons with earlier or current supply contracts, and two potential  
25 infrastructure projects (NED and Granite Bridge) that were cancelled. Their justification  
26 for the proposed TGP supply contract is based on comparing it to supply contracts with less

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<sup>17</sup> Liberty 2017 LCIRP, Bates p. 033.

<sup>18</sup> My recommendation on design day methodology agrees with the testimony of Stephen P. Frink in this Docket. However, the adjustment of design day estimation by itself is not sufficient to address the other concerns with the Company's petition, which I discuss in my testimony.

1 favorable terms, or to large and expensive capital investment projects that did not move  
2 forward. As discussed in Section IV of my testimony above, the LCIRP statutes are clear  
3 in requiring comparison to efficiency and demand side resources as alternatives to supply  
4 side investments. The Company’s current petition fails to make such comparisons.

**VIII. DISCUSSION OF RISKS**

6 **Q: Has the Company adequately identified and discussed the risks associated with the**  
7 **proposed TGP supply contract?**

8 **A:** No. Following the same pattern as found in their comparison of resource alternatives, the  
9 Company’s discussion of risks in Section VI “TGP Contract Risks and Mitigation” is very  
10 limited in scope, focusing on supply system and contractual risks.

11 **Q: What additional risks need to be considered in relation to the proposed TGP**  
12 **contract?**

13 **A:** Three critically important areas of risk that are not analyzed or even mentioned by the  
14 Company are climate, stranded costs, and equity.

15 **IX. CLIMATE RISKS AND IMPACTS**

16 **Q: Should the Commission review the climate change risks and impacts of the TGP**  
17 **contract as part of its review?**

18 **A:** Yes, climate change includes a range of impacts to the environment, economy, and public  
19 health that are reasonable to incorporate in any evaluation of utility plans or projects,  
20 particularly those projects that commit ratepayers to funding a new fossil fuel investment  
21 over a long-time horizon, such as the proposed TGP contract.

22 **Q: Is climate change expected to affect New Hampshire?**

23 **A:** Yes. The Fourth National Climate Assessment Report, prepared by the U.S. Global  
24 Change Research Program,<sup>19</sup> developed with inputs from over 300 subject matter experts,  
25 provides a comprehensive scientific, peer reviewed, overview of impacts, adaptation, and

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<sup>19</sup> *Fourth National Climate Assessment*, U.S. Global Change Research Program, at Chapter 18 (2018), available at <https://nca2018.globalchange.gov/chapter/northeast>.

1 mitigation. Chapter 18 of the Fourth National Climate Assessment presents results for the  
2 Northeast United States. Five key messages from Chapter 18:

- 3 **1. Changing Seasons Affect Rural Ecosystems, Environments, and Economies** - The  
4 seasonality of the Northeast is central to the region's sense of place and is an important  
5 driver of rural economies. Less distinct seasons with milder winter and earlier spring  
6 conditions are already altering ecosystems and environments in ways that adversely  
7 impact tourism, farming, and forestry. The region's rural industries and livelihoods are  
8 at risk from further changes to forests, wildlife, snowpack, and streamflow.
- 9 **2. Changing Coastal and Ocean Habitats, Ecosystems Services, and Livelihoods** - The  
10 Northeast's coast and ocean support commerce, tourism, and recreation that are  
11 important to the region's economy and way of life. Warmer ocean temperatures, sea  
12 level rise, and ocean acidification threaten these services. The adaptive capacity of  
13 marine ecosystems and coastal communities will influence ecological and  
14 socioeconomic outcomes as climate risks increase.
- 15 **3. Maintaining Urban Areas and Communities and Their Interconnectedness** - The  
16 Northeast's urban centers and their interconnections are regional and national hubs for  
17 cultural and economic activity. Major negative impacts on critical infrastructure, urban  
18 economies, and nationally significant historic sites are already occurring and will  
19 become more common with a changing climate.
- 20 **4. Threats to Human Health** - Changing climate threatens the health and well-being of  
21 people in the Northeast through more extreme weather, warmer temperatures,  
22 degradation of air and water quality, and sea level rise. These environmental changes  
23 are expected to lead to health-related impacts and costs, including additional deaths,  
24 emergency room visits and hospitalizations, and a lower quality of life. Health impacts  
25 are expected to vary by location, age, current health, and other characteristics of  
26 individuals and communities.
- 27 **5. Adaptation to Climate Change Is Underway** - Communities in the Northeast are  
28 proactively planning and implementing actions to reduce risks posed by climate change.  
29 Using decision support tools to develop and apply adaptation strategies informs both the

1 value of adopting solutions and the remaining challenges. Experience since the last  
2 assessment provides a foundation to advance future adaptation efforts.<sup>20</sup>

3 These key messages underscore the importance of considering climate related risks and  
4 impacts for any proposed expansion of gas supplies, be it through supply contracts or  
5 infrastructure investments in New Hampshire.

6 **Q: Did Liberty consider the potential environmental and public health impacts—  
7 including impacts from climate change—resulting from the TGP contract?**

8 A: No, in response to CLF Data Request 1-23 asking whether Liberty performed an analysis of  
9 the climate change impacts of the TGP contract, Liberty stated that it has not performed  
10 such analysis because Liberty’s “contract with TGP uses existing TGP capacity. As such,  
11 whether the Company contracted for the capacity or not, the environmental impacts would  
12 be the same since an entity(ies) other than [Liberty] would be utilizing this capacity that  
13 has existed for 20 years.”

14 **Q: Do you agree with Liberty’s claims regarding the environmental impacts of the TGP  
15 contract?**

16 A: No. It is not valid to assume that if Liberty does not enter the TGP contract, other entities  
17 will contract for these supplies. As New Hampshire and other states served by the TGP  
18 system take steps to mitigate climate impacts and risks, including efforts to reduce gas  
19 consumption and emissions, the demand for gas and the use of existing capacity may  
20 decline. The Company’s response to CLF 1-23 is entirely insufficient as an explanation for  
21 not considering climate impacts and risks.

22 **Q: Is an analysis of climate change impacts of the TGP contract required under the  
23 LCIRP statutes.**

24 A: Yes. RSA 378:37 provides that it is the energy policy of this state to protect the safety and  
25 *health* of New Hampshire’s citizens and the *physical environment of the state*. RSA  
26 378:38 requires least cost integrated resource plans to contain an “assessment of plan  
27 integration and impact on state compliance with the Clean Air Act of 1990, as amended,  
28 and other environmental laws that may impact a utility’s assets or customers” and “an

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<sup>20</sup> *Id.*

1 assessment of the plan’s long- and short-term *environmental*, economic, and energy price  
 2 and supply impact on the state.” RSA 378:39 requires the Commission to analyze the  
 3 potential *environmental*, economic, and health-related impacts of each proposed option  
 4 presented in a utility’s plan.

5 **X. STRANDED COST AND EQUITY RISKS**

6 **Q: What concerns do you have over the risk of stranded costs?**

7 A: While this docket concerns a petition for a long-term supply contract, the Company also  
 8 indicates that to “optimize” the use of the new supplies, on-system distribution system  
 9 enhancements estimated to cost \$45 million will be undertaken.<sup>21</sup> I am strongly opposed to  
 10 the Company’s proposed approach of using the proposed TGP supply contract as a basis  
 11 for justifying the need for on-system enhancements. Any capital infrastructure investments  
 12 need to be subject to rigorous comparisons of supply and demand side alternatives required  
 13 by the LCIRP statutes and which I have outlined above. In this docket the Commission  
 14 should make it very clear that under any circumstance the TGP supply contract, if  
 15 approved, does not translate to an approval for the on-system enhancements. I recommend  
 16 the Commission make it clear that any on-system enhancements must be submitted for pre-  
 17 approval, and that proceeding with the on-system enhancements and seeking cost recovery  
 18 after they are completed is not acceptable.

19 Nevertheless, in the current case, in the DG 21-008 Technical Session on May 3<sup>rd</sup>, the  
 20 Company indicated a proposed depreciation period for the presumed necessary on-system  
 21 enhancements to optimize the TGP supply contract of **BEGIN CONFIDENTIAL** [ ■  
 22 ■ ] **END CONFIDENTIAL**

23 There would be a clear risk of stranded costs for the proposed on-system enhancements,  
 24 particularly using the proposed depreciation period of **BEGIN CONFIDENTIAL** [ ■  
 25 ■ ] **END CONFIDENTIAL** . Exhibit DGH-3 is a whitepaper I co-authored on behalf of  
 26 CLF earlier in 2021, in which we recommended a depreciation of no longer than 20 years  
 27 be used for potential new gas infrastructure investments.

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<sup>21</sup> Direct Testimony of Franciso C. DaFonte and William R. Killeen, line 10, Bates p. 26.

1 The Company has not included enhanced cost-effective energy efficiency, demand  
2 response, increased electrification, or reduced promotional activities in their analyses. All  
3 of these are likely to reduce future gas demand. If the costs for on-system enhancements  
4 are depreciated **BEGIN CONFIDENTIAL** [REDACTED], **END CONFIDENTIAL**  
5 reductions in gas demand will mean the base of sales from which the amortized costs are  
6 recovered will decline. This in turn makes gas more expensive for customers and can  
7 create feedbacks that further reduce demand. Therefore, I would make the same  
8 recommendation here as in the CLF whitepaper that a depreciation period of no longer than  
9 20 years be used for any new gas infrastructure investments.

10 **Q: How might the stranded cost risk also create equity impacts?**

11 A: If gas demand declines, which is certainly plausible, due to climate concerns, potential  
12 future legislation or regulation to address climate risks, and increased adoption of  
13 technologies and alternatives that Liberty has not considered in their analyses, then  
14 recovery of costs for the on-system enhancements will be recovered from a smaller sales  
15 base.<sup>22</sup> While rate design might be used to try and protect lower income customers in such  
16 a situation, it is also possible that rates for income vulnerable households and businesses  
17 would need to increase. These customers are at the greatest risk for energy burden related  
18 to their incomes. They are also less likely to be able to adopt alternative technologies, such  
19 as cold climate heat pumps, and so may have fewer options to reduce their consumption  
20 and costs if gas prices rise. The Executive Summary for a 2021 study examining the  
21 Challenge of Retail Gas in California includes the following statement:

22 “If demand for natural gas in California falls dramatically because of some  
23 combination of policy and economically driven electrification, the fixed costs to  
24 maintain and operate the gas system will be spread over a smaller number of gas  
25 sales and, ultimately, will increase costs for remaining gas customers. This outcome  
26 raises the possibility of a feedback effect where rising gas rates caused by  
27 electrification spur additional electrification. Such a feedback effect would threaten  
28 the financial viability of the gas system, as well as raise substantial equity concerns  
29 over the costs that remaining gas system customers would face.”<sup>23</sup>

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<sup>22</sup> New Hampshire’s neighbors across New England and the Northeast have adopted or are considering global warming solutions acts, setting statutory targets for emissions reductions. At the local level, moratoriums on gas system expansion and new connections have been implemented in Massachusetts and New York and are being considered elsewhere. Federal legislation establishing emissions caps or carbon pricing also remain a possibility.

<sup>23</sup> *The Challenge of Retail Gas in California’s Low-Carbon Future: Technology Options, Customer Costs, and Public Health Benefits of Reducing Natural Gas Use*, prepared by E3 Economics for the California Energy

1 **Q: Can you please recap recommendations for the Commission?**

2 **A:** Yes. Before approving the TGP supply contract I recommend the Commission require:

- 3 1. Liberty conduct, and present for stakeholder review, a transparent deficiency analysis  
4 that:
- 5 a. Removes promotional activities from the load forecast;
  - 6 b. Includes analysis of enhanced energy efficiency at a level equal to, or  
7 exceeding, the cost-effective initiative proposed by Liberty for the Joint Utility  
8 Triennial Plan;
  - 9 c. Includes analysis of a gas demand response initiative including tariff, direct  
10 control, and load coordination options;
  - 11 d. Accounts for market trends and potential for increased promotion of  
12 electrification using high efficiency cold climate heat pumps and heat pump  
13 water heaters as a substitute for gas; and
  - 14 e. Uses one in thirty-year historical weather data as the basis for design day  
15 calculations.

16 The Commission should require that these analyses be transparent and the inputs,  
17 calculations, and results be available for review and comment by intervenors. I anticipate  
18 that such an analysis will reduce the demand sufficiently that the proposed contract is not  
19 required. If the proposed contract is not required as a supply resource to meet projected  
20 demands, it may still have value, as a hedge on future gas costs, or to retire other higher  
21 cost supply contracts. I have not analyzed or reached conclusions on whether the contract  
22 has merit as a hedge or replacement for other supply contracts.

23 However, under any circumstances, approval of the proposed supply contract should not  
24 indicate a tacit or explicit approval of Liberty's approach to on-system enhancements the  
25 Company claims are required to optimize the additional capacity. Therefore,

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Commission, at ES p. 1 (April 2020), available at <https://www.energy.ca.gov/sites/default/files/2021-06/CEC-500-2019-055-F.pdf>. Note, this study discusses strategic planning for gas system with declining demand, not the elimination of the gas system or services.

1 2. I also recommend the Commission explicitly deny Liberty’s proposed plan of action to  
2 proceed with on-system distribution enhancements required to optimize the new  
3 contracted supply, without pre-approval. The Commission should clearly require any  
4 proposals for gas system expansion, or enhancements, be considered in relation to their  
5 long-term GHG impacts, the potential for stranded costs, and equity impacts. This  
6 should include:

- 7 a. Considering future scenarios in which state and regional greenhouse gas  
8 emissions are reduced by 50 percent by 2030, and by 80 percent or more by  
9 2050;
- 10 b. Examining the best use of existing gas infrastructure and supplies to serve New  
11 Hampshire’s ratepayers and economy;
- 12 c. Analysis of the resource potential and costs of renewable natural gas from  
13 biogenic resources,
- 14 d. Analysis of the potential and costs for electrification, primarily for space and  
15 water heating to displace gas demand; and
- 16 e. Analysis of the potential and cost effectiveness of expanded energy efficiency  
17 and demand response initiatives for meeting gas and electric system needs.

18 3. Further, prior to Commission approval of the TGP contract, the Commission should  
19 require Liberty to update its 2017 LCIRP to include the TGP contract and the required  
20 analyses under New Hampshire’s LCIRP statutes, which are consistent with my above  
21 recommendations of the analyses that Liberty must perform.

22 These recommendations are aligned with the tenets of least cost integrated resource  
23 planning, and if adopted will contribute to a more complete consideration of the future of  
24 gas in New Hampshire’s energy economy. This will benefit ratepayers, and the state’s  
25 economy and environment.

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

27 **A:** Yes.