COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

Petition of The Berkshire Gas Company for Approval of Agreements for Natural Gas Transportation and Supply Service, pursuant to G.L. c. 164, § 94A.

D.P.U. 17-145

REDACTED

Direct Testimony of Elizabeth A. Stanton

On Behalf of Conservation Law Foundation

Regarding Consistency of Petition with Company Portfolio Objectives, Adequacy of Alternatives Considered, and Consistency with State Environmental Policies

February 14, 2018
# Table of Contents

1. INTRODUCTION AND QUALIFICATIONS..................................................3

2. CONSISTENCY WITH THE PORTFOLIO OBJECTIVES ESTABLISHED IN THE COMPANY’S SUPPLY PLAN ........................................................................................................5

3. COMPARISON TO THE RANGE OF ALTERNATIVES REASONABLY AVAILABLE TO THE COMPANY AND ITS CUSTOMERS .................11

4. COMPLIANCE WITH THE GLOBAL WARMING SOLUTIONS ACT........15
1. **INTRODUCTION AND QUALIFICATIONS**

Q. Please state your name, title, and employer.

A. My name is Elizabeth A. Stanton, and I am the Director and Senior Economist of the Applied Economics Clinic of the Global Development and Environment Institute at Tufts University, 44 Teele Avenue, Somerville, MA 02144.

Q. Please describe the Applied Economics Clinic.

A. The Applied Economics Clinic is a 501(c)(3) non-profit consulting group housed at Tufts University's Global Development and Environment Institute. Founded in February 2017, the Clinic provides expert testimony, analysis, modeling, policy briefs, and reports for public interest groups on the topics of energy, environment, consumer protection, and equity, while providing on-the-job training to a new generation of technical experts. The Applied Economics Clinic's mission is: (1) To provide low cost and (when we receive foundation grants) pro bono expert services to public interest groups on the topics of energy, environment, consumer protection, and equity; (2) To train the next generation of expert technical witnesses and analysts by providing applied, on-the-job learning experiences to graduate students in related fields; and (3) To work proactively to support and promote diversity in the fields of economics, engineering, math and sciences.

Q. Please summarize your professional and educational experience.

A. I have more than 17 years of professional experience as an environmental economist. I have submitted expert testimony in Massachusetts, Vermont, New Hampshire, Illinois, Minnesota, Indiana, and several federal dockets; and I have authored more than 140 reports, policy studies, white papers, journal articles, and book chapters on topics related to energy, the economy, and the environment.

Before founding the Applied Economics Clinic, I was a Senior Economist at Synapse Energy Economics where I led studies examining environmental
regulation, cost-benefit analyses, and the economics of energy efficiency and renewable energy.

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

My articles have been published in *Ecological Economics, Renewable Resources Journal, Environmental Science & Technology*, and other journals. I have also published books, including *Climate Economics: The State of the Art* (Routledge, 2013), which I co-wrote with my colleague at Synapse, Dr. Frank Ackerman. I am also coauthor of *Environment for the People* (Political Economy Research Institute, 2005, with James K. Boyce) and coeditor of *Reclaiming Nature: Worldwide Strategies for Building Natural Assets* (Anthem Press, 2007, with Boyce and Sunita Narain).

I earned my Ph.D. in economics at the University of Massachusetts-Amherst, and have taught economics at Tufts University, the University of Massachusetts-Amherst, and the College of New Rochelle, among others. My curriculum vitae is attached as Exhibit CLF-EAS-2.

Q. **On whose behalf are you testifying in this case?**
A. I am testifying on behalf of the Conservation Law Foundation.

Q. **Have you testified previously in this docket?**
A. No, I have not.
1. **What is the purpose of your testimony?**
2. **A.** The purpose of my testimony is to provide an independent, third-party review of the Petition filed by The Berkshire Gas Company (Berkshire Gas or the Company) to assess its consistency with the Company’s portfolio objectives, the adequacy of alternatives considered, and its compliance with the Massachusetts Global Warming Solutions Act (GWSA).

3. **Q.** How is your testimony organized?
4. **A.** My testimony is organized as follows:
   1. Introduction and Qualifications.
   2. Consistency with the Portfolio Objectives Established in the Company’s Supply Plan.
   3. Comparison to the Range of Alternatives Reasonably Available to the Company and its Customers.

5. **2. CONSISTENCY WITH THE PORTFOLIO OBJECTIVES ESTABLISHED IN THE COMPANY’S SUPPLY PLAN**

6. **Q.** Have you reviewed the most recently approved FSP for Berkshire Gas?
7. **A.** Yes, I have reviewed DPU 16-103, Berkshire Gas’s FSP filed in July 2016 and approved by the Department in July 2017.

8. **Q.** Please describe the portfolio objectives established in Berkshire Gas’s 2016 FSP.
9. **A.** In its 2016 FSP, Berkshire Gas describes portfolio objectives of providing gas resources in “reliable, least-cost service with a minimum impact upon the environment” (p.1) and also notes that “The Company continues to actively manage its resource portfolio in order to reduce costs for the benefit of customers and its efforts, both in terms of long-term resource decisions as well as day-to-day activities, have secured substantial benefits for customers.” (p.1-2).
Q. Have you reviewed Berkshire Gas’s most recently approved Initial Filing in this docket (DPU 17-145)?

A. Yes.

Q. Please describe the portfolio objectives established in Berkshire Gas’s DPU 17-145 Initial Filing.

A. The testimony of Berkshire Gas witness, Jennifer M. Boucher describes the objective of Berkshire Gas’s resource portfolio as “to provide reliable, least-cost service” (Exhibit BGC-JMB-1, p.6).

Q. Do Berkshire Gas’s portfolio objectives depend on increased supply capacity?

A. Berkshire Gas’s portfolio objectives do not necessarily depend on increased supply capacity. Berkshire Gas’s portfolio objectives depend on selection of the most cost-effective set of supply and demand resources that together are sufficient to meet natural gas demand. Whether or not this optimal set of resources includes higher supply capacity is a matter to be established through modeling and demonstrated in the Company’s filings to the Department.

Figure 1 presents Berkshire Gas’s expected “shortfall” as predicted in its past filings to the Department. The Company’s “shortfall” is the difference between its expected natural gas requirements or needs in a given year and its expected gas supply. The shortfalls shown in Figure 1 are for the “design day” and are given as a percentage of the same year’s expected gas requirements.
Instead of providing the G tables associated with the Company's modeling for 17-145, Witness Jennifer M. Boucher describes the contracts themselves in text (p.9-14). Ms. Boucher asserts that the Company’s proposed contracts with TGP, Repsol, ENGIE, and PXP are necessary resolve its shortfall, but does not provide materials sufficient to a third-party review:

_The main reason that the Company has decided to enter into the Agreements is because the addition of long-term resources to its portfolio is necessary to meet customer requirements on a reliable basis and to address a planning requirement identified in the course of the_
In reviewing Figure 1, it is apparent that the new supply contracts requested by the Company in 17-145 turn a 20 percent design day shortfall in 2017/2018 into a [BLANK] in 2018/2019. Without the appropriate G tables to review for 17-145 it is impossible to adequately review these unusual findings. Some explanation of this [BLANK] seems incumbent on the Company.

Q. Does Berkshire Gas expect its proposed contracts with TGP, Repsol, ENGIE, and PXP for new supply to resolve its shortfall?

A. Yes. The information presented by the Company in its initial filing in 17-145, Berkshire Gas indicates that the Company expects its proposed contracts with TGP, Repsol, ENGIE, and PXP for new supply to resolve its shortfall.

Q. Does this increased supply have other impacts on Berkshire Gas’s portfolio objectives?

A. Recall that Berkshire Gas’s portfolio objectives depend on selection of the most cost-effective set of supply and demand resources that together are sufficient to meet natural gas demand. Berkshire Gas asserts that its proposed contracts with TGP, Repsol, ENGIE, and PXP for new supply resolves its shortfall (by increasing the resources needed to meet natural gas demand). In addition, the Company appears to contend that its proposed contracts with TGP, Repsol, ENGIE, and PXP for new supply render the set of supply and demand resources that includes these contracts the most cost-effective and reliable choice:

The capacity and supply agreements contribute to and are consistent with the Company’s goal of developing a least-cost, reliable resource portfolio... [T]he Agreements represent the only viable alternative that will maintain reliable, least-cost service for existing customers and
further beneficial development in the Company's service area. (17-145, Exhibit BGC-JMB-1, p.18)

Q. Are Berkshire Gas's proposed contracts with TGP, Repsol, ENGIE, and PXP for new supply necessary to meet the Company's forecast of customer needs in future years?

A. The materials filed by the Company in 17-145 do not provide information sufficient to determine whether or not Berkshire's contracts with TGP, Repsol, ENGIE, and PXP for new supply are necessary to meet the Company's forecast of customer needs in future years.

Q. Does Berkshire Gas demonstrate that its proposed contracts with TGP, Repsol, ENGIE, and PXP for new supply result in the least-cost supply and demand resource mix?

A. No. Berkshire Gas does not provide sufficient evidence to demonstrate that its contracts with TGP, Repsol, ENGIE, and PXP for new supply result in the least-cost supply and demand resource mix.

Q. What additional evidence would Berkshire Gas need to present to demonstrate that its contracts with TGP, Repsol, ENGIE, and PXP for new supply result in the least-cost supply and demand resource mix?

A. Berkshire Gas uses the SENDOUT model to identify the least-cost portfolio of supply and demand resources for its customers:

[T]he Company used its SENDOUT® model to evaluate the costs of the proposed Agreements using the Resource Mix functionality. When multiple viable alternatives exist, this sophisticated cost analysis evaluates the cost impact of changes to portfolio by simulating the daily dispatch of available resources under specified conditions. This results in a determination of a least-cost incremental resource or package of
resources based on the total cost impact upon the portfolio. (17-145, Exhibit BGC-JMB-1, p.17)

Put simply, SENDOUT allows Berkshire Gas to input (1) its expected future demand for natural gas and (2) its potential supply resources, and from these inputs determine a least-cost supply portfolio for its customers. Essentially, SENDOUT performs a “cost effectiveness” analysis, answering the question: Given a set amount of natural gas requirement what is the least expensive way to provide reliable supply?

Gas requirements are treated as fixed, as a given. And the expected prices of natural gas supply resources (including transportation and storage) are examined in various combinations to find the cheapest combination of resources that will meet customers demand.

Three obstacles exist that may prevent the type of cost-effectiveness modeling from achieving Berkshire Gas’s portfolio objective (selection of the most cost-effective set of supply and demand resources that together are sufficient to meet natural gas demand):

(1) Missing resources: Many potential resources are not included in modeling and are therefore not available for the model to choose as it assembles its least-cost portfolio. For Berkshire Gas, potential resources that are left out of modeling appear to include additional energy efficiency measures (beyond current and planned measures) that reduce annual gas usage, efficiency measures targeted at peak day usage, incentives to adopt electric and/or renewable space and water heating, additional LNG and natural gas storage, thermal storage, and additional load management (demand response). More demand-side measures may exist with benefit-cost ratios higher than 1.00 (or even measures with negative benefit-cost ratios that, when combined with the rest of Berkshire’s efficiency portfolio, result in an average benefit-cost ratio that is lower than 1.77 but
greater than 1.00); these measures are not including in the SENDOUT modeling
of the least-cost supply portfolio.

(2) **Uneven playing field:** While energy efficiency from current and planned
programs are included in the Company’s expected gas requirements, these
critical demand-side resources are not treated the same as supply-side resources.
Like supply-side resources, energy efficiency measures have a net cost or
benefit associated with them that should be considered in a cost-effectiveness
analysis of a least-cost resource portfolio for Berkshire Gas’s customers.
Berkshire Gas’s benefit-cost ratio for the last three-year gas efficiency planning
period (2016-2018) was expected to be 1.77. \(^1\) That is, the benefit of the
Company’s gas efficiency savings was $1.77 for every $1 of cost (or, stated
another way, every therm of energy efficiency savings makes the Company’s
supply and demand portfolio less expensive). It seems unlikely that any of the
supply-side resources included by Berkshire Gas in its modeling have negative
costs (that is, offer benefits) for every therm. The Company’s SENDOUT model
is not considering the lowest cost resource among its alternatives.

3. **COMPARISON TO THE RANGE OF ALTERNATIVES REASONABLY
AVAILABLE TO THE COMPANY AND ITS CUSTOMERS**

Q. **Could Berkshire Gas’s portfolio objectives be served using other resources?**

A. Berkshire Gas’s portfolio objectives depend on selection of the most cost-effective
set of supply and demand resources that together are sufficient to meet natural gas
demand. Taken in its component parts:

- **Most cost-effective set of supply and demand resources:** Berkshire Gas’s
selected set of resources includes both supply and demand resources. Together,

\(^1\) DPU 15-165, Initial Filing, Exhibit BERKSHIRE-4, p. 13 of 31.
http://170.63.40.34/DPU/FilesRoomAPI/api/Attachments/Get?path=15-165%2fExhBerkshire420162018DataTable.pdf.
these resources—both supply and demand—determine the overall cost of the portfolio. Least cost resource portfolios include the lowest cost resources regardless of whether these resources are on the supply or demand side. Could Berkshire Gas’s portfolio objective of providing the most cost-effective set of resources be achieved using resources other than their new supply contracts? The answer depends on cost information not provided in the Company’s 17-145 filing.

- **Sufficient resources to meet natural gas demand:** It is not clear from the information provided in 17-145 whether or not Berkshire Gas’s contracts with TGP, Repsol, ENGIE, and PXP for new supply are necessary to meet the Company’s forecast of customer needs in future years. Could Berkshire Gas’s portfolio objective of providing sufficient resources to meet natural gas demand be achieved using resources other than their new supply contracts? Berkshire Gas’s 17-145 filing does not provide sufficient information to demonstrate whether or not it could meet this objective by other means. Alternate resources could certainly help it meet this objective.

Q. **What alternatives to additional pipeline contracts are described by Berkshire Gas in its 2016 FSP?**

A. Berkshire Gas’s FSP 2016 includes both supply and demand-side alternatives to new pipeline contracts. LNG delivery, storage, and withdrawal are important supply-side alternatives while energy efficiency measures are an important demand-side alternative.

In addition, since as early as 2012 (see Berkshire Gas FSP 2012 and FSP 2014), Berkshire Gas has operated a load management program with the goal of reducing the need for supply resources on peak:

[T]he Company has entered into agreements with several large customers (with alternate fuel capabilities) that provide significant load
management flexibility in that the Company may curtail service for a designated period of time in order to promote the efficient use of its distribution system (also referred to as "demand-side management"). The Company has been a leader in terms of its load management initiatives. (Berkshire Gas FSP 2016, p.15)

Q. What alternatives to additional pipeline contracts are described by Berkshire Gas in this docket (DPU 17-145)?

A. Similarly, in its 17-145 filing, Berkshire Gas includes both LNG delivery, storage, and withdrawal, energy efficiency, and load management among its resources. With regards to the viability of additional resources other than its contract with TGP, Repsol, ENGIE, and PXP for new supply, the Company asserts in its 17-145 filing:

After extensive investigation and diligence, the Company determined that there are simply no reasonable and viable pipeline alternatives to the TGP Agreement. (17-145, Exhibit BGC-JMB-1, p.14)

The only "conceptual" alternatives to the Agreements are: (i) the expansion of on-system peaking resources; and (ii) long-term reliance on third-party seasonal citygate delivered resources. With respect to the expansion of on-system peaking resources, beyond cost, Berkshire could not meet its identified design-day need through this alternative, even if modifications/improvements were made to its facilities. Additionally, there are significant operational considerations with an over-reliance on system peaking, such as gas mixing constraints, product and trucking availability, and increased reliance on mechanical facilities that affect reliability. As a result, this conceptual alternative would not be viable. (17-145, Exhibit BGC-JMB-1, p.16)

Q. What alternative resources are available to Berkshire Gas to meet its portfolio goals?
Possible alternative resources available to Berkshire Gas include additional energy efficiency measures that reduce annual gas usage, efficiency measures targeted at peak day usage, incentives to adopt electric and/or renewable space and water heating, additional LNG and natural gas storage, thermal storage, and additional load management (demand response).

Q. What steps have other natural gas distribution companies taken to secure non-pipeline alternative resources?

A. In December 2017 New York’s ConEdison issued a request for proposals (RFP) for “Non-Pipeline Solutions to Provide Peak Period Natural Gas System Relief”.\(^2\)

Con Edion has identified a need for Non-Pipeline Solutions throughout its natural gas service territory to address a nine percent shortfall in Peak Day pipeline capacity by November 2023, which is equivalent to more than 100,000 Dth on a Peak Day. The traditional solution would be the acquisition of incremental interstate pipeline capacity to address this requirement. The goal of this RFP is to identify a portfolio of opportunities that will reduce customer loads and provide new supply sources without the construction of a new pipeline, or at a minimum will be able to reduce the Company’s reliance on Delivered Services. The primary capacity constraint is for daily deliveries of natural gas into Con Edison’s service territory from upstream pipelines; the Company’s internal distribution capacity is adequate to meet fluctuations in customer Demand throughout the day. As a result, NPS projects must be able to provide Relief for a minimum of 24 consecutive hours on the coldest days of the year to be useful to Con Edion, and are more

valuable if deployable for multi-day consecutive periods of cold weather. (Exhibit CLF-EAS-3 p.7)

Q. Did Berkshire Gas issue an RFP for non-pipeline alternatives in an attempt to identify and secure least-cost alternative resources?

A. To my knowledge, no.

4. COMPLIANCE WITH THE GLOBAL WARMING SOLUTIONS ACT.

Q. Are you familiar with the Commonwealth’s Global Warming Solutions Act, and if so, do you have an understanding of its technical requirements?

A. Yes, I am familiar with the Massachusetts Global Warming Solutions Act, and I do have an understanding of its technical requirements. The Global Warming Solutions Act, or “GWSA,” is a law passed in 2008 that requires the Commonwealth to reduce its statewide greenhouse gas emissions across all sectors and emissions sources to a level in 2020 that is no greater than 25 percent of 1990 emissions levels (or approximately 70.8 million metric tons of CO₂ equivalent (“MMCO₂e”)), and a level in 2050 that is no greater than 80 percent of the state’s 1990 emissions level (or approximately 18.9 MMTCO₂e).³

Q. In your understanding, what is required technically for a program, project, or approval to be considered consistent with the GWSA?

A. While the quantitative details will differ from case to case, assessing consistency with the GWSA as a technical matter requires at a minimum an understanding of the net volume of greenhouse gas emissions that can be reasonably expected to occur as a result of the program, project, or approval as well as the level of statewide greenhouse gas emissions allowed by the GWSA at the time those

emissions are expected to occur. It should also include evidence of emission
reductions that assist the Commonwealth with achieving its GWSA goals, as
distinct from simply not actively harming the Commonwealth’s achievement of
GWSA goals.

Q. In your opinion, does the record in this matter contain adequate evidence to
enable someone to assess the greenhouse gas emissions impact of the contracts
with TGP, PXP, Engie, and Repsol for new supply?

A. No.

Q. Please explain.

A. In its Petition, the Company asks for permission to acquire 12,500 dekatherm
(“Dth”) per day of new gas capacity in the proposed TGP contract\(^4\) and to acquire
another 4,010 Dth/day of new gas capacity in the proposed PXP contract.\(^5\) All of
that capacity, according to the Company, is designed to serve retail customers by
enabling the Company to sell them gas for end-use combustion (predominantly for
space heating).\(^6\)

According to the U.S. Environmental Protection Agency, “the average heat content
of natural gas is 0.1 MMBtu per therm”; “the average carbon coefficient of natural
gas is 14.46 kg carbon per mmbtu”; and the “fraction of that carbon oxidized to
CO\(_2\) during combustion is 100 percent”.\(^7\) Accordingly, the combustion of a

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\(^4\) See Ex. BGC-JMB-1 at 10.
\(^5\) Id. at 14.
\(^6\) See, e.g., id. at 3 (“The main reason that the Company has decided to enter into the Agreements is because the addition of long-term resources to its portfolio is necessary to meet customer requirements on a reliable basis and to address a planning requirement identified in the course of the Company’s most recent forecast and supply plan.”).
dekattherm of gas will result in the release to atmosphere of approximately 0.053
metric tons of CO₂.⁸

As a result, the approval of the Petition would authorize the release into the
atmosphere of approximately 668 metric tons per day of CO₂, or, for the TGP
contract, up to 0.2 MMTCO₂e annually for the next twenty years life of the
contract,⁹ until about the year 2038.

Over that same 20-year period, the GWSA requires dramatic annual reductions in
the Commonwealth’s greenhouse gas emissions, including those from the
combustion of gas for end-uses like those served by the Company. Over the life of
the proposed TGP supply contract, statewide greenhouse gas emissions – which
include those that will result from the proposed contracts¹⁰ – must decline
approximately 2 percent per year to about 36.2 MMTCO₂e (approximately 62
percent below 1990 levels in 2040).¹¹

By 2040, then, the proposed TGP agreement would alone authorize and enable the
release of greenhouse gases of a volume that will have a significant and direct
impact on the ability of the state to meet its GWSA-required emissions levels, as
these contracts would be a source of emissions equivalent to approximately 0.7
percent of the total permitted in the Commonwealth as a whole by the GWSA in
that timeframe for the entire state economy. Indeed, contrary to the Company’s
suggestion here that these contracts are necessary to serve a sustained high volume

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⁸ 0.1 MMBtu/1 therm × 14.46 kg C/MMBtu × 44 kg CO₂/12 kg C × 1 metric ton/1,000 kg = 0.0053 metric tons CO₂/therm
⁹ Ex. Ex. BGC-JMB-1 at 10.
¹¹ Based on a straight-line decline from the GWSA’s 25 percent emissions reduction required by 2020 to the 80 percent reduction required by 2050.
of gas consumption by its customers through 2038, the Commonwealth already anticipates that in the same timeframe compliance with the GWSA will require the use of less gas as the Commonwealth “electrify[es] the buildings sector’s heating and cooling loads” and develops non-fossil “renewable thermal market.”

Q. Does the Petition, or any other document in the record, contain an analysis of either the greenhouse gas emissions that will result from the proposed agreements or their impact on the ability of the Commonwealth to meet its GWSA-required emissions reductions over the life of the contracts?

A. No, I have seen no such analysis in the record as of the date of this testimony. The Petition itself contains no mention whatsoever of either the greenhouse gas emissions that can be reasonably assumed will result from the approval of the proposed contracts or of the impact of such emissions on the state’s ability to meet its GWSA-required emissions reduction. Similarly, there is no mention of either in Berkshire’s approved FSP which the Petition references and relies on.

Q. Have you seen any mention of greenhouse gas emissions or the GWSA by the Company in the record?

A. Only one, in the Company’s February 13, 2018 response to request for information DPU-1-15. However, that response alone does not contain sufficient information or analysis upon which the Department can conclude that approval of the proposed contracts is consistent with the GWSA.

Q. What does that response say?

A. The response states that the proposed contracts will “serve as a replacement” to previously approved capacity.

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12 See, e.g., 2015 CECP at 1-10, 50-54 (meeting the GWSA’s emissions limits between 2030 and 2050 will require “electrification of the buildings sector’s heating and cooling loads” and the development of non-fossil “renewable thermal market”).
13 Ex. DPU-1-15.
Q. Does the citation to previous approval of pipeline capacity in Ex. DPU-1-15 refer to a prior proceeding before the Department with record evidence that could support a conclusion that some portion of the proposed 20-year supply agreements will not have a significant impact on the ability of the Commonwealth to meet its GWSA-required emissions levels?

A. No. The Department's prior approval of contracts for 36,000 Dth/day of capacity which the Company suggests the proposed contracts will "replace" did not contain record evidence that could be analyzed to test the impact of the 36,000 Dth/day on the Commonwealth's ability to meet its GWSA-required emissions levels. I reviewed the Final Order in D.P.U. 15-48 and the record evidence to which it refers in its GWSA-related findings. In the Final Order in D.P.U. 15-48, the Department cites to no quantitative evidence regarding the emissions levels expected as a result of the end-use combustion of that gas, and includes no assessment (and points to no evidence containing any assessment) regarding the levels of greenhouse gas emissions required by the GWSA, or the proposed contract's impact on those levels, at any time during the life of the contracts at issue in D.P.U. 15-48.

Q. Did the Department's Final Order in 15-48 use or describe a reasonable standard for a proposed contract for new gas supply to meet the emissions requirements of the GWSA?

A. No. In the Final Order in 15-48 the Department states only that "the record evidence indicates that the additional capacity will be used, in large part, to serve new customers converting from oil heating to natural gas, and therefore the Department expects that the acquisition of the proposed capacity will further reduce greenhouse gas emissions and contribute towards GWSA goals."14 The record exhibits from the

14 D.P.U. 15-48 Final Order at 52.
Company, to which the Department cites in support of that statement, do not provide quantification of the emissions impact.¹⁵

Q. **What would be a reasonable minimum standard for a proposed contract for new gas supply to meet the emissions requirements of the GWSA?**

A. As I indicated previously, assessing consistency with the GWSA requires evidence of emissions reductions that assist the Commonwealth with achieving its GWSA goals (as distinct from simply not actively harming the Commonwealth’s achievement of GWSA goals) as well as evidence of emission impacts that are both quantitative and specific. Here, that would require, at minimum, quantitative estimates of the expected number of conversions from a different space heating fuel to natural gas caused by the proposed contract capacity (of the resulting change in expected greenhouse gas emissions) and of the pace and scope of reductions in greenhouse gas emissions required in the same timeframe by the GWSA.

Q. **In addition to expected greenhouse gas emissions from combusting gas, are there any additional sources of greenhouse gas emissions that are reasonably foreseeable from a proposed contract for new gas supply?**

A. Yes. Analysis should be presented of the known and reasonably estimable greenhouse gas emissions that can and should be assumed will occur from the transport and distribution of the gas associated with a proposed contract (based on current technology and scientific assessments of existing Commonwealth leak rates). The Department has determined that 0.6 to 1.1 percent of total gas received into the Commonwealth’s gas distribution system is lost to the atmosphere as direct methane emissions due to leakage throughout the system.¹⁶ Assuming in the

¹⁵ See Order, D.P.U. 15-48 at 52 (citing D.P.U. 15-48 Ex. DPU-1-5, Tr. 3, at 17, 28-29, 62-63, 68-70, 77). The Department also cites CLF’s direct testimony, which contains emissions calculations. See id. At 53 (citing Exhibit CLF-1 at 29). However, that page of the direct testimony of CLF’s expert witness in D.P.U. 15-48 only mentions a portion of the pipeline capacity which might be used to convert oil-fired space heat to gas-fired space heat and the resulting emissions changes between 2019 and 2029.

¹⁶ See, e.g., ICF, *Lost and Unaccounted For Gas* (Dec. 23, 2014) (prepared for the Department) at i.
absence here of evidence to the contrary regarding the Company’s own leak rates, the Department must assume that at least 0.85 percent (the mid-point of the 0.6 to 1.1 percent range) of 12,600 Dth/day that the proposed TGP contract would authorize would similarly be released into the atmosphere again (with substantial potential impact to the state’s ability to comply with GWSA-required emissions limits over the life of these contracts). Such reasonably expected leakage would increase expected greenhouse gas emissions resulting from these contracts by as much as 0.1 MMTCO$_2$e, each year, or about 0.1 percent of the Commonwealth’s total permitted greenhouse gas emissions in 2040.$^{17}$

Q. Does this conclude your testimony?

A. Yes, it does.

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