Maine Public Utilities Commission

Report Pursuant to Public Law 2023, chapter 222 (LD 698)

Submitted to the Joint Standing Committee on Energy, Utilities and Technology

February 1, 2024

I. Introduction

In 2023, the Legislature enacted Public Law 2023, chapter 222 (2023 Act), which requires the Maine Public Utilities Commission (Commission), after consultation with the Office of the Public Advocate (OPA), the Governor's Energy Office (GEO) and the Efficiency Maine Trust (Trust), to issue a request for information to appropriate stakeholders, organizations and other entities identified by the Commission for the following information:

1. Whether there are any reasonable opportunities for the commission to explore and consider engaging in the execution of an energy cost reduction contract (ECRC) or a physical energy storage contract (PESC) in accordance with the principles of beneficial electrification and Title 35-A, chapter 19; and

2. Identification of existing and near-term replacement energy sources for natural gas in commercial and industrial uses, including when the replacement energy sources are expected to be available, the cost of those replacement energy sources, and the steps needed to develop a cost-effective and reliable supply of such replacement energy sources.

The 2023 Act requires the Commission to submit a report to the Joint Standing Committee on Energy, Utilities and Technology (Committee) by February 1, 2024, that includes a summary of the comments received by the Commission, if the Commission has taken any action as a result of the information submitted pursuant to the Commission's request for information and any recommendations. The 2023 Act authorizes the Committee to report out a bill related to the report.

Prior to initiating an inquiry, the Commission consulted with the OPA, the GEO and the Trust regarding the inquiry and request for information (RFI) and these entities provided input to the Commission, which the Commission incorporated. On November 15, 2023, the Commission initiated an inquiry and issued an RFI in response to the 2023 Act.[1] In addition to the two items above contained in the 2023 Act, the Commission also included a third item in the RFI as follows:

3. Other information that commenters believe is relevant or may be instructive with respect to the topics described above or in Public Law 2023, chapter 222.

Comments were required to be submitted no later than December 8, 2023. The Commission received extensive comments from 11 entities. Most comments received focused on renewable natural gas (RNG) and presented both positive and negative perspectives on the use of RNG. Some commenters did provide some details on possible alternatives to the use of natural gas in commercial and industrial settings, especially for those industries that are more difficult to electrify, such as aviation and shipping. A summary of the comments received through this RFI are located in Appendix A of this report.

Due to several bills that are still in the Committee's possession and current Commission activities, the Commission is not making any recommendations in this report and has not formally considered whether to engage in an ECRC or a PESC proceeding and has no plans to do so at this time.

[1] Docket No. 2023-00302

II. Commission Notice of Inquiry and Request for Information

On November 15, 2023, the Commission initiated an inquiry and issued an RFI in response to the 2023 Act. The Commission requested the following information:

1. Whether there are any reasonable opportunities for the commission to explore and consider engaging in the execution of an energy cost reduction contract (ECRC) or a physical energy storage contract (PESC) in accordance with the principles of beneficial electrification and Title 35-A, chapter 19;

2. Identification of existing and near-term replacement energy sources for natural gas in commercial and industrial uses, including when the replacement energy sources are expected to be available, the cost of those replacement energy sources, and the steps needed to develop a cost-effective and reliable supply of such replacement energy sources; and

3. Other information that commenters believe is relevant or may be instructive with respect to the topics described above or in Public Law 2023, chapter 222.

Comments were required to be submitted no later than December 8, 2023. The Commission received extensive comments from the following 11 entities: (1) Cashman-Preload Cryogenics (CPC); (2) the Trust; (3) Bangor Natural Gas (BNG); (4) Maine Natural Gas (MNG); (5) Summit Natural Gas of Maine (SNGME); (6) the Coalition for Renewable Natural Gas (RNG Coalition); (7) the Northeast Gas Association (NGA); (8) the OPA; (9) Enbridge, Inc. (Enbridge); (10) Northern Utilities, Inc. d/b/a Until (Northern); and (11) Conservation Law Foundation (CLF). Comments are summarized in Appendix A.

In relation to question 1 in the RFI, except for CPC, none of the comments received identified any specific opportunities for the Commission to explore the execution of an ECRC or PESC. A majority of commenters, in response to question 2 posed in the RFI, mainly addressed the benefits of renewable natural gas (RNG) and hydrogen generally, although some commenters did speak to replacement energy sources for natural gas in commercial and industrial settings, especially in harder to electrify industries such as aviation and shipping. A couple of the commenters did provide information on their activities in relation to the third question posed in the RFI. A summary of all comments received by the Commission are located in Appendix A.

III. Commission Activities -Past and Present

ECRC Activities

On June 26, 2013, Public Law 2013, chapter 369[2] was enacted. This law contains several provisions including the enactment of "The Maine Energy Cost Reduction Act" (MECR Act), created to expand natural gas transmission pipeline capacity into Maine and other states in the New England electric pool region in order to result in lower natural gas prices and, by extension, lower electricity prices for consumers in the State, which the Legislature determined was in the public interest. To facilitate the expansion of natural gas transmission capacity, the MECR Act authorized the Commission, in consultation with the OPA and GEO, to execute an ECRC in accordance with 35-A M.R.S. § 1904.

On March 20, 2014, the Commission opened an investigation to determine what parameters should

[2] LD 1559, often referred to as the Maine Omnibus Energy Bill.

govern an exercise of the Commission's authority under the MECR Act.[3] Subsequent to this investigation, and after review of proposals during the proceeding, the Commission concluded in an Order dated September 14, 2016, that each of the ECRC proposals presented in the proceeding would satisfy the statutory requirements for acceptance. Specifically, the Commission found:

> . . .neither market developments and rule changes, nor private participation in securing additional pipeline capacity will address the energy price and infrastructure concerns identified by the Legislature in the enactment of the Maine Energy Cost Reduction Act, P.L. 2013, ch. 369. Moreover, the ECRC proposals before the Commission (Spectra Energy Partner LLC's AccessNortheast (ANE) and Portland Natural Gas Transmission's Continent to Coast (C2C)) are commercially reasonable, in the public interest and reasonably likely to increase pipeline capacity into the region, be cost beneficial, and enhance system reliability.

While two proposals were found to meet statutory requirements, a majority of the Commission concluded that the ANE project provided greater benefits than the C2C project; therefore, the Commission decided to move forward with negotiation of a precedent agreement with the ANE for Maine's nine percent load share conditioned upon ANE entering into comparable precedent agreements with other New England states at a minimum of those states' respective load shares. The Commission noted that if these conditions were not met or if the ANE did not proceed, the Commission may move forward with negotiation for C2C.

Then on November 21, 2016, the Commission issued a new Order specifying the following:

> The Commission postpones further activities in this proceeding regarding the development and review of a precedent agreement pending future developments in other New England states. The Commission will monitor such developments and will renew activity in this proceeding in the future if circumstance warrant.

The Commission noted that since the authorization of an ECRC was conditioned on other New England states authorizing similar agreements for their load share, events in Massachusetts, New Hampshire and Rhode Island created doubt that there was a pathway forward and that it would not be an efficient use of the Commission's resources to proceed with the negotiation of an agreement. The Commission ordered ANE to file a project status report every six months, beginning June 1, 2017, and allowed other parties to the proceeding to also file status reports or comments on regional pipeline developments on the same schedule. The Commission retained the ability to act in the future if any positive development in the region unfolded. The last status report was filed with the Commission on November 12, 2019, and it was noted at that time that regional solutions involving all New England states to address fuel security challenges had not emerged.

PESC Activities

The MECR Act was amended by the enactment of Public Law 2015, chapter 445 (LNG Storage Act), which included the authority for the Commission to execute a physical energy storage contract based on the Legislative finding that "liquified natural gas storage located in the State, under certain circumstance, may offer the potential to decrease energy costs by providing a hedge against gas price volatility caused by gas supply constraints, which in turn may lower natural gas prices, and, by

[3] Docket No. 2014-00071

extension, lower electricity prices for consumers in this State." Pursuant to the amended law and in response to a petition on September 14, 2016, the Commission issued a request for proposals (RFP) for liquefied natural gas storage capacity through one or more physical energy storage contract(s).[4]

On May 17. 2017, the Commission issued an Order concluding that none of the PESC proposals presented in the RFP satisfied the statutory requirements. Specifically, the Commission found:

- Statutory perquisites regarding market rules and private participation were not satisfied;
- None of the proposed PESCs satisfy the LNG Storage Act requirements that such contract:
  - Be commercially reasonable;
  - Be in the public interest;
  - Will materially enhance LNG storage in the region;
  - Will significantly affect peak pricing; and
  - Are reasonably likely to be cost beneficial to utility ratepayers; and
- Several of the proposals may exceed the statutory spending cap, depending on the actual cost of any executed ECRC authorized pursuant to the September 14, 2016 Order.

The Commission's Authority to Execute a ECRC or PESC

When the MECR Act was first enacted it specified that the Commission was prohibited from executing a contract after December 31, 2018. The LNG Storage Act limited the Commission authority to execute a PESC to June 1, 2017. Public Law 2017, chapter 22 extended the Commission's authority to execute a ECRC to December 31, 2020. The 2023 Act repealed the limitations on the Commission's authority; therefore, the Commission is currently authorized to execute an ECRC or PESC if there were opportunities available that would meet the statutory requirements under the MECR Act.

Current Commission Activities

Recent cases in front of the Commission have shown us that there is not a clear path that natural gas utilities or the Commission can follow to understand how natural gas use is expected to change in response to our State's climate goals. It is very challenging both for utilities to plan for future supply capacity and for the Commission to evaluate the prudence of commitments given this uncertainty. Additionally, given the Commission's statutory obligation, it is important that we develop a consistent methodology to incorporate GHG emissions impacts in our decision making around gas infrastructure investments and contractual commitments. There are at least two potential lenses through which to evaluate GHG emissions. The first is the relative emissions of different supply alternatives – for example comparing a pipeline expansion verses imported LNG verses increased energy efficiency. The second is the consistency of a natural gas utility's supply plan with the State's long-term climate goal and customers' needs.

Consequently, the Commission has directed Staff to open an inquiry into these issues to gather ideas with the goal of developing best practices or a common methodology to evaluation the GHG impact of long-term supply commitments, their consistency with our State goals, and to assist in evaluating a

[4] Docket No. 2016-00253

broader path for the future of natural gas in the State.[5]

V. Conclusion

As stated in the introduction, the Commission is not making any recommendations at this time for several reasons. First, there are two bills currently in the possession of the Committee that have implications for both alternatives to natural gas as well as the operation and regulation of natural gas utilities. LD 1775, An Act to Establish a Clean Hydrogen Pilot Program, which is expected to be reported out of Committee as a divided report, with a majority of members voting "Ought to Pass as Amended," establishes a clean hydrogen pilot program, whereby the Commission is required to issue a request for proposals from qualifying clean hydrogen facilities. If there are any proposals that meet the requirements of the law and are determined to be in the public interest, the Commission, in consultation with the GEO and the Department of Environmental Protection, may choose one facility that would be eligible to receive a special rate contract.

LD 2077, An Act Regarding Customer Costs and the Environmental and Health Effects of Natural Gas, which has not yet been voted on by the Committee, would, beginning in 2025, prohibit: (1) a gas utility from including in rates any charge for costs associated with new gas service mains and gas service lines for residential and commercial gas service; (2) the Commission from approving a gas utility to furnish or serve customers in a municipality that is outside of the utility's service area on June 30, 2024; and (3) a gas utility from offering or providing a promotional allowance to customers or potential customers. LD 2077 also requires the Commission to conduct inquiries related to district geothermal systems and costs associated with gas system expansion and submit reports related to these inquires and requires the Department of Health and Human Services, Maine Center for Disease Control and Prevention, to submit a report on indoor air quality and health impacts of fossil fuel combustion and leakage to several joint standing committees of the Legislature.

Second, the Commission will be opening an inquiry to obtain input on how the Commission can regulate gas utilities and develop best practices or a common methodology to evaluate the GHG impact of long-term supply commitments, their consistency with our State goals, and to assist in evaluating a broader path for the future of natural gas in the State. This inquiry will take time, both to receive comments, and for the Commission to evaluate those comments and develop this framework.

Lastly, the Commission has not formally considered whether to engage in an ECRC or a PESC proceeding and has no plans to do so at this time. For possible contracts that have regional implications, the climate today in the region regarding natural gas is less favorable than it was in 2016-2017 when the Commission deliberated engaging in the execution of an ECRC and a PESC,

[5] Docket No. 2023-00254: In this docket the Commission approved Northern Utilities d/b/a/ Unitil's (Northern) proposed entry into four agreements establishing its commitment for 12,500 Dth/day of firm transportation capacity service on Portland Natural Gas Transmission System (PNGTS) and TransCanada Pipeline Limited (TCPL) from Empress, Alberta to Northern's interconnections with Granite State Gas Transmission, Inc. for a term of 30 years, subject to conditions that, among other things, require Northern to monitor and prudently manage its portfolio to reflect changes in future load. In addition, the Commission established that any future filing seeking approval of gas supply contracts shall include an analysis of demand, project economics, and emissions impacts over the full term of the contract to present a robust record for decision. The Commission found that entering into the Empress Agreements will likely reduce Northern's dependence on more costly delivered supply resulting in savings for ratepayers over current operations, provide access to a lower cost gas supply and provide further supply diversity, protect ratepayers from delivered supply price and basis volatility, improve supply security by reducing reliance on less reliably available annual off-system peaking contracts for imported LNG, and provide access to additional resources along the Empress Pathway and the Western Canadian Basin supply region to enhance Northern's resource diversity operations.

and the Commission is confident that regional partnerships are likely not viable at this time.

The Commission will continue to monitor proceedings at the Federal Energy Regulatory Commission (FERC) related to interstate natural gas transportation capacity in New England and the Northeast. The Commission will intervene and participate in such proceedings if the Commission finds that intervention and participation will best represent the interests of the State's electric and gas ratepayers and may achieve a result that will ensure the lowest possible natural gas and electricity prices for consumers in the State. As required by 35-A M.R.S. § 1909-A(2), the Commission will report to the Committee on any actions it takes at FERC related to interstate natural gas transportation capacity.

Appendix A

Summary of Comment Received in Docket No. 2023-00302

Appendix A: Below is a summary of the comments received in the Commission's RFI. The full comments and any supporting materials submitted can be accessed in Docket No. 2023-00302 on the Commission's Case Management System[6]

Cashman-Preload Cryogenics (CPC)

CPC has been engaged in pioneering the research, development, design and construction of Liquefied Natural Gas (LNG) storage tanks for over 80 years and through its subsidiary, Patriot Renewables, LLC, is and has been a developer, owner, and operator of commercial-scale wind and solar energy projects in Maine. CPC had also submitted a proposal on November 6, 2016, in response to the Commission's request for proposals for PESCs for LNG storage capacity in Docket No. 2016-00253.

CPC states that they intend to develop, construct, own and operate an LNG facility (Project) in southern Maine to meet the needs of the Local Distribution Companies (LDC), as well as the natural gas fired power generation facilities in the region. CPC states that this Project is needed to fulfill the supply commitments to natural gas consumers during peak day usage on extremely cold winter days. The Project will include liquefaction equipment to produce LNG, approximately 2.0 billion cubic feet (BCF) of full containment LNG storage tank to hold approximately 24 million gallons of LNG, and fast response regasification equipment to turn the LNG back into natural gas that can send out 200,000 dekatherms (dth) to 300,000 dth per day to the pipeline system on the coldest winter days. CPC states that the Project will be capable of providing intra-day regassification delivery service. For the purpose of comparison, CPC states that a 2.0 BCF LNG facility is equivalent to having access to a 1,300-megawatt gas fired power plant for ten consecutive days, 24-hours/day during peak demand.

CPC provided a summary of the expected benefits of the Project which include: meeting peak day gas supply constraints; improving reliability; providing back up to future intermittent variable renewable energy resources; and the integration of responsibly sources gas. In relation to the integration of responsibly sourced gas, CPC states that the Project can be further decarbonized by sourcing LNG feedstock gas from responsibly sources gas (RSG) and renewable natural gas (RNG) resources. Furthermore, local market area LNG energy storage can store daily produced carbon-negative RSG and RNG resources during periods of low demand that can be stored and used during peak demand periods. CPC states the Project also intends to incorporate self-generated solar power to meet a portion of the electricity requirements of the Project and have initiated discussions regarding the future use of hydrogen and other emerging technologies in the Project.

CPC states a challenge to the current project is the policy driven uncertainty of natural gas and natural gas infrastructure in the future. The uncertainty is directly related to individual state policies that are focused solely on the long-term goals of renewable energy and total electrification.

CPC states that it is widely documented at the state, federal and international level that natural gas will continue to be a reliable resource to back up intermittent renewable resources and is still one of the lowest-cost, cleanest, and most reliable thermal energy resource.

CPC states that an ECRC with the Project, that is pursued by the State of Maine, would act as an underwriting for LDCs and power generation companies to contract for critical and necessary peak

[6] https://mpuc-cms.maine.gov/CQM.Public.WebUI/ExternalHome.aspx

day service to ensure reliability and domestically sourced gas as the energy transition unfolds. CPC states that this would allow end users to ensure energy and electricity remains affordable, reliable and sustainable. CPC states that the lead developer of the Project, who is a Maine resident understands the need and commitment to the energy transition, but also recognizes that quantitatively the right balance of infrastructure (fossil fuels vs. renewables) will be needed to address the complexities of that transition.

Efficiency Maine Trust (Trust)

The Trust notes in its comment that it administers programs to incentivize commercial and industrial (C&I) customers to invest in energy-efficient equipment that reduces both energy costs and greenhouse gas (GHG) emissions. The Trust notes that certain measures, including electric heat pump solutions, provide alternatives to the use of natural gas for space and water heating in commercial and industrial settings.

The Trust offered to review responses provided in this RFI relating to existing and near-term replacement energy sources for natural gas and, where possible, compare that information to relevant data the Trust has from its current initiative. The Trust notes this analysis may be able to provide relevant context on the costs and benefits to C&I customers and to ratepayers associated with the use of the replacement energy source to natural gas.

Bangor Natural Gas (BNG)

BNG provides gas service to approximately 7,885 customers in three counties in Maine. To serve these customer BNG has a firm transportation service agreement with Maritimes & Northeast Pipeline, L.L.C. from which it receives gas at two points of interconnection. BNG states that due to its geographical location and access to upstream capacity solely from Maritimes, it has very limited gas supply options. BNG also has an asset management agreement (AMA) with Record Energy America Corporation. This AMA contract allows BNG to also access limited gas supply from the Dawn Hub on the TransCanada Pipeline, from Algonquin Gas Transmission, L.L.C and from Tennessee Gas Pipeline Company, L.L.C. in its Zone 6, depending on the time of year.

BNG notes that the Commission recently approved a stipulation pertaining to BNG adding additional Terms and Conditions of Service on Sheet 62 of its tariff on RNG. BNG notes that in approving Sheet 62 the Commission held that Sheet 62 will inform potential suppliers and ratepayers of this potentiality while not relieving BNG of the obligation to act prudently with regard to the legal, safety, or operational aspects of incorporating RNG into its gas supply and that this does not establish cost recovery assurance. This would be addressed after the parties and Commission have had the opportunity to review the specific arrangements or details of the procurement by BNG. Furthermore, the Commission stated that the inclusion of RNG in gas utilities' supply portfolios may be consistent with the Legislative mandate requiring that the Commission's in its oversight of public utilities must consider the reduction of GHG emissions to meet the levels set in 38 M.R.S. § 576-A.

BNG supports the development, transportation and use of RSG, provided it can be developed or blended to meet standards and other requirements. BNG notes that the development of RSG facilities near its system would be beneficial to BNG and its customers, to the extent that it would be another source of reasonably priced gas that could be used to serve its customers, without the need to acquire additional upstream baseline firm transportation, which at this time is difficult, if not impossible.

Like others, BNG notes the pipeline constraints facing the New England region and the difficulty in developing new pipeline infrastructure in the region and how demand for natural gas continues to grow, thus subjecting the region to higher price dynamics. BNG cites information from FERC stating that due to the constrained pipeline capacity into New England, segments of the region's pipeline often reach their maximum capacity during the winter months. This is reflected in prices as well as the region's dependence on LNG imports to supplement supply. BNG notes that RSG prices are at a premium compared to the market prices for natural gas, if that purchase of RSG includes a corresponding purchase of credits representative of the environmental attributes corresponding to the RSG. BNG notes that it could potentially structure a future purchase of RSG, where the RSG developer would sell the credits to a third-party and BNG would only purchase the RSG in order to reduce the price for the RSG. This would allow Maine customers to receive the benefits of emission reducing RSG at a reasonable cost.

BNG is also supportive of the development of RSG that can be delivered into Maritimes; however, is unsure if Maritimes' FERC gas tariff requires changes to its gas quality provisions to enable it to receive RSG. BNG notes that the North American Energy Standards Board (NAESB) has facilitated ease of acquiring RSG to the extent that it has approved a form of RNG Addendum for use when purchasing natural gas pursuant to NAESB's form of Base Contract for the Sale and Purchase of Natural Gas.

BNG proposes some mechanisms to acquire RSG, both requiring Commission approval, and include:

- Installing any required compression, gas treatment, pipelines, and interconnects with the RSG facilities to BNG's distribution pipelines and recover those costs and utility rate of return through rates charged to the RSG developer. This would reduce the upfront costs of RSG development and could stimulate that development.

- BNG building, owning, operating and maintaining RSG facilities in the State and delivering that RSG to BNG's distribution pipelines. The costs associated with this could be recovered through BNG's customers pursuant to BNG's recovery of its gas costs.

Either of these options would allow BNG to directly receive the RSG and provide customers with the environmental benefits from RSG developed and used in Maine. BNG recommends that since there will be costs to BNG's customers from the development, procurement and transportation of RSG, before proceeding with the introduction of RSG into its system, BNG could provide its customers with the option of electing to use RSG.

In response to question 1 in the RFI, BNG does not specifically address whether there are opportunities to explore engaging in ECRCs of PESCs, but rather speaks to the benefits of natural gas and highlights the complications with relying solely on renewable energy and associated energy storage.

In response to question 2 in the RFI, BNG notes that it has approximately 63 transportation service customers that rely on natural gas as a primary energy source for commercial and industrial purposes. Like MNG (summarized below), BNG suggests polling these customers for their input on this question. BNG notes it is reasonable to assume that replacement energy sources for commercial and industrial customers must be reliable, sustainable and cost effective. BNG notes that competition to these businesses from other states, along with rising energy costs and possible service interruption to

service in winter months, may incentivize these businesses and their workers to relocate elsewhere and greatly impacts the region's economic competitiveness.

BNG notes RSG requires source material, such as biowaste from landfills, food waste, agricultural waste and municipal wastewater. An alternative solution to RSG is green or blue hydrogen created from water through electrolysis or methane through steam reforming and carbon capture. BNG notes pilots for hydrogen in other states but specifies that hydrogen compatibility with existing pipelines and existing homeowner appliance limits hydrogen injection to about 15%. BNG notes Hawaii has been receiving hydrogen blended gas in its distribution system for 30 years, but hydrogen is still a premium product with premium prices.

In response to the RFI to provide any other relevant information, BNG notes that electric prices in Maine will not likely be reduced with continued State support of renewable-source electricity development. BNG states that Maine's elected officials, the Commission, energy utilities and advocated for consumers have a duty to Maine residents to have a well thought out plan for carbon reductions that does not sacrifice reliability and affordability.

Maine Natural Gas (MNG)

MNG serves over 6,000 customers in southern and central Maine. MNG receives its gas through deliveries to one of five city gates via the Portland Natural Gas Transmission System or Maritimes and Northeast pipeline and MNG continues its monitoring of market developments for opportunities to lock in additional capacity but notes that until more infrastructure is developed in the Northeast, these opportunities will continue to be limited.

MNG notes that natural gas is an efficient, reliable, and clean energy source and releases fewer emissions than coal, oil or wood. MNG states its commitment to reducing greenhouse emissions and that RSG may be a promising option, assuming it can be reasonably priced and developed to meet current needs.

In its response to question 1, MNG states that it supports the possibility of the Commission exploring an ECRC that would bring additional firm transportation capacity to the region. MNG notes that natural gas pipeline capacity to the Northeast has not expanded at a rate to meet demand. Having an increase in natural gas supply via a firm transportation capacity would stabilize prices, increase reliability and support efforts to reduce GHG emissions by replacing the use of oil and wood.

MNG notes that the Northeast regional gas market relies on imported LNG in the winter to meet demand and competes for this LNG with Europe and Asia. This competition along with the geopolitical environment can greatly impact the prices. As an example, MNG cites the impact the Russia/Ukraine conflict had on winter LNG prices in 2022-23. MNG notes that it plans to continue to research and offer support to opportunities that would bring value to its customers, including bringing additional LNG storage capability to the region. However, MNG notes that the cost of operating an LNG facility, including the cost of supply itself, may not be cost advantageous to customers, especially if there is no incremental firm transportation capacity available to Maine LDCs to bring the supply to the LDCs respective city gates.

MNG cites a report issued by FERC and the North American Electricity Reliability Corporation (NERC) that was in response to an "Inquiry into Bulk Power System Operations During December 2022 Winter Storm Elliott," which recommended the need for "a study to analyze whether additional

natural gas infrastructure, including interstate pipelines and storage, is needed to support the reliability of the electric grid and meet the needs of natural gas LDCs." MNG states that the report and events, like the one that caused the need for the report, reinforce the need in the Northeast region and elsewhere for additional firm reliability mechanisms and measures.

In response to question 2 in the RFI, MNG states the RNG and hydrogen are storable, dispatchable and can be blended with the natural gas provided to Maine residents resulting in reduced GHG emissions. MNG states that blending hydrogen into the natural gas stream is another opportunity to reduce GHG emissions as hydrogen does not contain carbon; therefore, it emits no CO_2 when combusted. MNG is open to exploring opportunities incorporating RNG and hydrogen into their distribution system but recognizes that the availability of RNG and hydrogen are still under research and development. MNG states that its distribution infrastructure is made of high-density plastic, which is leak resistant. This not only contributes to a reduction of GHGs, but this infrastructure is ideal for utilizing these new technologies, thus making any transition more seamless. MNG notes that a large part of their commercial and industrial customers are transportation customers who procure their gas supply from marketers and a company, like MNG.

In response to the RFI to provide any other relevant information, MNG states that the industry is still learning about low- and no-carbon fuels and their effect on energy delivery infrastructure systems and end use, but states that carbon capture, sequestration, certified gas and geothermal are all opportunities to reduce GHG emissions and that it is in the industry's best interest to continue research, collaboration and dissemination of available history and experience.

Summit Natural Gas of Maine (SNGME)

SNGME states that a clean energy future will require a multifaceted, holistic approach and that a host of studies recognize that RNG, hydrogen and natural gas infrastructure will continue to be critical resources in the transition to a cleaner, more sustainable energy future. SNGME cited that the GEO predicts that electricity load will more than double by the year 2040 and that in its "Pathway to 2040 Study" anticipates that pipeline gas and hydrogen will be significant energy resources at least through 2050.

SNGME states that a variety of studies and programs conclude that it is substantially more economic to achieve emission reductions through the use of RNG in combination with electrification than to achieve the savings with electrification alone. SNGME included the following examples:

- A study by Deutsche Energie-Agentur states that a successful transition will require not only energy efficiency and renewable power, but also power fuels. According to the study, the same reductions in emissions can be met by using a mixed technology energy resource portfolio at a fraction of the cost than using an electricity-only approach.

- A study by the American Gas Association, estimates that emission reductions from full residential electrification would cost eight times more than achieving the same emission reductions using RNG.

- A study by McKinsey and Company noted that "modeling shows that a decarbonization pathway for the energy system based solely on electrification, renewables, and storage, without clean fuels or carbon sequestration, results in a net higher societal cost" and

depending on the region, using clean fuels to lower emission could cost 15% to 80% less than achieving those same emissions reduction through electrification alone.

SNGME notes that in Quebec, Energir and Hydro-Québec signed a dual energy agreement from 2022 through 2045 to convert customers to electricity and natural gas and that the use of natural gas in the dual energy approach could be replaced by RNG and hydrogen. Using a dual energy approach that includes RNG is expected to reduce heating-related emission by 50% of 1990 levels and result in a savings of $1.682 billion as compared with full electrification of building heat. SNGME notes that in order to attain emission reduction targets, one must consider system efficiencies and losses as a whole. SNGME cites estimates from the U.S. Department of Energy (DOE), Energy Information Administration (EIA) that generating electricity from natural gas results in losses of approximately 55% of the available energy in the conversion process and that transmitting electricity over the grid to a secondary-voltage level customer represents additional losses of approximately 8% to 9%; however, using fuel directly at the end-use can significantly improve efficiency. DOE reports that modern conventional heating systems can achieve efficiencies as high as 98.5%.

SNGME cites the following regarding opportunities for RNG and Hydrogen:

- An ICF study, conducted for the American Gas Foundation estimates that by 2040, the US could achieve between 1,660 and 4,510 trillion Btus of RNG annually for pipeline injection, this is compared to 4,800 Btus average of total annual residential natural gas consumption between 2009 and 2018. It is estimated that such deployment of RNG could save between 101 and 235 million metric tons of GHG emissions by 2040.

- DOE's Energy Earthshot program was launched to reduce the cost of clean hydrogen to $1 per kilogram within 10 years.

- The Commission's Power-to-Fuel report required pursuant to Legislation noted that these types of facilities could complement the operation of certain renewable resources, most notably solar and wind, serving as a balancing resource and a sink for energy that might otherwise be lost or produced at suboptimal times and if properly sited could avoid or delay transmission and distribution system upgrades.

- Power-to-Fuel can be used to store renewable energy and serve as a dispatchable resource and can be a unique solution for a state such as Maine, where there are several high heating days, shifts in seasonal energy usage, a large amount of intermittent generation and transmission and distribution constraints.

In response to question 1 of the RFI, SNGME states there are reasonable opportunities to explore and consider engaging the execution of a ECRC or PESC. SNGME also notes the Commission should use its authority under 35-A MRSA §3803 (Beneficial Electrification Policy Act) to solicit proposals for long-term contracts for RNG or hydrogen produced with renewable resources or recommend the Legislature provide explicit support for such contracts. SNGME states that existing natural gas infrastructure is likely the most valuable energy asset as it provides firm, flexible capacity, especially as more intermittent resources are added, and demand increases due to electrification, and it is more reliable than other energy sources because it is less vulnerable to weather conditions. Additionally, SNGME states that the gas distribution network is the largest energy transportation and storage

system in the country holding over 1,200 billion kWhs, when the highest hourly peak demand on the U.S. electric grid ever recorded was just over 740 billion kWhs and could store energy for long periods of time (up to years) while providing energy on demand.

SNGME notes like the development of other technologies, long-term contracts are critical in supporting the initial establishment of the technology. Long-term contracts, such as those contemplated in §3803 could act as a hedge against the volatile natural gas market and potentially lower cost to Maine consumers, increase reliability, and lessen natural gas pipeline capacity constraints. In response to question 2, SNGME suggests soliciting input on this question directly from commercial and industrial customers, but notes the following:

- It is likely many industrial applications may not lend themselves to electrification opportunities.

- Burning natural gas, RNG or hydrogen, converting it to electricity and then transmitting that electricity is not as efficient as using the fuel directly for onsite applications.

- In many instances, industrial customers may be burning oil or even coal as their energy resource, so replacing the current source with RNG, hydrogen or even natural gas could produce significant emissions and economic savings.

The Coalition for Renewable Natural Gas (RNG Coalition)

The RNG Coalition states that it is broadly focused on the development of RNG, biogas-to-electricity, renewable hydrogen and renewable carbon dioxide, and supports the use of these resources directly in the energy sector, and as platform molecules for other fuels products. The RNG Coalition notes that it has a membership of over 390 entities, which includes organizations who operate throughout the supply chain for these renewable molecules and represents over 98% of RNG production in the US. The RNG Coalition states that it is important to recognize that using waste-derived renewable gases will provide environmental benefits across all sectors by increasing clean fuel supply, the capture and utilization of methane emissions from organic waste streams, and circularity in Maine's economy through recycling, the creation of bioproducts and carbon sequestration and that these activities support the tenets of the *Maine Won't Wait* climate action plan.

The RNG Coalition states that renewable gases, including RNG and renewable hydrogen are an important near-term decarbonization strategy for all applications which currently use fossil-derived fuels and, in the long-term, renewable gas use will be necessary in applications that have certain reliability requirements, or which are not well-suited to electrification.

The RNG Coalition states that the benefits of renewable gases in Maine include:

- The displacement of anthropogenic CO_2 emissions from fossil fuel combustion;
- The critical near-term GHG benefits of increased methane capture and destruction; and
- Additional environmental benefits that result from the improved management of organic waste.

The RNG Coalition recommends that Maine target the development of renewable gases in tandem with other technologies that will be required to fully meet decarbonization goals. RNG needs to be given significant attention because it already has well-proven technology readiness levels to be

created using various methods and is flexible because it can be interchanged with all conventional gas applications.

The RNG Coalition also states that in the mid- and long-term, hydrogen produced from renewable feedstock also needs to be viewed as essential to Maine's renewable gas mix. The use of carbon capture and sequestration (CCS) technologies paired with RNG, and hydrogen derived from organic waste will produce negative GHG outcomes. The RNG Coalition states that using renewable gas does not need to lead to net pipeline expansion beyond what is needed to connect these new sources of supply to the existing load. The RNG Coalition notes that many studies show the use of renewable gases is essential to decarbonization, but there is disagreement as to which sector will most need RNG to decarbonize.

The RNG Coalition articulates a vision of how RNG in Maine can best assist with decarbonization in the near-, mid-, and long-term and is as follows:

- Near-term: reduce methane emissions through new policies to deploy RNG quickly, including:
    - Building biogas and RNG facilities; and
    - Adopting a Renewable Gas Standard and/or Clean Heat Standard to incentivize project development and begin to decarbonize the gas system.
- Mid-term: begin to prioritize RNG use in hard to decarbonize sectors:
    - RNG facilities that are pipeline injected offer a flexible resource which can be sent to sectors which are best served by gaseous fuels rather than other decarbonization methods.
    - This choice becomes more important when remaining gas demand is closer to RNG supply; and
- Long-term: manage transition to hydrogen and CCS:
    - Consider transitioning bio feedstocks to the hydrogen molecule as the energy carrier once hydrogen transport infrastructure is developed; and
    - Couple hydrogen production with CCS to achieve carbon negative outcomes.

The RNG Coalition notes that in jurisdictions with similar decarbonization goals, Tradeable Performance Standard (TPS) have been effective in motivating RNG buildout and fuel switching. The RNG Coalition explains that a TPS sets a standard of technology performance but leaves technology choice to the program participants. The relative costs of technologies that are less beneficial to reduction of GHG emissions are higher than those technologies that are more beneficial to meet GHG emissions reductions. The RNG Coalition explains that specific to gas supply, some jurisdictions have instituted a Renewable Gas Standard, which establishes targets for total renewable gas throughput, and can include both RNG and renewable hydrogen. A Clean Heat Standard can be used to incentivize clean heat resources, and often includes electrification and geothermal infrastructure alongside renewable gases. The comment from the RNC Coalition provides examples from California and Minnesota and specifies that allowing gas utilities to invest broadly in renewable thermal infrastructure, dedicated hydrogen infrastructure, geothermal energy, and electrification could provide a pathway for the development and maintenance in a diverse, sustainable energy infrastructure that can serve Maine's future needs.

The RNG Coalition states that biogas and RNG are unique in their near-term ability to reduce methane, which is a potent GHG created by society's waste stream. By using methane from organic

waste as a resource improves methane capture and organic waste management systems. Estimated costs of reducing methane emissions through the creation of RNG show RNG is likely a cost-effective GHG reduction strategy and its cost-effectiveness is increased when one factors in the methane reduction benefits. The RNG Coalition states that given the expected increase in municipal solid waste and population globally, paired with Maine's GHG reduction goals, there is a need for the State to help pioneer the development and commercial deployment of viable technologies.

The RNG Coalition notes that the Environmental Protection Agency (EPA) ranks anaerobic digestion as the fourth highest use category for food waste. Producing biogas and RNG through anaerobic digestion of materials such as food waste, animal manure and wastewater also yields valuable by-products including animal bedding, organic fertilizer, and soil amendments that can eliminate PFAS, while achieving carbon-negative outcomes.

The RNG Coalition notes that Maine's fourth largest source of energy is conventional natural gas and that ICF estimates that Maine's potential to produce RNG from anaerobic digestion sources is on the order of 6.9-22.5 trillion Btu (tBtu)/year, which could satisfy 39% of Maine's total current natural gas demand. The RNG Coalition also notes that RNG can also be produced via gasification of feedstocks such as agricultural residue, forestry and forest product residue, and energy crops; however, this process does not have the same methane emissions reduction benefits but does provide the benefit of incentivizing improved management of these feedstock streams. This gasification of feedstock in Maine has been estimated by ICF to potentially add 6.4tBtu/year to RNG supply.

In its comment, the RNG Coalition cited several studies and programs that outline the role of RNG in economywide decarbonization, including:

- The Intergovernmental Panel on Climate Change which states that methane capture and recovery from solid waste management is a short-term win-win policy that simultaneously improves air quality and limits climate change and that certain sectors that are not currently amendable to electrification, such as aviation, will need to include alternative fuels such as hydrogen or biofuels as a GHG mitigation strategy.

- The EPA has supported biogas recovery for use as RNG under programs such as the Landfill Methane Outreach Program (LMOP), AgSTAR and the Renewable Fuel Standard and that the EPA's LMOP website notes the benefits of RNG as a resource which utilizes existing infrastructure, supports local economies, provides local air quality benefits compared to fossil fuel resources, and reduces GHG emissions through methane destruction and fossil fuel displacement.

- Canada, in a number of policies and plans, has recognized the role of clean fuels, including hydrogen, advanced biofuels, liquid synthetic fuel and RNG in meeting climate goals, especially for those sectors harder to decarbonize such as industry and medium- and heavy-duty freight. Furthermore, an economy-wide strategy in Canada's 2030 Emissions Reduction Plan to reduce GHG emissions, includes clean fuels and methane emissions reductions as a flexible and cost-effective way to meet climate targets. Canada has also joined the Global Methane Pledge to reduce anthropogenic methane emissions across all sections by at 30% below 2020 levels by 2030.

- Europe has long supported RNG under the Renewable Energy Directive (RED) framework and recent revisions known as the Hydrogen and Decarbonized Gas Package reinforce support for renewable gases as a key GHG reduction strategy. Additionally, individual European Union members have high biomethane blend rates. Denmark aims to meet 75% of its gas demand from RNG by 2030 and by 2034, RNG production is expected to cover all Danish gas consumed on a daily basis. Following aggression against Ukraine by Russia, the European Union (EU) called for a rapid phase out of Russian fossil fuels as this highlighted the EU's over-dependence on gas, oil and coal imports from Russia. As part of the action plan, Europe aims to achieve 35 billion cubic meters of annual RNG production by 2030, which is over 20% of the current EU gas imports from Russia. The EU has also joined the Methane Pledge.

- The International Energy Agency's (IEA) in its Net Zero by 2050 report projects that to reach carbon neutrality, global RNG use needs to increase seven times from 2020 levels by 2030 and over 27 times 2020 levels by 2050 and specifies that a key advantage to RNG is that it can be used utilizing existing pipelines and end-user equipment. This report also stated that governments need to prioritize the co-development of biogas upgrading facilities and biomethane injection sites by 2030.

- California, which has one of the most ambitious GHG reduction targets, identifies increasing methane capture at landfills and dairy digesters as a key GHG abatement strategy. The strategy also includes the use of RNG across different sectors.

- Columbia University's School of International Public Affairs Center on Global Energy Policy study focusing on the use of existing gas system in a carbon neutral world, states that that investments in existing infrastructure can achieve wider storage and delivery of cleaner gases while lowering the overall cost of transitioning to carbon neutral world.

- The World Resources Institute (WRI) also highlighted how RNG fills an important niche as part of a broader low-carbon technology portfolio. Like others reports and plans, the WRI also recognized that RNG has the potential to reduce methane emissions from organic wastes and provides fuel for applications that lack low-carbon alternatives and is a flexible source.

- Energy and Environmental Economics' (E3) analysis conducted for proceedings in several states has identified switching to low-carbon fuels as one of the four pillars of decarbonization and that even in high-electrification scenarios, there is significant demand for gaseous fuels in 2050.

- A study conducted in NYC outlines three pathways to achieve carbon neutrality in the City and all three outline the use of renewable gas as essential to achieve carbon neutrality, even the pathway that contemplates the highest use of electrification.

The RNG Coalition notes there are two distinct GHG emission accounting approaches that are commonly employed in regulatory programs for bioenergy: the "point-source biogenic CO_2 emission are carbon neutral" approach; and the "lifecycle" approach and that programs built on the lifecycle analysis are more likely to produce better incentives for biofuels and bioenergy. The RNG Coalition

states that analyses of RNG, hydrogen, and other energy resources under consideration Maine should rely on proven lifecycle approach tools.

The RNG Coalition also notes that the transition away from traditional energy sources can lead to the creation of high paying jobs and benefits to the economy.

The Northeast Gas Association (NGA)

NGA states that they and their members are committed to being part of Maine's green energy future and that they believe RNG, as well as other emerging technologies and decarbonization strategies can play a crucial role in that future. NGA, through their Infrastructure Optimization Committee is focused on enabling the introduction of green gaseous fuels into the gas network. NGA notes that they, in collaboration with members and other national organizations released the "Interconnect Guide for Emerging Fuels into Energy Delivery Networks" to assist with the introduction of emerging fuels, like RNG and hydrogen in the natural gas distribution network.

Like other commenters, NGA notes the benefits of RNG and other emerging technologies in ensuring reliable, affordable energy for Maine residents and include fuel security, economic revenues or savings, local air quality and GHG emission reduction, all while utilizing existing natural gas infrastructure. Like other commenters, NGA also cites natural gas supply constraints in New England and how those constraints create significant risks to the region in winter months to both the electric grid and in meeting heating demands. NGA states absent expanded pipeline capacity, the development and use of RNG and blended hydrogen offers an opportunity to diversify and increase the energy supply for the State. NGA notes that natural gas usage for both electricity generation and home heating has increased in recent years displacing to some extent the use of more polluting fuel sources, such as oil.

NGA also notes that RNG and hydrogen can play a significant role in decarbonizing transportation and hard-to-electrify industries. Citing a report from the RNG Coalition, NGA states that in 2022 RNG as a transportation fuel "lowered GHG emissions equivalent to 13,962,760 miles driven by the average passenger car" and use of RNG in the transportation sector has increased 218% over the last five years.

In relation to decarbonizing hard-to-electrify activities, such as in the maritime sector and industrial applications requiring high temperature or high energy density (aluminum, glass and ceramics manufacturing and steel production), NGA notes that RNG can play a critical role because electrification is challenging for these purposes.

Like several other commenters, NGA notes that there is no one solution to meet decarbonization goals and all options should be explored through demonstration projects in multiple regions in the State. NGA also believes other technologies and practices are worth considering, including hybrid heating, using high efficiency heating systems combined with air sourced heat pumps, which may reduce upfront and ongoing operating costs for homeowners and business and provides energy reliability. NGA also notes that geothermal heating and cooling is another technology that warrants further evaluation for various applications in the State.

Office of the Public Advocate (OPA)

In response to question 1 of the RFI, the OPA notes the Commission's past activities related to ECRCs and PESCs and states the Commission could issue a request for proposals (RFP). However,

the OPA notes their skepticism that an ECRC could materially enhance natural gas transmission capacity into the State or into the ISO-NE region or that additional capacity will be economically beneficial to both electricity and natural gas consumers or that the benefits of an ECRC would outweigh the costs as required by 35-A M.R.S. § 1904(2)(A). The OPA notes that in the past Docket exploring a PESC the Commission found none of the proposals satisfied statutory requirements and another RFP would likely produce the same result.

The OPA states that before investing in additional pipeline capacity, we need to ensure that doing so is feasible, cost effective and consistent with achieving Maine's climate goals. The OPA states that an overall framework for how the natural gas industry should operate in the future while considering the State's climate goals should be developed, like the undertaking recently completed in Massachusetts. The OPA cautions the Commission against encouraging further investment in natural gas pipelines at this time because of the growing risk that some of the natural gas infrastructure will become "stranded" due to the pressure to phase out all fossil fuels and those costs may be borne by ratepayers.

In response to question 2 of the RFI, the OPA notes the State's Beneficial Electrification Act and the policy goal of phasing out natural gas in commercial and industrial settings and replacing that natural gas usage with electric technologies where practical. The OPA notes it is open to considering other alternative technologies, such as hydrogen or geothermal, and energy efficiency technologies suitable for industrial use, but has not developed any specific recommendations. As identified in Massachusetts, non-gas pipeline alternatives, including electrification, thermal networked systems, targeted energy efficiency, demand response, behavior change and market transformation, can help minimize gas system investments that could become stranded in the future.

In response to question 3 of the RFI, the OPA states that they will look for opportunities to participate in regulatory proceedings which could affect regional natural gas and electric prices. The OPA also states that to the extent that renewable gas projects are economically viable, consistent with the State's climate goals, and the cost of these alternatives are in line with the cost of geologically derived natural gas, then Maine's LDCs should be encouraged to pursue these alternatives.

Enbridge, Inc. (Enbridge)

Enbridge is an energy infrastructure company with strategic business platforms that include an extensive network of natural gas and liquids pipelines, regulated natural gas distribution utilities and renewable power generation. Enbridge notes that is journey in the energy transition stated two decades ago with wind, solar and geothermal investments onshore in North America and more recently offshore in Europe, as Enbridge has recognized the important role that both renewable energy and natural gas would have in the future energy mix and has invested over $8 billion and built a portfolio of 8.4 GW of gross renewable power generation. Enbridge notes that they were the first to commission a utility-scale electrolyzer in 2018 in North America (Markham, Ontario facility) and was the first company in 2021, in North America to blend hydrogen into their existing gas distribution system, with a 2% blend supplying 3,600 homes.

Enbridge encourages Maine to evaluate RNG and low-carbon hydrogen and incentivizing the use of RNG would provide sustainable outlets for difficult to decarbonize waste streams, such as food and farm waste, while satisfying the growing demand for natural gas. Enbridge cites a study by ICF that

estimates that the potential of RNG in Maine is approximately 38.8 TBtu/year, which is enough to fully meet all of Maine's residential and commercial natural gas demand based on 2022 usage levels.

Enbridge states that as solar and wind development begins to represent a larger share of Maine's power generation portfolio, that hydrogen presents an opportunity to effectively store and utilize renewable energy that would otherwise be curtailed in the absence of demand. The produced hydrogen could be used to meet supply demands, while simultaneously decarbonizing supply and creating an economic outlet for curtailed renewable energy.

Using RNG and hydrogen allows Maine to leverage existing infrastructure reliably, and cost effectively deliver cleaner energy to residential, industrial and commercial customers while meeting decarbonization goals.

Like the RNG Coalition, Enbridge encourages Maine to apply a lifecycle carbon accounting methodology to evaluate carbon emissions from various fuel sources and technologies to ensure that global emissions are truly being reduced instead of narrowly focusing on specific State or sector inventory of emissions.

Enbridge also notes the need to use natural gas-fired generator to meet demand on short notice, as the production of renewable energy is subject to significant variability and is intermittent. Enbridge too notes how constraints in the region pose issues, especially during peak demand periods and that the lack of firm transportation mean gas-fired generators do not always have guaranteed access to their primary fuel source, creating price volatility and reliability issues for electric consumers. This could lead to an increase in carbon emission because more carbon-intensive fuels are required for power generation due to limitations on natural gas supplies.

Enbridge specifies that is would be beneficial to:

- Study the use of RNG and hydrogen within existing pipeline infrastructure to decarbonize supply to residential, commercial and industrial end users;

- Undertake a life cycle analysis of all proposed solutions to ensure recommended approaches are optimal from an overall climate perspective;

- Carefully analyze the impact of increased electric load and penetration of intermittent renewables on affordability and reliability, with a particular focus on available gas pipeline capacity to support this transition; and

- Study the opportunity for hydrogen production and blending as an alternative to renewables curtailment as Maine builds out renewable resources.

Northern Utilities, Inc. d/b/a Unitil (Northern)

In response to question 1 of the RFI, Northern acknowledges previous efforts related to ECRCs and PESCs, but provides no specific information on this topic.

In response to question 2 of the RFI, Northern notes that in addition to the use of RNG and hydrogen, networked geothermal systems have the potential to leverage steady ground temperatures as an energy source. Northern also notes that commercial and industrial customer could also reduce their GHG emissions while consuming natural gas or RNG by using gas heat pumps to reduce energy

demand and by using carbon capture technology to directly capture and repurpose emitted carbon dioxide.

Northern cites information from the RNG Coalition that there are currently 311 RNG facilities in operation, 176 are under construction and another 313 are planned in the US and Canada. RNG has been mainly developed to pursue transportation sector incentives provided by federal and state compliance programs. Additionally commercial and industrial customers purchase RNG in voluntary markets. Some states have established RNG procurement targets upon a finding that RNG provides benefits to natural gas utility customers.

Northern explains that RNG typically results in the direct reduction of GHG emissions that would occur as part of the waste stream, because those emissions are instead captured and used to produce RNG. Once processed and consumed, RNG essentially removes emissions of methane, leaving only carbon dioxide emissions after the fuel is combusted. Northern, like the RNG Coalition, also notes the other benefits of RNG production.

Northern notes that Unitil adopted its own gas quality and delivery point standards for non-traditional sources of gas in anticipation of the potential interconnection of RNG project and to facilitate the direct interconnection of RNG into gas distribution systems in Maine, New Hampshire and Massachusetts.

Northern notes that hydrogen produced from low- or no-carbon sources is another potential replacement energy source and it emits no GHGs when combusted and that the DOE announced initial awards for projects that will be working towards production, delivery, storage and end-use of clean hydrogen.

Northern also provides information on networked geothermal systems, and how these systems involve connecting individual customer heat pumps to a water filled pipeline loop rather than to individual customer geothermal wells or an air source heat pump (although there are other configurations). These network loops can serve residential neighborhoods but can also incorporate commercial and industrial heating and cooling loads. Northern notes that efficiencies can be gained by adding diverse energy users to a common network that allows customers to swap heating and cooling. Northern does note that there are limitations to the deployment of networked geothermal systems, such as geology, including the consideration of aquifers and bedrock, as well as proximity of potential customers to be connected. Northern notes that Eversource and National Grid are implementing network geothermal pilot programs in Massachusetts.

Northern also highlights gas absorption heat pumps (GAHP). This technology has a lengthy history in Europe and is currently commercially available in the US. Northern cites that GAHPs produce more energy than they consume, but that air source heat pumps (ASHP) have a higher coefficient of performance. However, Northern notes that GAHPs consume gas directly without any loses, while ASHPs rely solely on electricity and when used in regions that rely heavily on natural gas for generation the coefficient of performance between the two technologies are comparable. GAHPs also require less power to operate which may avoid the need for costly power service upgrades during installation. Additionally, GAHPs use ammonia and water as the refrigerant which, in the event of leak, would have zero GHG impacts, as compared to ASHPs, which typically use a hydrofluorocarbon refrigerant which would have a GHG impact if there was leak. GAHPs can be used to heat and cool moderately sized buildings, such as schools, assisted living facilities, multi-unit

residences, hotels, hospitals, restaurants, laundromats, swimming pools and can run on natural gas, propane or a blend of natural gas and hydrogen. GAHPs can also be connected to networked geothermal systems. Northern notes that some manufacturers are designing GAHPs that will run 100 percent on hydrogen.

Northern also provides details on CCS for use in commercial and industrial settings.

In response to the third item in the RFI, Northern notes that in 2024 it will complete a 14-year program in which they will replace all cast iron pipes on its system. This effort will improve the integrity of the distribution system, improve safety and reliability and reduce methane emissions. Northern notes that natural gas is the cleanest of all fossil fuels, emitting approximately 30 percent less GHG gas than delivered fuels and virtually no air quality criteria pollutants. Northern cites that nationwide, methane emissions from natural gas utility distribution systems have declined by 70% since 1990 even as natural gas utility companies added more than 760,000 miles of pipeline.

Conservation Law Foundation (CLF)

CLF, a nonprofit advocacy organization committed to protecting New England's environment for the benefit of all people, notes that a substantial component of their work on behalf of their members is directed to ensuring that Maine achieves its decarbonization targets set forth in 38 M.R.S. § 576-A. CLF notes that given significant contributions of Maine's buildings to GHG emission, particularly through heating, natural gas use in Maine over the next several decades is central to CLF's advocacy.

CLF provided a recent report they produced called "*Limited Careful Use: The Role of Bioenergy in New England's Clean Energy Future."* CLF notes that this report is particularly relevant to question 2 posed in the Commission's RFI and presents an important viewpoint of the issues that may otherwise be missing from this RFI.

The CLF report notes that states, the federal government, and other decisionmakers should embrace a fuel-saving industrial policy that advances these strategies as aggressively as possible:

1. New all-electric building standards for most building classes (buildings that may require fuels for resiliency or high-temperature uses should carefully evaluate whether or not such fuels are best met with pipeline gas or an alternative like propane to avoid stranded asset risks associated with expanding the gas system);
2. Firm yet adaptable zero emissions vehicle, appliance, and heating equipment targets (e.g., policies implemented by California and New York);
3. Sufficient incentives to bridge funding gaps between conventional combustion-based equipment and electric and efficient buildings;
4. Modernization and decarbonization of the electrical grid to support and respond to increasing consumer demand for electrification (increase distribution capacity, add renewables, and enhance reliability and resiliency);
5. Aggressive energy efficiency (e.g., building shells, thermal networks) and flexible electric system measures to moderate the costs of grid modernization and electrification while improving building habitability;
6. Workforce and supply chain development to support the above strategies; and
7. Gas system rightsizing to reduce costs associated with maintaining aging and, because of electrification, increasingly redundant utility infrastructure

The report by CLF specifies that the appropriate role of bioenergy is a limited and targeted one. Unlike other commenters, the CLF report states that the indiscriminate use of bioenergy in the electricity and heating sectors can undermine efforts to decarbonize, and in some cases, results in emissions that are more climate damaging than fossil fuels. This is particularly true when it comes to fuels that might replace natural gas in end-uses that will be electrified. In these cases, it could be both cheaper and cleaner to continue using fossil fuels until the use can be electrified, instead of temporarily adopting a bioenergy strategy. Furthermore, in their analysis of the environmental effects of using biogas and RNG, the CLF report, using GWP-20 (global warming potential over 20 years) found that biogas and RNG become the "least climate friendly" option; however, using the historical method to account for the climate impacts of GHGs of GWP-100 (global warming potential over 100 years) these fuels appear much more climate friendly. The report notes "given the pressing need to reduce greenhouse gas emissions over the next 20 years to forestall the worst effects of climate change, this difference is significant and that shifting to the use of GWP-20 would more accurately reflect the warming effects methane is having now and over the next three decades while discounting future warming and broader impacts of CO_2 emissions such as ocean acidification.

The CLF report does specify that bioenergy may have a role to play in industries and transportation that are hard to electrify, such as aviation or shipping; however, even with limited use of bioenergy it will be important to scrutinize the climate-damaging emissions and other impacts from the fuels' production, transportation, and ultimate use. The CLF report notes that when implemented with the appropriate safeguards, the production of bioenergy from waste resources delivers some modest climate benefits, but that the production of bioenergy cannot be dependent upon intentionally cultivated resources as the overuse of agricultural land can result in impacts to food production or in the clearing of forests, which reduces the forests' inherent ability to soak up carbon. The CLF report also cautions against relying on currently abundant waste materials, as demand for these waste streams could increase, and a more efficient way to address these waste streams is through better waste policies that could decrease their production.

The CLF report states the combustion of alternative fuel is not a substitute for clean electrification. However, where storage, demand shifting, and imported electricity from other regions are not capable of covering the full scope of our electricity generation needs, modeling does acknowledge a minor role for maintained combustion-based electricity generation until there are cleaner technological options. These technologies include green hydrogen combustion, hydrogen fuel cells, enhanced geothermal, small modular nuclear, and carbon capture and storage, all of which currently face significant cost and practical barriers in the region.

As the region moves towards 2025, The CLF report addresses the question of what combustible fuels should be targeted for use in those small number of cases where electrification with current technology is not an option. The report states that:

> Generally, locally available bioenergy should be prioritized for hard-to-electrify end-uses like aviation fuel. Limited strategic use of fossil fuels will be a preferable transition strategy in other cases where combustion is still necessary. Pipeline-quality RNG, for example, has a very high production and purification cost that, relative to the cost of fossil gas, exceeds the social cost of carbon and the emissions abatement costs of other fuels. Its production and use require infrastructure that will be increasingly underutilized over time as the buildings

> sector, writ large, electrifies. A policy assumption that gas can be decarbonized will delay necessary decisions to right size the gas system to manage its costs better. RNG production assets and gas distribution infrastructure are significantly at risk of being underused in a deeply electrified future, at the expense and responsibility of ratepayers. The feedstocks for RNG can instead be used to produce higher-value fuels and products, and such feedstocks are of limited supply.

The CLF report notes that while there is a "supporting transitional role for combustion, it is also clear that even a modest degree of electrification will severely challenge the long-term financial viability of the gas system. Transitioning away from gas use in a coordinated way will be important to avoid utility death spirals, in which an unmanaged transition results in fixed gas system costs being borne by the few likely-lower-income consumers who are unable to migrate to clean technologies." While managing the implications of transitioning away from gas use is being actively explored in Massachusetts and Rhode Island the CLF report includes how this transition will need to proceed on three fronts.

- First, given the emerging cost-effectiveness of all-electric, high-performing buildings, it is clear that continued expansion of the gas system is misguided and could lock in combustion infrastructure that will be costly to convert in the future.
- Second, New England states currently accelerating the process of replacing leak-prone pipes should seek out opportunities to avoid reinvestment in gas distribution systems, given that the increasing cost of pipeline replacement projects typically exceeds the cost of electrifying connected buildings on affected street segments.
- Finally, given an increasingly electrified and efficient building stock, coordinated zonal transition strategies – such as those being implemented in parts of Europe – will be needed to leverage local energy thermal resources, construction of energy networks, and optimized upgrading of the electrification system.

Like other comments, the CLF report does specify that a life-cycle assessment can be a useful tool for calculating greenhouse gas emissions from bioenergy and other energy sources, but only if the focus is on accurate and transparent emissions accounting with the goal of facilitating genuine decarbonization. It is noted in the report that life-cycle assessments can also be misleading when constructed poorly, applied in vague situations, or used by those with the intent of promoting a particular energy strategy. The report notes that a direct life-cycle comparison of RNG to fossil gas shows that it may provide modest reduction of greenhouse gases relative to fossil methane – but a lot depends on leaks and avoided feedstock emissions. The report notes when this is evaluated more comprehensively there are significant deficiencies in its use as a decarbonization strategy. An analysis conducted by the Massachusetts Executive Office of Energy and Environmental Affairs demonstrated that decarbonization of pipeline gas is the most expensive emissions abatement action. The report states that using RNG for building heat would be an expensive misallocation of bioenergy resources that are better suited for decarbonizing other sectors.