



Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty

Supplemental Filing to the Integrated Resource Plan,

2022/2023 through 2026/2027

May 1, 2023

TABLE OF CONTENTS

I. Overview	1
II. Statutory and Regulatory Requirements	1
III. Assessment of Plan Impacts	2
A. Impact on State Compliance with Clean Air Act of 1990	2
B. Assessment of Environmental, Economic, and Health-related Impacts	2
C. Consistency with State Energy Strategy	10
IV. Distribution System Planning	11

I. OVERVIEW

This filing presents supplemental information to the 2022 Integrated Resource Plan (“IRP” or “2022 IRP”) for Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a/ Liberty (hereinafter referred to as “Liberty” or the “Company”) for the five-year forecast period from 2022/2023 to 2026/2027, which was submitted for review by the New Hampshire Public Utilities Commission (the “Commission”) on October 3, 2022, in Docket No. DG 22-064. Consistent with the Commission’s directives in Order No. 26,684 (Sep. 14, 2022) (the “2017 IRP Interim Order”) and Order No. 26,702 (Oct. 12, 2022) (the “2017 IRP Final Order”), this supplemental filing to Liberty’s 2022 IRP presents the remaining statutory and regulatory requirements pursuant to New Hampshire’s Revised Statutes Annotated (“RSA”) 378:38 through RSA 378:39, as well as additional information regarding the Company’s distribution system planning.

II. STATUTORY AND REGULATORY REQUIREMENTS

RSA 378:38, titled “Submission of Plans to the Commission,” requires gas and electric utilities to “file a least cost integrated resource plan [which] shall include, but not be limited to, the following, as applicable”:

* * *

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

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

VII. An assessment of plan integration and consistency with the state energy strategy under RSA 12-P.

In the 2017 IRP Interim Order, the Commission provided the following guidance regarding Liberty’s assessment of the environmental, economic, and health-related impacts of its IRP on the state as required under RSA 378:38:

- “The Commission does not oppose analyses of the environmental impact of greenhouse gas emissions and finds such analyses would be within the LCIRP statute under RSA 378:38, VI and RSA 378:39. We understand this to include the leakage of natural gas and other pollutants from the Liberty distribution system in New Hampshire... This consideration, however, must be grounded in the direct operation of the Liberty system in our State and not second or third-order impacts which are beyond the scope of the LCIRP.” (2017 IRP Interim Order, at 7)
- “Liberty should assess the health-related impacts of the emissions resulting from leakage (also known as “lost gas” or “unmetered gas”) occurring in its distribution system in New Hampshire. Such an assessment would properly fall within the scope of an LCIRP under RSA 378:38, V and RSA 378:39. This assessment should be based on state and federal government reports and peer-reviewed and publicly available reports concerning the public health impacts of emissions at levels similar to those resulting from leakage from Liberty’s distribution system.” (2017 IRP Interim Order, at 7)

- “Liberty should assess the economic impacts of its distribution system operation and its system upgrades by reporting on direct jobs attributable to Liberty’s operations over the last 20 years. Such an assessment would be appropriate under RSA 378:38, VI and RSA 378:39. To the extent that Liberty believes that any of the supply options being considered would create jobs in New Hampshire, Liberty should estimate the direct jobs that would be created by utilizing recent trends and past experience.” (2017 IRP Interim Order, at 8)

Liberty addresses these statutory elements in the sections that follow.

III. ASSESSMENT OF PLAN IMPACTS

A. Impact on State Compliance with Clean Air Act of 1990

The federal Clean Air Act requires the U.S. Environmental Protection Agency (“EPA”) to determine the National Ambient Air Quality Standards (“NAAQS”) for six common air pollutants (i.e., sulfur dioxide, carbon monoxide, nitrogen dioxide, ozone, lead, and particulate matter) and to designate an entire state (or areas within a state) as in “attainment” or “nonattainment” of the designated standard for each of the pollutants. New Hampshire has adopted the NAAQS pursuant to Env-A 300, Ambient Air Quality Standards;¹ and fulfills its requirement to attain and maintain the air quality standards through its state implementation plan (“SIP”). The New Hampshire SIP is developed by the New Hampshire Department of Environmental Services (“NH DES”) and reviewed and approved by the EPA. The NH DES operates a network of monitoring stations to measure and track air pollution throughout the state to establish compliance with the NAAQS. New Hampshire’s air quality currently meets all federal air quality standards.²

As discussed in Section II.B below, Liberty’s continued focus on the replacement of leak-prone pipe in its natural gas distribution system, which contributes to emissions reductions, has positive impacts on the state’s air quality. In addition, customer conversions to natural gas from higher carbon-emitting fuel sources (e.g., oil or propane)³ generally has positive impacts on air quality.

B. Assessment of Environmental, Economic, and Health-related Impacts

1. Environmental and Health-Related Impacts of Emissions

As discussed by the EPA in its Endangerment Finding study,⁴ the impacts of greenhouse gas (“GHG”) emissions on public health and the overall climate and environment include:

¹ See, <https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/env-a-300.pdf>.

² See, <https://www.des.nh.gov/air/state-implementation-plans/criteria-pollutants>.

³ See, https://www.eia.gov/environment/emissions/co2_vol_mass.php.

⁴ U.S. Environmental Protection Agency, 40 CFR Chapter I: Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act; Final Rule; December 15, 2009. See, also, National Association of Regulatory Utility Commissioners, “Sampling of Methane Emissions Detection Technologies and Practices for Natural Gas Distribution Infrastructure: An Educational Handbook for State Energy Regulators,” July 2019, at 15-17.

- Impacts on climate change and temperatures with an increasing trend in the number of abnormally hot days and heat waves, which may increase the risk of heat-related mortality and morbidity.
- Changes in air quality with increases in ozone pollution and hazardous air pollutants, which may affect respiratory and cardiovascular symptoms and conditions, such as asthma, and may cause respiratory irritation and nervous system effects, such as headaches and dizziness in humans;
- Increases in the occurrence and intensity of extreme weather events, such as hurricanes, tropical storms, floods, drought, and wildfires, which may increase the risk of disease and physical harm and injury, as well as the risk of mental illness from the social disruption brought upon by extreme weather events;
- Increases in climate sensitive diseases, including tick-borne diseases and food and water-borne pathogens, as well as changes in aeroallergens, which may increase the prevalence of allergenic illnesses and severity of allergy symptoms; and
- Climate-related health effects on Environmental Justice and vulnerable populations, including children, elderly, poor and low-income individuals, disabled and individuals with poor health.

The New Hampshire Ad Hoc Emissions Commission also found that “the data presented suggest that climate-related exposures and climate-sensitive diseases are frequently clustered in areas of the state that are already more vulnerable with respect to income, age, education, race/ethnicity, and disability status.”⁵ This is corroborated by a recent independent study on local distribution companies (“LDCs”) in Massachusetts, which identified that minority, low-income, and limited-English speaking households waited longer periods to receive repairs for reported leakages.⁶

In addition, consistent with the EPA’s findings, a report from the University of New Hampshire concluded that the effects of climate change in New Hampshire: “are likely to negatively impact public health outcomes such as heat-related morbidity and mortality, respiratory illness, allergies, vector-borne disease, foodborne disease, waterborne disease, health behaviors/chronic disease, and mental health or stress-related disorders, which can greatly increase medical costs.”⁷

While assessments of the health-related impacts of emissions are generally qualitative in nature, a March 2018 study released by the NH DES provided estimates for the potential public health-related and economic costs associated with certain air pollutants based on EPA data. At a high level, the NH DES noted that, “Despite the improvements in air quality, air pollution in New Hampshire is estimated to have cost residents and businesses of New Hampshire over \$3 billion per year from 2013 to 2015 in health care costs and lost productivity.”⁸ The NH DES study estimated the median economic valuation of various health-related events due to air pollution, such as one premature death costs \$9,350,000, one hospital

⁵ New Hampshire Ad Hoc Emissions Commission, Final Report 2020, at 10.

⁶ See, Marcos Luna, Dominic Nicholas, “An environmental justice analysis of distribution-level natural gas leaks in Massachusetts, USA,” Energy Policy 162 (2022).

⁷ Semra Aytur, John Bucci, Cameron Wake, “Climate Change and Human Health in New Hampshire: An Impact Assessment,” University of New Hampshire, at 40.

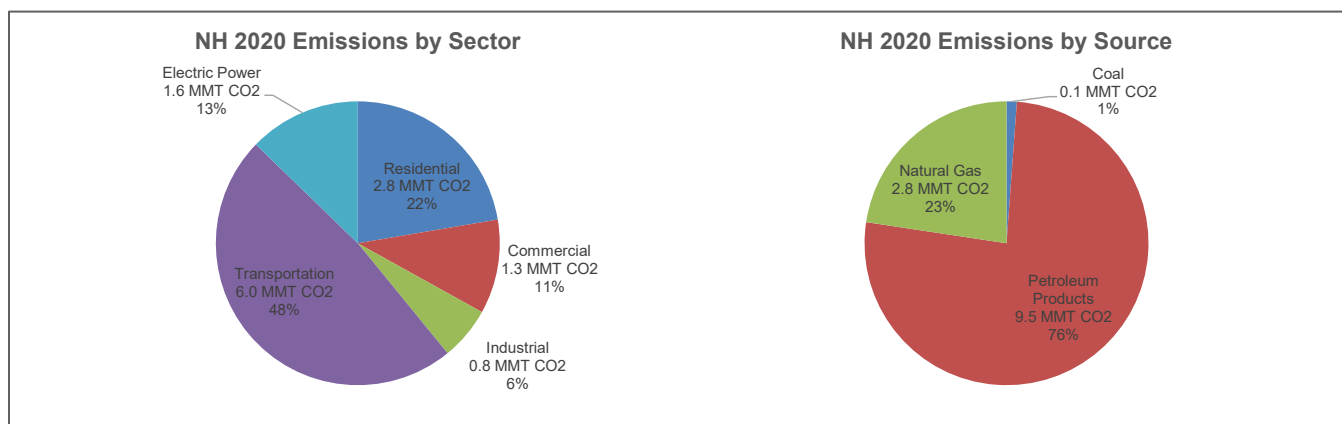
⁸ New Hampshire Department of Environmental Services, “State of New Hampshire Air Quality – 2017: Air Pollution Trends, Effects and Regulation,” March 2018, at 11.

admission for respiratory issues costs \$37,000, and one lost work day costs \$150.⁹ An updated December 2021 study released by NH DES indicated that air quality has improved with all areas of the state currently meeting federal air quality and health standards, with a positive air quality outlook over the next 10 years. Furthermore, NH DES concluded that, “Ensuring current health standards are met... could provide additional health valuation benefits, an average of \$1.6 million per year based on the past five years. Should the air quality get even cleaner than currently required, there will be additional benefits, up to \$3 billion per year in health-related benefits.”¹⁰

Liberty has not conducted its own detailed study to estimate the environmental and health-related impacts of emissions resulting from leakage occurring in its distribution system; however, Liberty quantifies and provides contextual background regarding the Company’s emissions relative to state-wide emissions levels below.

As reported by the U.S. Energy Information Administration (“EIA”), there were approximately 12.4 million metric tons (“MMT”) of state energy-related carbon dioxide (“CO₂”) emissions in New Hampshire, which represents approximately 0.3% of the total U.S. energy-related emissions and “ranks 8th-lowest in per capita energy-related carbon dioxide emissions in the U.S.”¹¹ Figure 1 below illustrates the energy-related emissions by sector and fuel source for New Hampshire. Specifically, as shown in Figure 1, the transportation sector accounted for the largest proportion of emissions, and petroleum products were the primary source of energy-related emissions. Emissions from natural gas represented approximately 23% of the total state energy-related emissions – with roughly half attributable to the electric power sector and the remainder attributable to the combined residential, commercial, and industrial segments (i.e., the traditional LDC sector).

Figure 1: New Hampshire 2020 Energy-related Carbon Dioxide Emissions¹²



⁹ New Hampshire Department of Environmental Services, “State of New Hampshire Air Quality – 2017: Air Pollution Trends, Effects and Regulation,” March 2018, at 65. Note: The NH DES estimates of the economic impacts of health-related events were based on the 2015 Ozone Regulatory Impact Assessment from the U.S. EPA.

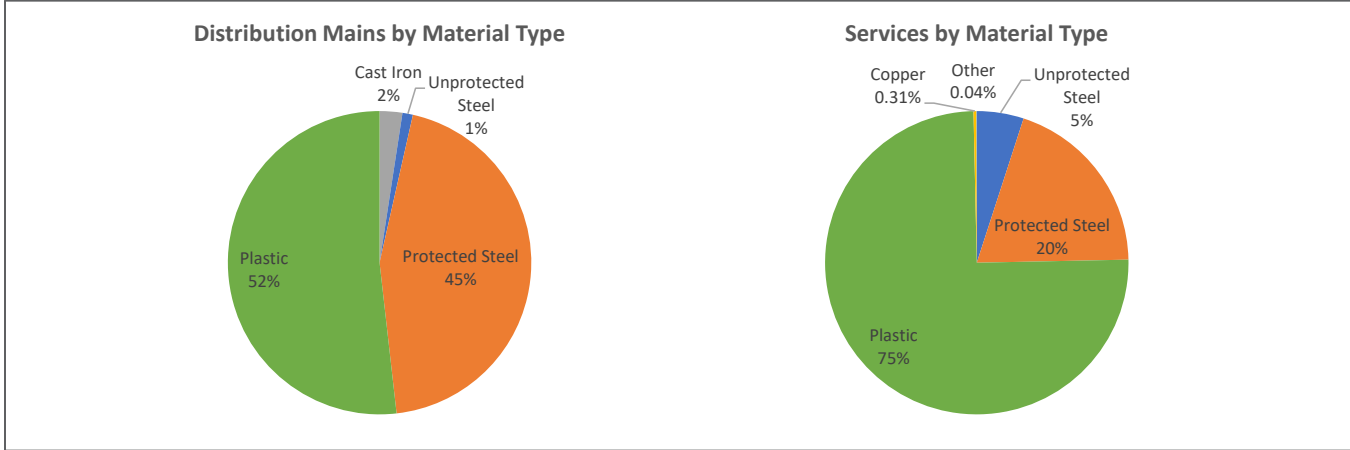
¹⁰ New Hampshire Department of Environmental Services’ State of New Hampshire: 2020 Air Quality Update,” December 2021, at 28.

¹¹ See, New Hampshire Department of Energy, “New Hampshire 10-Year State Energy Strategy,” July 2022, at 21.

¹² U.S. Energy Information Administration, Energy-Related CO₂ Emission Data Tables, October 11, 2022, <https://www.eia.gov/environment/emissions/state/>.

Prior to quantifying Liberty-specific emissions levels associated with the leakage of natural gas and other pollutants from its distribution system, a summary of the distribution system is provided for appropriate context. As discussed in the 2022 IRP, Liberty’s distribution system consists of 1,445 miles of natural gas distribution pipeline to serve approximately 98,000 customers in central and southern New Hampshire.¹³ Figure 2 below shows the Company’s gas distribution mains and services are largely comprised of plastic and cathodically-protected steel materials. Cast iron and bare steel pipes, which are targeted for replacement as part of the Company’s leak-prone pipe projects (discussed below),¹⁴ represent less than 5% of Liberty’s distribution mains and services.

Figure 2: Liberty’s 2022 Distribution Mains and Services by Material Type¹⁵



In addition, Liberty owns and operates a propane-air and natural gas distribution system in Keene to serve approximately 1,200 customers in the Keene Division, which is not connected to the Company’s larger distribution system. The approximately 29-mile propane-air and 2-mile natural gas distribution system serving the Keene Division is predominantly comprised of plastic materials.¹⁶

On an annual basis, the Company reviews the performance of its distribution system as it relates to the integrity of its pipes, which includes an analysis of leak activity. As summarized in Commission Staff’s recommendation to terminate the Cast Iron Bare Steel (“CIBS”) replacement program in 2019: “Liberty has seen a significant reduction in outstanding leaks. Since reporting 1,445 outstanding leaks in March 2011, Liberty has seen a steady decline in leaks and reported only 50 outstanding leaks in November

¹³ Liberty’s distribution system also consists of 2.8 miles of cathodically-protected steel transmission pipe; and associated with its propane gas operations are less than 1-mile of cathodically-protected steel main, 30 cathodically-protected services, and 1 plastic service. See, EnergyNorth Natural Gas Inc., U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration, Annual Report for Calendar Year 2022 Natural and Other Gas Transmission and Gathering Systems, March 1, 2023; and EnergyNorth Natural Gas Inc., U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration, Annual Report for Calendar Year 2022 Gas Distribution System, March 1, 2023.

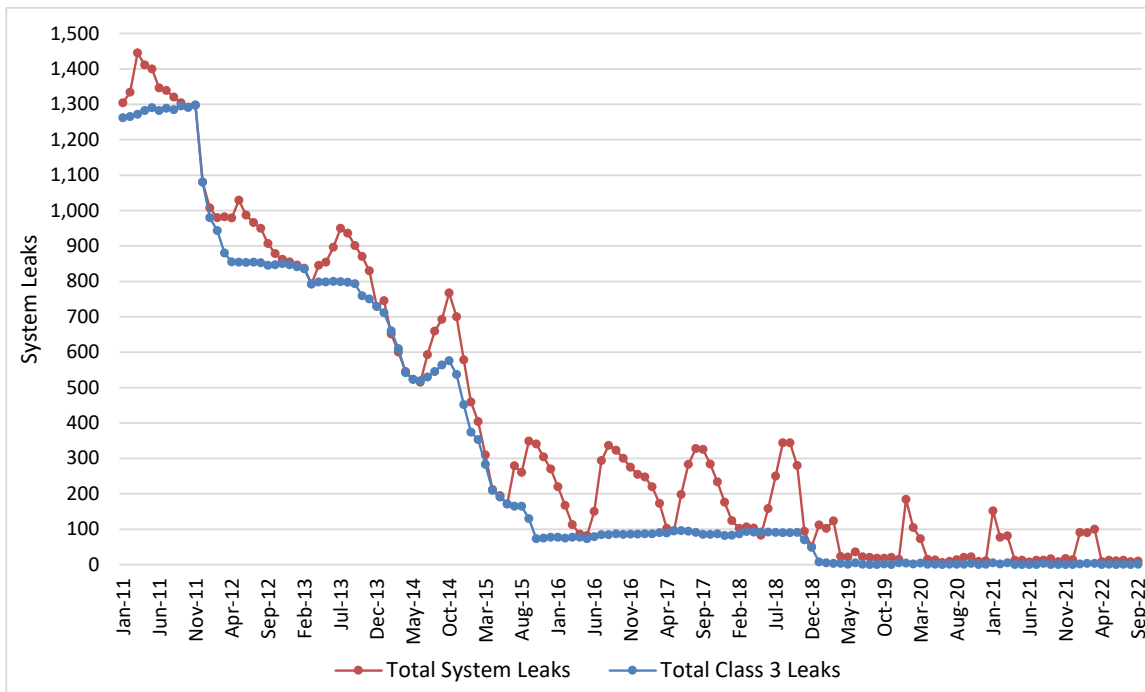
¹⁴ See, 2022 IRP, at Bates 54-55.

¹⁵ EnergyNorth Natural Gas Inc., U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration, Annual Report for Calendar Year 2022 Gas Distribution System, March 2, 2023.

¹⁶ New Hampshire Gas Corp., U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration, Annual Report for Calendar Year 2022 Gas Distribution System, March 8, 2023.

2018, 49 of which were classified as Class III (non-hazardous) leaks.”¹⁷ Furthermore, as recognized by Commission Staff in 2019, Liberty has “substantially reduced” public safety risks due to “leaks and pipe failures.”¹⁸ For reference purposes, a summary of the Company’s reported leaks is provided in Figure 3 below.

Figure 3: Liberty’s Natural Gas Leak Data

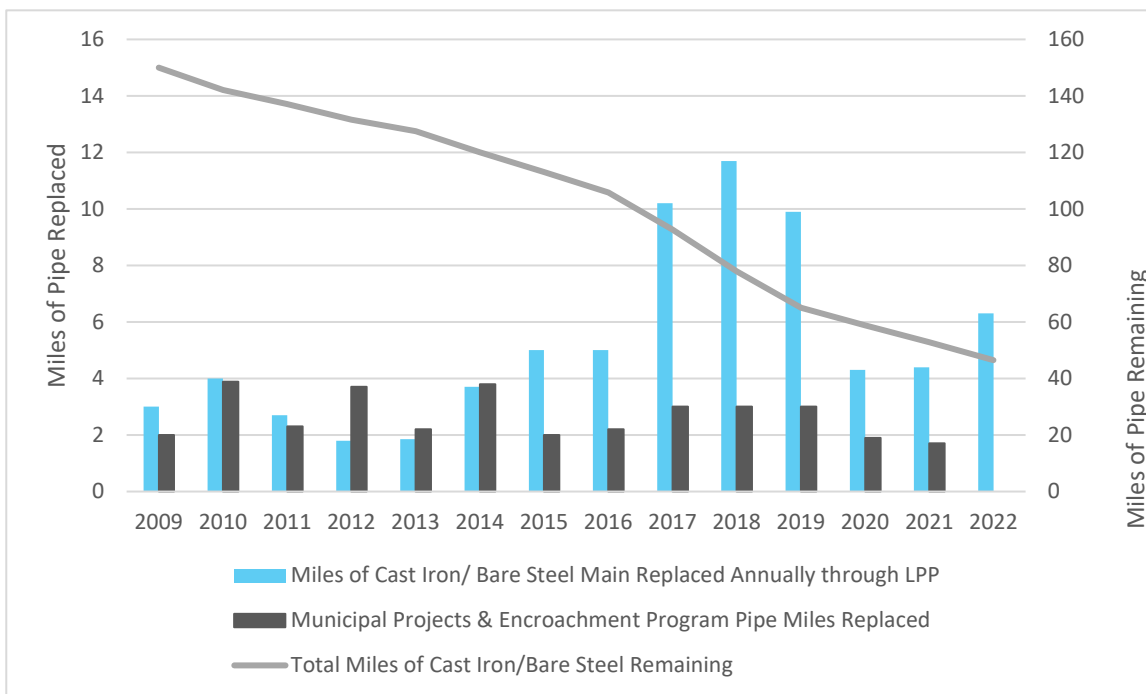


The reduction in leaks is attributed to the Company’s continued focus on replacing cast iron and bare steel pipes, which are more prone to leaks and fugitive emissions. The annual mileage of cast iron and bare steel mains replaced is provided in Figure 4 below. As of the end of 2022, there were approximately 46 miles of cast iron and bare steel pipes remaining in Liberty’s natural gas distribution system.

¹⁷ Staff’s Recommendation to Terminate the CIBS Program, Docket No. DG 19-054, February 14, 2019.

¹⁸ Liberty’s Response to Staff’s Recommendation to Terminate the CIBS Program, Docket Nos. DG 18-064 and DG 19-054, March 15, 2019.

Figure 4: Liberty’s Cast Iron and Bare Steel Main Replacements¹⁹

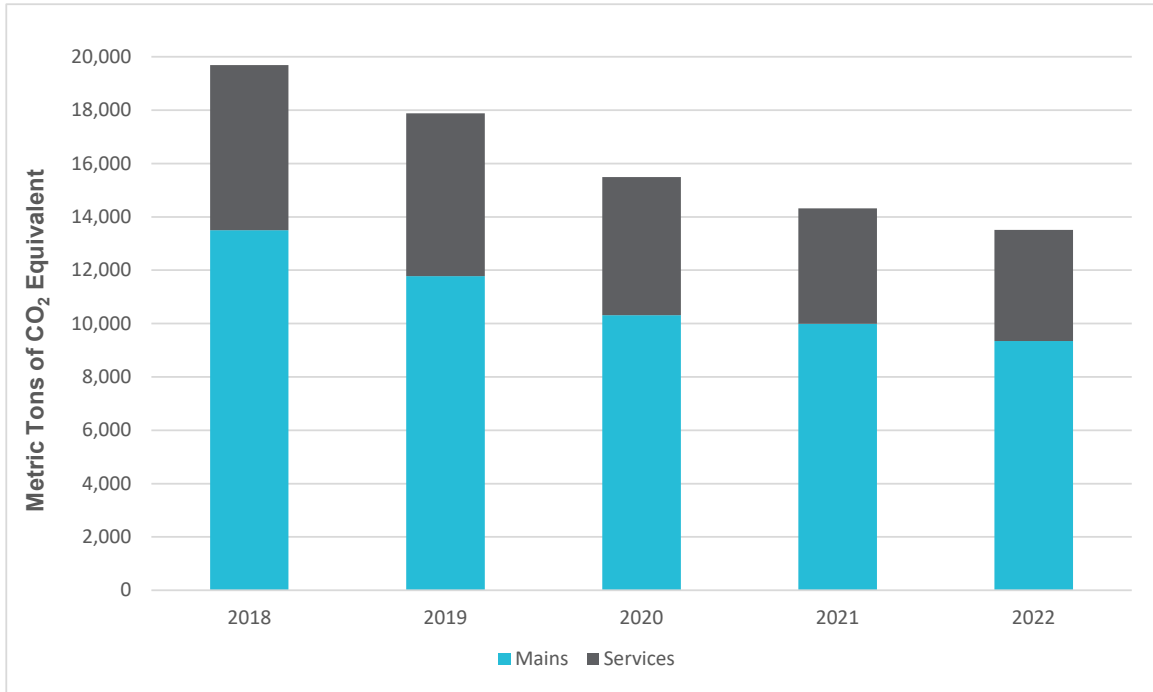


As indicated by the EPA, natural gas distribution system emissions result mainly from leak emissions from pipelines and stations, which result in the release of GHG compounds to the atmosphere, including CO₂, methane (“CH₄”), and nitrogen dioxide. On a nationwide basis, distribution system emissions accounted for only 8% of CH₄ emissions and less than 1% of CO₂ emissions from natural gas systems in 2021.²⁰ Using EPA’s methodology to estimate emissions rates, Liberty has quantified the level of emissions associated with its natural gas distribution mains and services, including the Keene Division. As illustrated in Figure 5 below, Liberty’s emissions levels from its natural gas distribution system have decreased from approximately 20,000 metric tons of CO₂ equivalent emissions in 2018 to under 14,000 metric tons of CO₂ equivalent emissions in 2022. That downward trend has been driven by the Company’s replacement of cast iron and bare steel pipes.

¹⁹ Although the Commission terminated the CIBS Program in Order No. 26,266 (June 28, 2019), Liberty continues to replace cast iron and bare steel pipe as part of its leak-prone pipe (“LPP”) projects.

²⁰ See, U.S. Environmental Protection Agency, “Draft Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2001,” EPA 430-D-23-001, February 2023, at 3-95.

Figure 5: Liberty's Emissions from Leaks

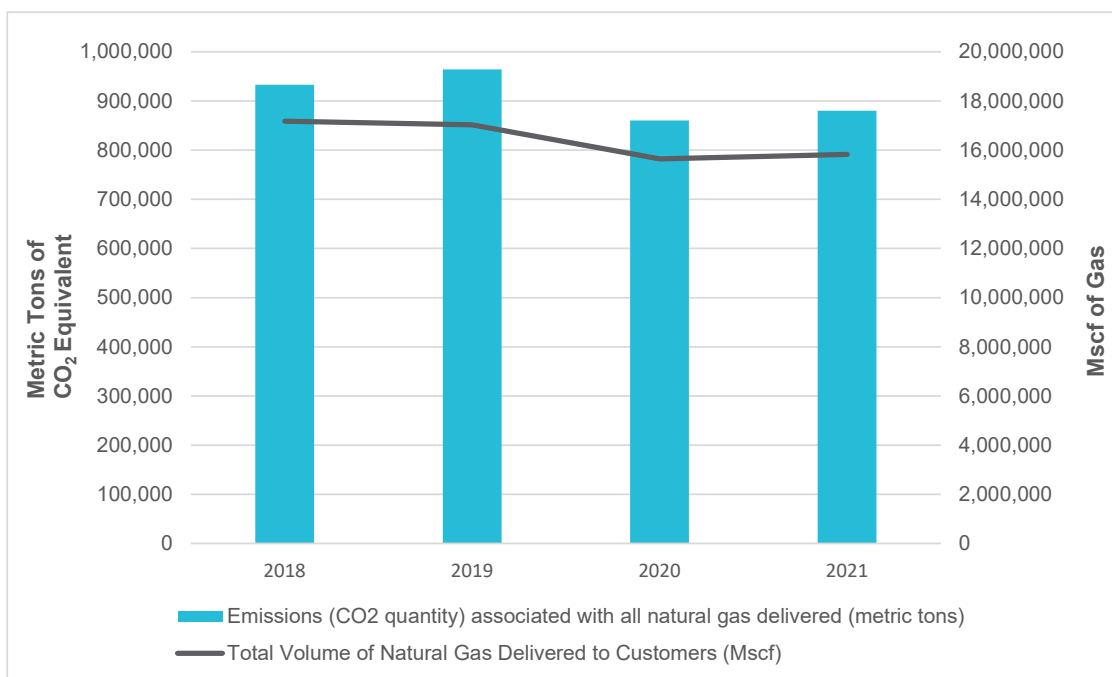


On a forward-looking basis, Liberty expects continued improvements in its natural gas distribution system as a result of the complete elimination of cast iron and bare steel pipes as part of its leak-prone pipe projects over the next five years. This will result in the mitigation of approximately 6,500 metric tons of CO₂ equivalent emissions and, consequently, have a positive impact on the overall environment.

Finally, as reported to the EPA in its annual Subpart NN filings, the Company's estimated CO₂ emissions from the total volumes of natural gas delivered to residential, commercial, and industrial customers have ranged from 860,000 metric tons to 960,000 metric tons of CO₂ emissions over the 2018 to 2021 time period.²¹ As shown in Figure 6 below, the emissions levels reflect the annual volumes of natural gas delivered (i.e., annual gas demand), which is primarily weather-driven. The Company's estimated emissions level of 860,000 metric tons of CO₂ emissions in 2020 represents less than 7% of the total state-wide energy-related emissions discussed previously (see, also, Figure 1 above).

²¹ Liberty has not yet filed its 2022 Subpart NN report with the EPA.

Figure 6: Liberty’s Emissions from Volumes of Gas Delivered²²



On a forward-looking basis, the Company’s 2022 IRP forecasted an increase in natural gas demand at a compound annual growth rate of approximately 0.9% over the five-year forecast period. The growth in natural gas demand is primarily driven by increases in the number of residential heating and C&I heating customers, a portion of which reflects customer conversion activity to natural gas from generally higher-emitting fuel sources (e.g., oil or propane).

2. Economic Impacts

Since the 2012 acquisition by Liberty Energy Utilities (New Hampshire) Corp., the Company has been committed to growth and investment in New Hampshire. With respect to the economic impact of Liberty’s distribution system operations, consistent and reliable data on direct jobs over the past 20 years is generally not available; however, Table 1 below summarizes the number of gas department employees reported in Liberty’s Form F-16 Annual Report to the Commission over the most recent five years.

Table 1: Liberty’s Annual Number of Employees²³

	2018	2019	2020	2021	2022
Total Employees	282	276	264	289	268

Liberty has not performed its own analysis of the impact of these direct jobs on New Hampshire’s economy. However, Liberty notes that a recent study by the American Gas Association (“AGA”) has

²² EnergyNorth Natural Gas, Inc., Greenhouse Gas Reporting Program, Subpart NN: Suppliers of Natural Gas and Natural Gas Liquids for 2018 to 2021. Liberty has not yet filed its 2022 Subpart NN report with the EPA.

²³ Liberty Utilities (EnergyNorth Natural Gas) Corp., F-16 Annual Reports to the New Hampshire Public Utilities Commission for 2018 to 2021; and Company estimates for 2022.

indicated that, “[b]ecause of the physical connection to the local community, jobs created directly by natural gas utilities tend to remain regional.”²⁴ Furthermore, the AGA study concluded that for the New England region in particular “every job created directly by an LDC multiplies to more than 11 jobs throughout the local economy and four more throughout the country.”²⁵ The AGA also indicated that by using the Regional Economic Modeling Inc. (“REMI”) model, “the economic contribution that LDCs bring [can be] measured in three parts. First as the sum of the direct input from LDCs, then the indirect contribution from supplying industries such as natural gas production, and finally the induced economic contribution that results from workers spending their incomes on other goods and services.”²⁶ Based on the findings from the REMI model provided in the AGA’s study, in total, U.S. LDCs directly employed nearly 138,000 people, and these jobs provided almost \$12 billion in personal income and \$67 billion in value-added to GDP. While these values are not specific to the state of New Hampshire, the AGA study supports the conclusion that LDCs, such as Liberty, generally provide positive value to the overall economy.

C. Consistency with State Energy Strategy

The New Hampshire 10-Year State Energy Strategy, which was updated in July 2022, includes the following energy policy goals:

1. Prioritize cost-effective energy policies.
2. Ensure a secure, reliable, and resilient energy system.
3. Adopt all-resource energy strategies and minimize government barriers to innovation.
4. Achieve cost-effective energy savings.
5. Achieve environmental protection that is cost-effective and enables economic growth.
6. Government intervention in energy markets should be limited, justifiable, and technology-neutral.
7. Support a robust, market-selection of cost-effective energy resources.
8. Generate in-state economic activity without reliance on permanent subsidization of energy.
9. Protect New Hampshire’s interests in regional energy matters.
10. Ensure that appropriate energy infrastructure is able to be sited while incorporating input and guidance from stakeholders.²⁷

Notably, the State Energy Strategy highlights the importance of fuel choice for residents and businesses in New Hampshire and recognizes “Natural gas and renewables will likely make up an increasingly sizeable fraction of New Hampshire’s fuel mix into the future.” In addition, the State Energy Strategy notes that cost-effective energy efficiency should be prioritized in all sectors.

The Company’s resource strategies contained in its 2022 IRP and this supplemental filing are consistent with the goals outlined in the New Hampshire 10-Year State Energy Strategy. Liberty has been focused on meeting the energy needs of the residents and businesses in New Hampshire by providing natural gas as a fuel choice for various end-use applications and, therefore, the Company has experienced – and continues to experience – an increase in natural gas demand. As discussed in Liberty’s 2022 IRP, the forecasted growth rate of 0.9% per year over the next five years is consistent with Company’s growth

²⁴ American Gas Association, “Benefits to the Economy through the Direct Use of Natural Gas,” July 9, 2020, at 6.

²⁵ American Gas Association, “Benefits to the Economy through the Direct Use of Natural Gas,” July 9, 2020, at 6.

²⁶ American Gas Association, “Benefits to the Economy through the Direct Use of Natural Gas,” July 9, 2020, at 4.

²⁷ See, <https://www.energy.nh.gov/sites/g/files/ehbemt551/files/2022-07/2022-state-energy-strategy.pdf>.

in normalized actual load of 0.9% per year over the period from 2017/18 to 2021/22. In addition, Liberty's demand forecast reflects the energy efficiency programs put forth in the 2021-2023 Triennial Energy Efficiency Plan developed and approved by the Commission in Docket No. DE 20-092, which was based on a comprehensive review of potential options and the reasonableness of implementation. The Company's mix of supply resources in its portfolio and known capital projects provided in the 2022 IRP will enable the Company to continue to provide safe and reliable natural gas service to its customers at the lowest reasonable cost. Finally, as discussed above, the Company has been focused on the replacement of leak-prone pipe and expects continued improvements in its natural gas distribution system, which will generally have a positive impact on the environment and local economy.

IV. DISTRIBUTION SYSTEM PLANNING

Consistent with the Commission's directives in the 2017 IRP Interim Order, this supplemental filing to the 2022 IRP provides a high-level summary of Liberty's capital investments over the most recent five years. As shown in Table 2 below, the Company has invested approximately \$300 million over the 2018 to 2022 time period, improving the safety, reliability, and flexibility of its distribution system. Descriptions for each of the project categories listed in Table 2 were provided in Liberty's initial 2022 IRP filing.

Table 2: Liberty's List of Historical Capital Projects (\$000)

Project Category	2018	2019	2020	2021	2022
Leak-Prone Pipe/City State	\$22,984	\$29,242	\$20,403	\$19,934	\$20,622
System Enhancements	-	-	-	\$261	\$5,053
Gas System Planning & Reliability	\$2,365	\$3,046	\$1,133	\$1,091	\$569
Integrity	\$2,674	\$4,405	\$4,129	\$3,659	\$4,100
Instrumentation & Regulation	\$1,110	\$742	\$802	\$1,008	\$4,329
Service/Meter Upgrades	\$2,593	\$2,473	\$3,525	\$3,934	\$3,152
Keene Division	\$1,568	\$1,974	\$1,546	\$1,671	\$844
Growth	\$14,383	\$15,600	\$12,313	\$8,999	\$8,081
Facility	\$960	\$1,418	\$1,850	\$2,447	\$3,695
Information Technology	\$1,173	\$1,423	\$969	\$868	\$949
Corporate	\$1,766	\$888	\$244	\$2,658	\$31,835
Equipment, Tools & Fleet	\$1,113	\$2,616	\$1,764	\$1,143	\$1,181
TOTAL	\$52,688	\$63,826	\$48,678	\$47,670	\$84,411