



Gas System: Long Term Plan

February 6, 2024



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I. Executive Summary

A. Central Hudson Approach and Priorities for Gas System Long Term Plan- Managing the Energy Transition

Central Hudson Gas and Electric (“Central Hudson” or “the Company”) presents this Gas System Long-Term Plan (GSLTP) in accordance with the New York Public Service Commission’s (“Commission”) May 12, 2022, Order Adopting Gas System Planning Process.¹ The Gas Planning Order establishes a gas system planning process for gas local distribution companies (LDCs) in New York and includes, among other things, a requirement for each LDC to file a long-term plan.

The foremost objective of Central Hudson’s approach to this planning process is to ensure that the Company is able to maintain safe and reliable service for all customers throughout our service territory in the coming decades. We are also focused on analyzing, planning, and executing an optimal approach to the clean energy transition. Central Hudson looks forward to engaging with stakeholders (customers, environmental and other advocacy groups, legislators, the Commission, and other state agencies) on this GSLTP, which provides information and analysis on how to reduce emissions while ensuring a safe, reliable, affordable, and viable energy system. This entails analyzing and determining the proper balance of numerous vital priorities.

Central Hudson will maintain a flexible and adaptable approach in developing this GSLTP. We are dedicated to testing different concepts that can support the plan and will keep all options on the table. We know there will be regulatory and technological advances along the way, and we will be flexible and adaptable to those changes. Finally, we will support our customers’ ability to choose their energy options. We know that customers value the ability to make their own energy choices such as heating fuel. We recognize that an optimal approach may be based not on eliminating choices but raising standards (*e.g.*, equipment efficiency standards).

The Company has developed the following priorities for the energy transition:



Safety, reliability, and resiliency for Central Hudson’s customers and communities are the core objectives for Central Hudson’s GSLTP. This priority cannot be compromised.



Central Hudson supports NY policy objectives of reduction in the State’s Greenhouse Gas (GHG) emissions and the development of programs to address Climate Leadership and Community Protection Act (CLCPA)² state-wide targets. This GSLTP is designed to pursue decarbonization and make progress toward supporting CLCPA goals, recognizing the context of facilitating safe and reliable service.

¹ Case 20-G-0131, Proceeding on Motion of the Commission in Regard to Gas Planning Procedures (“Gas Planning Proceeding”), Order Adopting Gas System Planning Process (Issued May 12, 2022) (“Gas Planning Order”).

² Chapter 106 of the Laws of 2019. The CLCPA is available at <https://legislation.nysenate.gov/pdf/bills/2019/S6599>

While New York's climate laws are laudable, this GSLTP takes on the challenge of balancing the need to decarbonize while avoiding unintended consequences regarding costs, safety, and reliability.



Central Hudson must focus on affordability for all customers. Primary focus must remain on affordability for the customers and communities it serves (including emphasis on low- and moderate-income (LMI) customers and Disadvantaged Communities (DACs)). This is done in recognition of the customer demographics of our service territory and aligning appropriately with the goal of preserving the economic base in our communities. Central Hudson supports efforts to ensure that historically under-represented communities have equitable access to clean energy program benefits and do not bear a disproportionate share of burdens. Central Hudson is focused on the resiliency and resource diversity that an underground pipeline provides to our business community.



Central Hudson supports beneficial electrification. Electrification of gas end uses and gas customers are supported by Central Hudson's initiatives to achieve this including the New York State Clean Heat Program ("Clean Heat"). Central Hudson likewise supports the opportunity to electrify customers that use alternative fuels (e.g., wood, oil, propane) for space heating rather than expanding the gas network.



Central Hudson will complete its Leak-Prone Pipe Replacement Program (LPPRP) for the safety of its customers. Central Hudson has been implementing its LPPRP, and continuation of this is vital for safety, reliability, and environmental benefits. The majority of the LPPRP program will be completed in 2028, with a targeted completion date of the LPPRP in 2029.



Central Hudson will continue to pursue Non-Pipe Alternatives (NPAs) in place of traditional infrastructure when feasible. Central Hudson has advanced its NPA program, including filing its NPA Criteria and other information.



Central Hudson will explore transforming its pipe for other uses. Central Hudson is exploring the benefits, costs, and potential of renewable natural gas (RNG), responsibly sourced gas (RSG), and hydrogen for its gas distribution system.



Central Hudson's GSLTP will have a flexible and adaptable approach. That approach will include: 1) Test different concepts that can support the plan; 2) Pursue the most cost-effective approach balanced with other goals; 3) Keep all options on the table; and 4) Be flexible and adaptable to regulatory and technological advances.³



Energy Efficiency will continue to be supported by Central Hudson. The Company has long administered and otherwise supported energy efficiency, and will continue to do so, subject to ongoing regulatory processes including requirements related to the July 2023 EE/BE Order, which limits gas energy efficiency measures in utility programs in the future.⁴



Central Hudson notes that utility regulatory policy changes may be needed to support broader policy goals. It will be important to assess and potentially modify gas utility regulatory policies, such as accelerated recovery of undepreciated costs and depreciation rates, depending on broader policy decisions and outcomes.

³ In addition, impacts from the Company's ongoing rate case filing will be integrated into this GSLTP, as feasible. See Case 23-G-0419, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Central Hudson Gas & Electric Corporation for Gas Service*.

⁴ Case 18-M-0084, *In the Matter of a Comprehensive Energy Efficiency Initiative* ("NE: NY Proceeding"), Order Directing Energy Efficiency and Building Electrification Proposals ("EE/BE Order") (issued and effective July 20, 2023).

B. Central Hudson's Environmental Efforts and Progress to Date

In conjunction with State, federal, and local policies and targets, Central Hudson has adopted decarbonization as a central objective, with a focus on the energy transition.⁵ This reflects goals of Fortis, Inc., Central Hudson's parent company, which include that "Fortis has a clear path to achieve a mid-term target of reducing GHG emissions 75% by 2035 compared to 2019 levels, and a 2050 net-zero direct GHG emissions target to decarbonize over the long-term."⁶

Central Hudson supports numerous clean energy programs and initiatives which reduce greenhouse gas emissions and support customer, state, and Central Hudson climate goals. Central Hudson has made significant progress on working toward CLCPA and other clean energy and GHG goals and targets. Advancements pertaining to its gas system operations include: 1) methane reduction through the Company's ongoing Mains Replacement Program (MRP); 2) selection of supply resources; 3) electrification of space heating and water heating; 4) electrification of commercial and industrial (C&I) end uses; and 5) utility thermal energy networks. Central Hudson efforts advance environmentally beneficial electrification, for example, promoting electric vehicles and heat pumps to lower emissions from transportation and building heating. For example, from 2020 through 2022, through the NYS Clean Heat Program, Central Hudson incentivized 15,449 heat pumps, achieving 449,316 MMBTu in energy savings, and achieved an estimated GHG reduction of 28,634 metric tons of carbon dioxide (CO₂).⁷ Through its energy efficiency programs, Central Hudson has supported energy savings, cost savings for customers, and GHG reductions. The projected GHG emissions reduction from conversions to electric heat pumps from gas programs are 175,000 metric tons of CO₂-equivalent by 2030; GHG reductions from conversions of oil and propane heat to electric heat pumps are 325,000 metric tons CO₂ equivalent by 2030.⁸

While Central Hudson has long offered programs to support the adoption of energy efficient gas measures, the Commission's July 2023 EE/BE Order reduces the ability of Central Hudson and the other NY utilities to incentivize gas measures beyond 2025. As described in its November 1, 2023, EE/ BE Proposal⁹, Central Hudson remains committed to its energy efficiency programs and will shift funding as appropriate to electric end uses and electrification programs and weatherization.

Central Hudson has also been exploring methods to reduce the greenhouse gas and environmental impacts of its gas distribution system, including RSG, RNG, and hydrogen. All these alternative fuels are considered in the scenarios analyzed in this GSLTP. For RNG Central Hudson is fully supportive of the Northeast Gas Association (NGA) interconnect guideline that outlines the process for an RNG supplier to work with a local distribution company to supply gas. This interconnect guideline takes into account the most current research across the industry to outline appropriate requirements for RNG developers. Central Hudson has adopted this interconnect guideline within our Gas Transportation

⁵ <https://www.cenhud.com/en/my-energy/our-energy-future/energy-in-transition/>
This website reflects both Central Hudson's electric and gas operations.

⁶ <https://www.cenhud.com/en/my-energy/our-energy-future/energy-in-transition/>

⁷ NE:NY Proceeding, Central Hudson Gas & Electric System Energy Efficiency Plan (SEEP) (filed November 20, 2023) ("2023 SEEP"), Table 3C.

⁸ Central Hudson GSLTP Stakeholder Presentation, slide 64 (December 19, 2023).

⁹ NE:NY Proceeding, Central Hudson Gas & Electric's Energy Efficiency And Building Electrification Portfolio Proposal (filed November 1, 2023).

Operating Procedures (GTOP) since the initial release in 2019. As of December 2022, NGA with the help of multiple utilities, have enhanced the interconnect guidelines to encompass alternative fuels as well, including hydrogen. In addition, Central Hudson has contracted with a third-party expert to conduct a study of RNG potential within the counties that overlap its territory from various feedstocks. For hydrogen, Central Hudson has completed a Hydrogen Blending Study of a subset of its pipeline distribution systems to estimate the amount of hydrogen Central Hudson can blend without any pipeline modifications or reduction in loading. Among other findings, this study concluded that 72% of Central Hudson's local distribution systems can support up to 20% hydrogen without any network reinforcements.

Central Hudson has been exploring the ability to abandon segments of its network which have a smaller number of customers by inducing customers to adopt electrification, energy efficiency, and other clean energy solutions, referred to as Targeted Network Abandonment. Analysis to date indicates that this may be quite costly. It is addressed in detail in this GSLTP including in the scenarios analyzed. In summary, analysis to date indicates that this may be quite challenging and costly.

The Company is also supporting complementary efforts in its electric businesses, with the recognition that electrification of gas end uses will result in increased electric usage.¹⁰ Central Hudson's overall approach includes pursuing the most cost-effective approach to emission reduction by examining current incentives to determine which offer the highest value in lowering emissions. Central Hudson is investing in upgrading electric transmission and distribution lines, including support for statewide transmission upgrades to deliver renewable energy sources to areas of high electric demand, including the Hudson Valley and in the metropolitan area, and investments in the regional electric distribution system to facilitate greater levels of locally sited renewable generation. Central Hudson is integrating gas benefits for fast-start electric generation to complement intermittent renewable resources. The Company is also substituting gas for higher-carbon petroleum-derived fuels used in heating and manufacturing. In addition, Central Hudson is expanding heat pump and energy efficiency programs (including weatherization), a cost-effective method to reduce emissions.

C. Gas/Electric Integration

As a key component of the energy transition, Central Hudson is focused on shifting the paradigm of distinct and separate "gas and electric" planning and investments to a single "energy delivery" paradigm. This GSLTP embodies this changing paradigm, as the modeling and analysis of Central Hudson's gas system, core to this planning document, are linked with comparable planning models and data for the Company's electric system. Specifically, the analytic models and concepts for the GSLTP are similar to, compatible with, and linked with those on the electric side, *i.e.*, as used for and described in the Company's electric Distribution System Implementation Plan (DSIP).¹¹

A primary example of the linked use of gas and electric planning data in this GSLTP is the layering of gas system loading information with granular data on heat pump penetration. This enables assessment of the overlap between highly loaded gas systems and corresponding electric grid

¹⁰ <https://www.cenhud.com/en/my-energy/our-energy-future/energy-in-transition/>

¹¹ Case 16-M-0411, *In the Matter of Distributed System Implementation Plans* ("DSIP Proceeding"), Central Hudson Distributed System Implementation Plan, Revised (June 30, 2023).

components— circuit feeders, substations, and utility transmission areas— to understand the available capacity for electrification of heating. This combined gas and electric planning approach supports key outputs such as benefits and costs (*i.e.*, benefit cost analysis or “BCA”) of scenarios, GHG emissions, sales, and customer rate and bill impacts. When considering customers’ shifting from gas to heat pumps for heating, the Company can assess if and/or when electric distribution system upgrades would be required to accommodate increased electric peak load and calculate and account for the associated cost projections. This combined analysis similarly provides visibility and information regarding opportunities for and potential impact of tools such as NPAs. These and other uses and insights from this combined analytic approach are described throughout this document, particularly in Section V which describes the modeling scenarios, assumptions and results.

While this transition toward a “single energy delivery” platform is reflected this GSLTP, this focus extends beyond this planning process. This GSLTP is one component of a broader Central Hudson process to advance system specific electric and gas integration/planning work, with additional initiatives commencing in Spring 2024.

D. Central Hudson Scenario Modeling

Central Hudson recognizes the importance of engagement with regulators, policy makers, and other stakeholders in the GSLTP process. For this reason, Central Hudson has developed a granular modeling approach that is flexible and can be adjusted to take into account numerous assumptions and inputs (Scenario Modeling). This will support discussions with Staff and stakeholders and will enable more efficient, less resource-intensive scenario modeling in the future. Furthermore, as the gas long term planning process goes forward with future iterations of the GSLTP, Central Hudson will seek to increase integration of Scenario Modeling with the electric DSIP modeling. Likewise, Central Hudson will look to expand analysis of the electric planning time horizons and impacts to better align with the Gas Long Term Plan on future DSIP filings.

Central Hudson’s Scenario Modeling approach as used in this GSLTP is built to evaluate the Company’s service territory at a granular, local level. This allows us to identify the portions of our system that require investment to maintain safety and reliability due to loading factors and demand projections. It also enables us to identify the regions that may benefit from targeted efforts at demand mitigation to avoid the need for incremental investment. Evaluating the needs of specific systems within the Central Hudson service territory will lead to more effective NPA program identification and design, better customer engagement, and a clearer indication of decarbonization potential. This will optimize investments at Central Hudson to mitigate bill impacts from capital investments. The analytical approach is designed to provide necessary information to understand the viability of reducing the need for investment in the gas system.

All of the analyses in this GSLTP reflect data and assumptions regarding what is feasible considering current technology and costs, including the feasibility of customer adoption, allowing the Company to present realistic achievable plans that will continue to provide safe, reliable, and resilient service for customers. The GSLTP also provides a basis for requesting approval for specific investments and programs, with particular focus on necessary actions during the next three years. In short, the GSLTP must be technically feasible and provide valid projections of costs, bill impacts, and GHG emission reductions that can inform subsequent utility proposals and decisions. Potential improvements or new

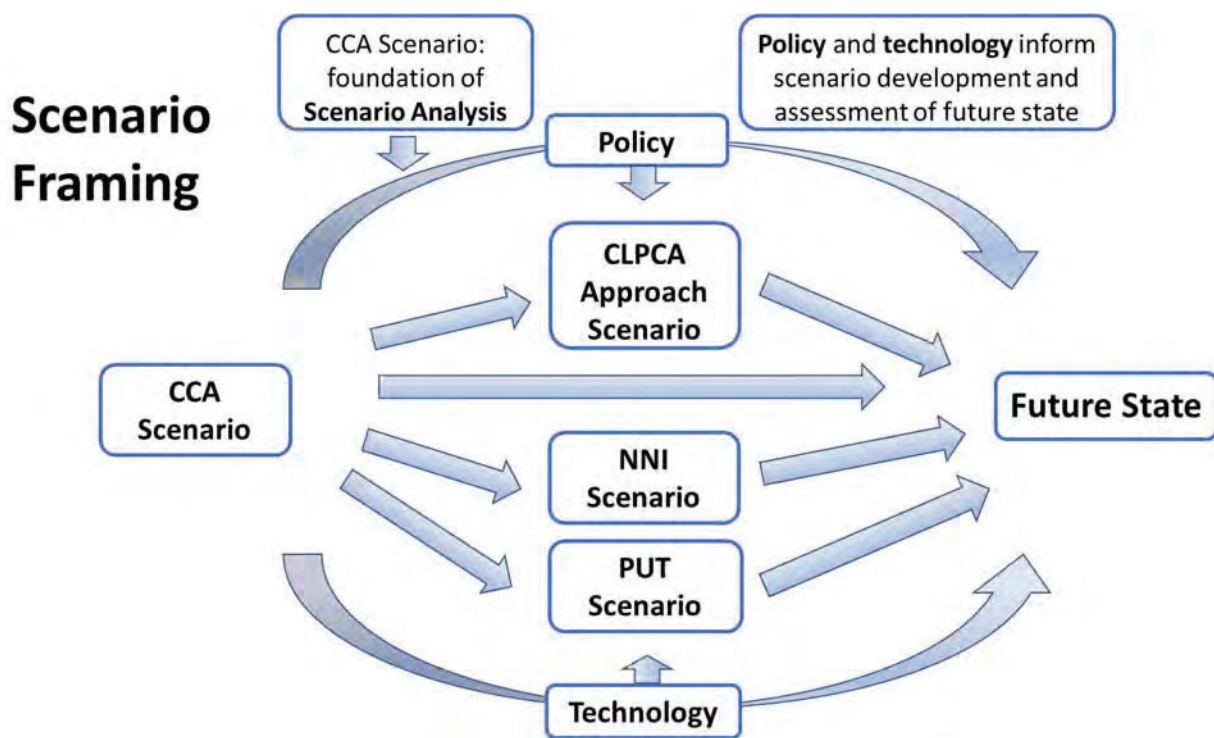
challenges related to policy, markets, technology, customer behavior, infrastructure development, and other developments that may evolve over time will be incorporated into future GSLTP filings.

E. GSLTP Scenarios

As a central component of this GSLTP, Central Hudson has conducted detailed modeling of various sets of assumptions and planned activities, referred to as scenarios. The scenarios modeled and included in this initial GSLTP are referred to as: 1) Current Clean Agenda (CCA) Scenario; 2) CLCPA Approach Scenario; 3) No New Infrastructure (NNI) Scenario; and 4) Pipe Use Transformation (PUT) Scenario. As is described in detail in Section V, below, these scenarios include overlapping elements, such as heat pump incentives, RNG, and hydrogen blending. Each scenario builds on the next. For instance, the PUT Scenario includes the assumptions from the NNI Scenario but layers on additional RNG and hydrogen.

Figure 1, below, illustrates the scenario framing.

Figure 1: Illustration of Central Hudson’s Approach to Scenario Development



i. Current Clean Agenda (*i.e.*, current policy/statutory framework)

The Current Clean Agenda (CCA) Scenario reflects the legal and policy framework that applies today at current funding levels. It presents the expected trajectory for the gas system (in terms of customers, footprint, volumes, *etc.*) that can be projected under current policies that apply to the gas system, including investments the New York Public Service Commission (Commission) has approved. This is the Company’s current base case which includes substantial decarbonization actions. Under these

assumptions, customer growth will continue as described in further detail below. The Current Clean Agenda Scenario assumes that gas business or market transformations that occur naturally during the next two decades reflect the current set of laws that direct Central Hudson's investments and operations, and the existing funding mechanisms for energy efficiency programs (*i.e.*, heat pump incentives). It reflects a higher level of investment in clean heat and weatherization and incorporates not-yet-enacted policies such as code requirements for heat pumps for new buildings. RNG and hydrogen will be integrated into the supply portfolio to the extent they are cost-competitive with conventional natural gas resources. The Current Clean Agenda Scenario assumes continuation of Central Hudson's Clean Heat and energy efficiency programs while recognizing ongoing shifts in energy efficiency policy in the state, including an increased emphasis on weatherization programs.

ii. CLCPA Approach

The CLCPA Approach Scenario generally incorporates programs and policies that Central Hudson expects will be needed to meet the economy wide GHG reductions envisioned in the CLCPA, though this does not seek to achieve a specific level of emissions reductions for the gas utility sector. The CLCPA Approach Scenario entails doubling (2x) heat pump incentives to convert current customers to the electric system. It relies on technological advancements (*e.g.*, improvements in the economics of ground source heat pumps, a decline in heat pump system costs, *etc.*) and a system-wide transition approach rather than one targeting specific regions within the Company's service territory. It also assumes progress in incorporating hydrogen (5% by 2043) and renewable gas (5%) into the supply mix. It also caps new connections starting in 2030.

Each of the scenarios the Company has evaluated requires deep collaboration among gas and electric system planning organizations within Central Hudson. Analyses project that the electric system likely has sufficient capacity to accommodate projected winter peaking loads over the next five to ten years but would experience overloads thereafter. As a result, the CLCPA Approach Scenario will require a large investment in the electric transmission and distribution system to support incremental electric load and provide assurances of safe, reliable, and resilient service, including upsizing pole-top and pad mount transformers and reinforcing circuit feeders, substations, and the utility transmission system (69-115kV).

iii. No New Infrastructure

The No New Infrastructure (NNI) Scenario represents the profile of the gas system under policies that prevent growth-related investment in the gas system. Note, however, that the NNI Scenario does not entail the elimination of capital spending altogether: under any scenario Central Hudson will continue to make the investments necessary to ensure that safe and reliable gas distribution service remains available to customers that continue to rely on the system. This includes infrastructure investment needed to address safety and reliability.

Efforts to limit capital investment in gas infrastructure will be supported by an assertive effort to identify highly loaded areas and develop NPAs where possible, consistent with State policies (pertaining to *e.g.*, NPA suitability, benefit cost analyses for alternatives to traditional infrastructure, *etc.*). It includes higher an up to five-fold increase in incentives for heat pumps and weatherization in local gas systems that are highly loaded and also caps new connections starting in 2030. In addition, energy efficiency and building electrification program design will emphasize decarbonization through electrification. Electrification-oriented incentives will focus on targeted areas of the system where load presents

challenges and would otherwise require infrastructure investments to meet safety and reliability requirements. This scenario includes small amounts of RNG and hydrogen blending.

iv. Pipe Use Transformation

The Pipe Use Transformation (PUT) Scenario features a focused transition of Central Hudson's gas supply resources to the extent feasible, safe, and practicable. Conventional natural gas resources will be displaced with alternative, low-carbon fuels (LCFs) that will produce a net reduction in GHG emissions to a greater focus than other scenarios. Central Hudson will continue to pursue the integration of responsibly sourced gas. Central Hudson will pursue RNG including in situations in which RNG interconnections prevent the need for investments in distribution infrastructure. Green hydrogen will be blended with conventional supply resources in a manner consistent with safety and reliability guidelines (*i.e.*, at an expected level up to 20% of the gas stream by volume). In addition, the scenario assumes increased use of renewable gas (20% by 2043) from feedstock and livestock.

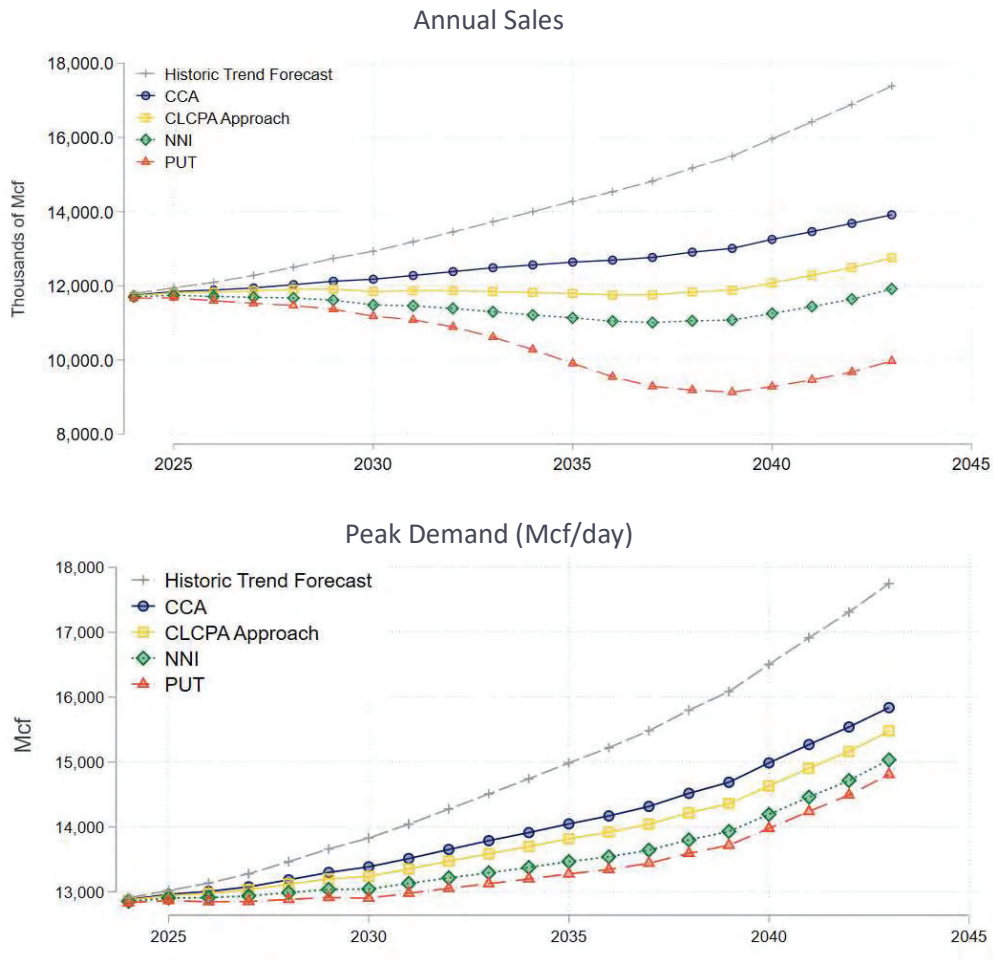
The PUT Scenario includes the same concerted and targeted effort to identify highly loaded gas systems and target resources to avoid infrastructure upgrades as in the NNI Scenario. Clean electricity and LCFs will be used to contribute to the State's economy-wide GHG emissions goals. The PUT Scenario also envisions the use of existing pipeline infrastructure to help decarbonize industrial facilities that currently rely on more carbon intensive fossil fuels such as oil and propane. This scenario provides the greatest emissions savings among the scenarios evaluated in this GSLTP.

F. High Level Results

As directed in the Gas Planning Order, Central Hudson's modeling analyses evaluate a variety of planning objectives, including supply and demand projections, estimates of carbon emissions reductions, dimensions of customer outcomes, and cost-effectiveness at a scenario-level.

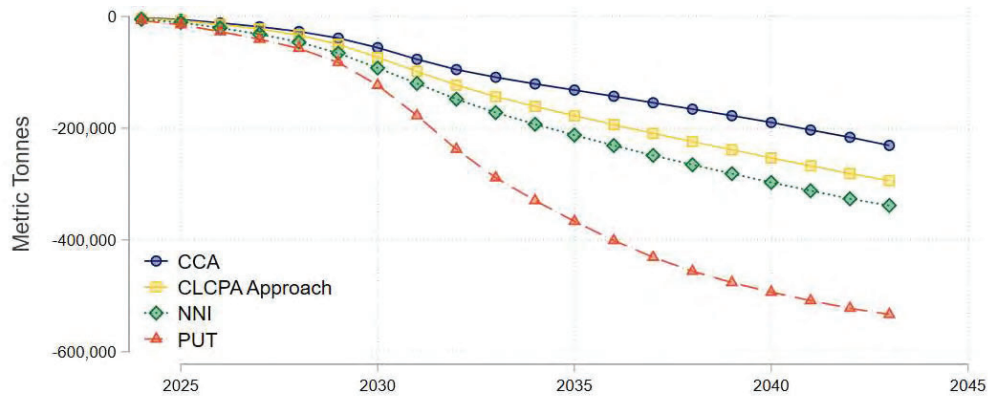
The Company's modeling indicates that, with the exception of the Current Clean Agenda Scenario, each planning scenario will result in significant reductions in total sales, even as peak demand continues to grow (Figure 2). As discussion in Section V, sales declines are projected to decline most significantly for residential customers.

Figure 2: 20-Year Annual Sales, Peak Demand Projections (2024-2043)



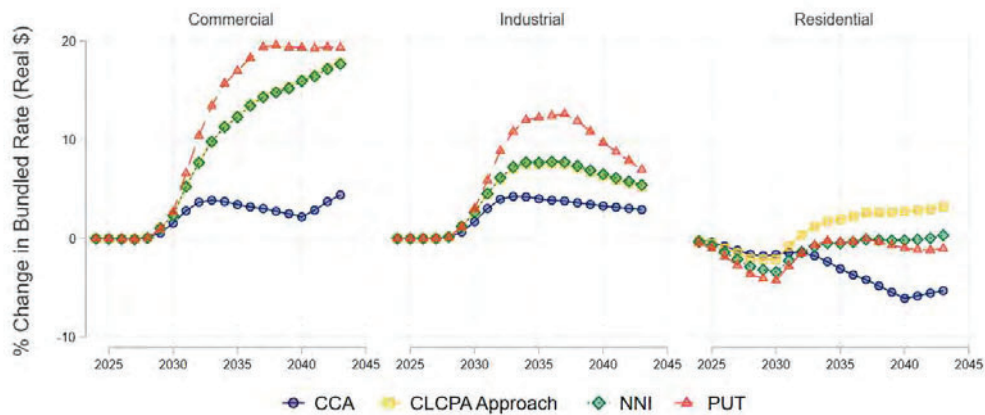
Central Hudson’s GSLTP – as refined through this process based on stakeholder feedback and regulatory direction - will contribute to achieving New York’s decarbonization targets. The GSLTP provides scenarios that are projected to reduce GHG emissions by between 250,000 metric tons (under the Current Clean Agenda Scenario) and nearly 600,000 metric tons (the PUT Scenario) by 2043. The scale of these reductions will continue through 2050 and beyond.

Figure 3: Calendar Year CO2 Emissions Reductions from a 2024 Baseline



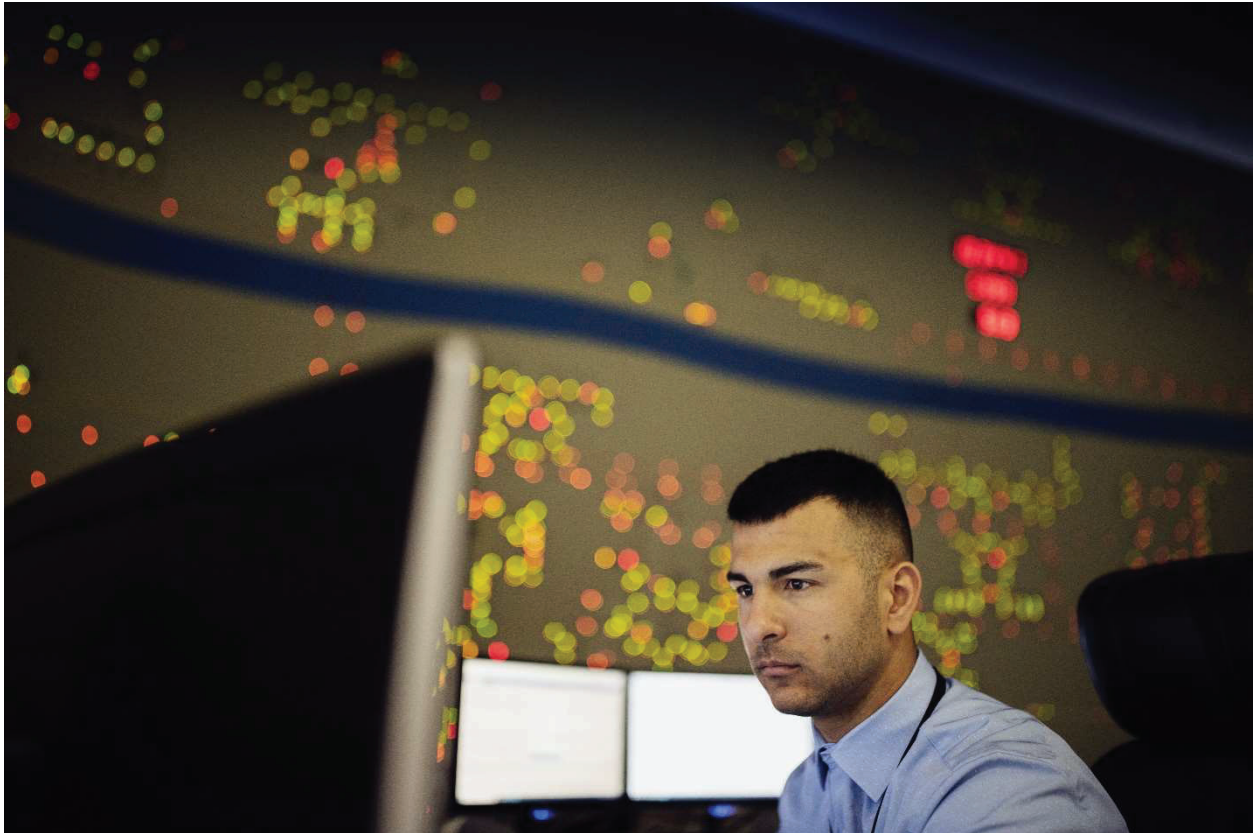
The cost of incentives to drive the evolution of customer preferences and the supportive infrastructure for lower-emitting services will drive costs up in the short term. However, as adoption of advanced energy efficiency and electrification technologies continues, the demand for gas on a per customer basis will fall. For residential customers, total bill impacts are expected to be modest (*i.e.*, to increase by approximately 4-6% through 2043). Commercial customers, for whom demand is less elastic, could see bill increases of as much as 18% depending on the scenario (Figure 4).

Figure 4: Percent Impact on Gas Bill for Residential, Commercial, Industrial Customers (2024-2043)



Gas planning strategies must be considered in the context of the costs and benefits that will materialize under various planning assumptions. In addition, the Company and stakeholders must acknowledge that the effects of gas planning extend beyond the gas utility. Both benefits (*e.g.*, emissions reductions) and costs (*e.g.*, electric infrastructure and commodity cost increases) will materialize as decarbonization efforts continue to mature. Taking measurable costs and benefits into consideration, the planning scenarios Central Hudson has evaluated in this GSLTP yield benefit-to-cost ratios of between 0.73 and 0.78, indicating that costs may outweigh benefits. However, the Company emphasizes that there are some benefit cost categories that are challenging to quantify and that are not internalized in the BCA calculations (*e.g.*, health benefits associated with lower carbon emissions, *etc.*).

Central Hudson looks forward to working with the Commission and stakeholders to evaluate and refine the assumptions that inform this GSLTP in the coming months.



II. Introduction – GSLTP Process

A. Context for GSLTP

This GSLTP represents Central Hudson’s commitment to provide safe, reliable, and affordable energy service to its 90,000 gas system customers that delivers sustainable reductions in GHG emissions. This GSLTP focuses primarily on Central Hudson’s gas business, but also references, as appropriate, its electric distribution business, as several components of this GSLTP address electric programs and initiatives, including electrification efforts, which result in growth in electricity usage from the conversion of heating and other end uses from natural gas (and other fuels) to electricity. (Central Hudson serves approximately 309,000 electric customers.) Similarly, one focus of this GSLTP is advancing integration of gas and electric planning.

B. Gas Planning Proceeding and Gas Planning Order Requirements

The Commission initiated the Gas Planning Proceeding in March 2020 to evaluate opportunities to improve gas system planning and operational practices and to enable LDCs to meet evolving policy goals and customer expectations transparently and equitably.¹² Within this context and in recognition of the need to assess LDC plans for the future of the gas system, the Commission issued the Gas Planning Order in May 2022, which required each LDC to file a GSLTP, among other requirements.

¹² Gas Planning Proceeding, Order Instituting Proceeding (Issued March 19, 2020) (“Initiating Order”).

The Gas Planning Order provides context for the GSLTP by identifying the overall objectives for the gas planning process, including requiring that gas planning be consistent with the CLCPA and a robust stakeholder engagement process to inform the development of LDC long-term plans. The Gas Planning Order also establishes several specific requirements to be addressed in long term plans:

1. a demand forecast that estimates the expected sources of growth and/or reduction in peak demand resulting from demand-side investments;
2. a supply forecast that explicitly includes the level of demand-side programs and those that prioritize developing innovative clean demand response programs;
3. the methodology by which reliability will be forecast and measured;
4. solutions to reliability and meeting demand, including a "no infrastructure" scenario and reasonable non-pipe alternatives (NPAs) to address gaps between demand and supply;
5. and an estimate of the bill impacts and net present value of costs of each alternative.

In addition, the Gas Planning Order directs LDCs to provide necessary information to assess the potential impacts of their long-term plans and alternatives, both benefits and burdens, on disadvantaged communities. LDCs are to ensure that the Commission, Staff, and stakeholders have the information necessary to appropriately evaluate the potential GHG emissions of the long-term plans and alternatives. The Commission also addresses the methodology to be applied when performing a BCA.

Finally, the Gas Planning Order required staggered filings by the utilities with National Fuel Gas' filing due on December 15, 2022, Con Edison and O&R due on May 31, 2023, NYSEG/RG&E due on September 30, 2023, Central Hudson due on January 15, 2024, KEDLI/KEDNY/NMPC due on May 31, 2024, Corning Gas due on September 30, 2024, and St. Lawrence Gas due on January 31, 2025. As such, Central Hudson's filing is informed by other utilities' prior filings and stakeholder engagement to be as targeted and useful for this process as possible, including proactively addressing known stakeholder concerns and views identified to date. In addition, Central Hudson understands that there will be Stakeholders that are not yet familiar with the LTP process, and we will work with them to be sure their concerns and ideas are equally considered.

C. Regulatory & Stakeholder Engagement

The Gas Planning Order provides for a robust stakeholder engagement process to inform the development of LDC long-term plans. Central Hudson is committed to undergoing detailed analysis and sharing the information and results with stakeholders as part of this GSLTP process and consistent with the Gas Planning Order. Engagement with stakeholders on this GSLTP is a central focus of the Gas Planning Order and a priority of Central Hudson. Below are key dates in this process:

- Pre-Filing Stakeholder Information Session: December 19, 2023
- Filing: February 6, 2024
- Initial PA Consulting Report Filing: April 6, 2024
- Stakeholder Meeting(s): As Necessary
- Revised Central Hudson Report Filing: June 7, 2024
- Preliminary PA Consulting Report Filing: July 16, 2024
- Final Central Hudson Report Filing: August 1, 2024
- Final PA Consulting Report Filing: September 24, 2024
- Central Hudson Final Report Comments: TBD

The process established in the Gas Planning Order begins a continuing cycle with each LDC filing a long-term plan every three years plus annual updates filed on May 31st in the interim years. The three-year cycle is designed to provide for future comprehensive updates that reflect new information and insights that inform the long-term plans.

D. Content of GSLTP and Appendices

This GSLTP is comprised of seven major sections. Following the Executive Summary (I.) and this Introduction (II.), the remaining sections are: III. Central Hudson Service Territory Description, IV. Forecasting, Planning and Decarbonization Programs; V. Decarbonization Scenarios; VI. Near-Term Actions for Future Decarbonization; and VII. Conclusions and Report Implications.

The GSLTP also includes the following Appendices:

- A. 20-Year Historical Trend Gas Forecast and Location-Specific Gas Distribution Costs
- B. GSLTP Dynamic Model Overview
- C. Potential Hydrogen Blending Study
- D. Renewable Natural Gas Analysis, Final Report (Guidehouse)
- E. Utility Thermal Energy Network (UTEN) Potential Study
- F. Central Hudson Utility Thermal Energy Network Final Pilot Proposal (December 2023)



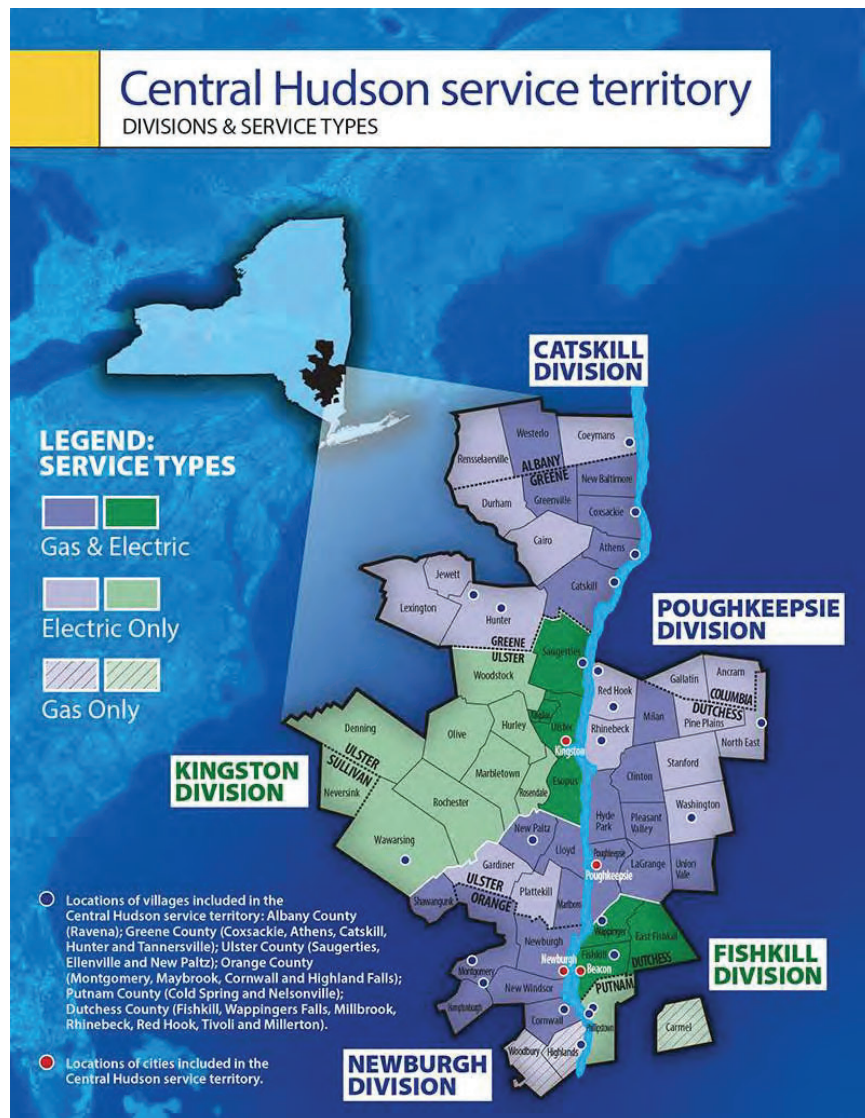
III. Central Hudson Service Territory Description

A. Service Territory Overview

Central Hudson Gas and Electric Corporation is a regulated electric and gas utility serving the mid-Hudson Valley of New York State. The Company provides electric and gas transmission and distribution (T&D) services to approximately 309,000 electric customers and 90,000 gas customers. The Central Hudson territory extends from the suburbs of metropolitan New York City north to the Capital District at Albany, covering approximately 2,600 square miles. The Central Hudson gas system is comprised of approximately 20,000 miles of services and mains and delivers approximately 11 million MCF of gas annually. Compared to its electric system, the Central Hudson gas service territory is fairly concentrated, as shown in the map below.¹³ It includes 96 distribution local systems (smaller networks) and the gas loads and pressure levels of these smaller systems drive distribution infrastructure planning and decisions. (See Figure 5, below.)

¹³ There are approximately 235,000 electric customers in the Central Hudson that do not receive gas service from the Company.

Figure 5: Map of Central Hudson’s Gas and Electric Service Territories



B. Central Hudson’s Customer Base

Of Central Hudson’s 90,000 gas customers, 90.4% also receive electric service from Central Hudson. There are only three service districts in which Central Hudson provides gas service but not electric service (Carmel, Highland Falls, and Woodbury). Customers fall into six general categories: residential, commercial, industrial, public authority, interruptible, and large firm transportation. Residential gas customer accounts have grown at a compound annual growth rate of about 1% over the last five years and commercial gas customers have grown at a compound annual growth rate of about 2% over the last five years. In comparison, industrial gas customer accounts have grown at a compound annual growth rate of 3.6% while public authority customers have grown at a rate of almost 5%. This growth on the C&I side has been fueled largely by new installations of warehouse and distribution centers, fulfillment centers, medicinal cannabis grow houses, sizeable gambling establishments, and

some tourism industry, along with concrete manufacturing facility expansion. On the public authority side, growth has been driven by supporting county economic development agency initiatives to extend gas to areas where they are seeking to attract commercial and industrial customers.

The vast majority of Central Hudson’s gas customers are residential customers and use gas for heating. However, the relatively smaller number of non-residential customers contributes a larger proportion of gas sales. The following graphics show a breakdown of overall customers by customer class as well as a breakdown of residential and commercial load by end use. Figure 6 highlights that gas usage in Central Hudson’s system is highly concentrated in a small number of customers.

Figure 6: Central Hudson Gas Customers by Customer Class and Sales Volume

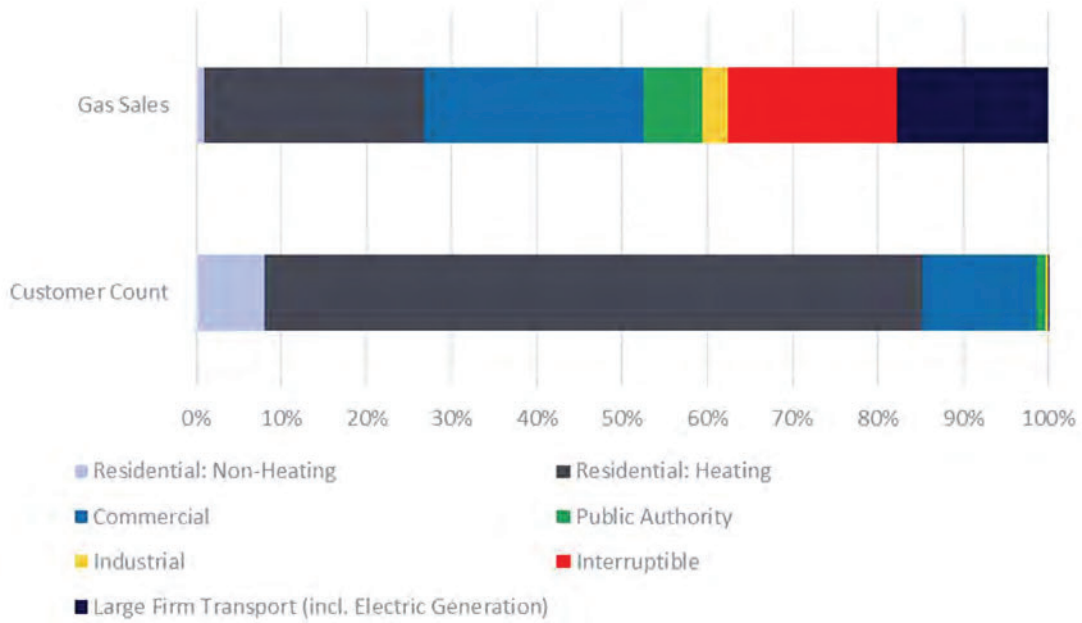


Figure 7 presents residential end uses by building type and Figure 8 presents commercial end uses by building type in Central Hudson’s service territory.

Figure 7: Residential End Uses by Building Type in the Central Hudson Service Territory

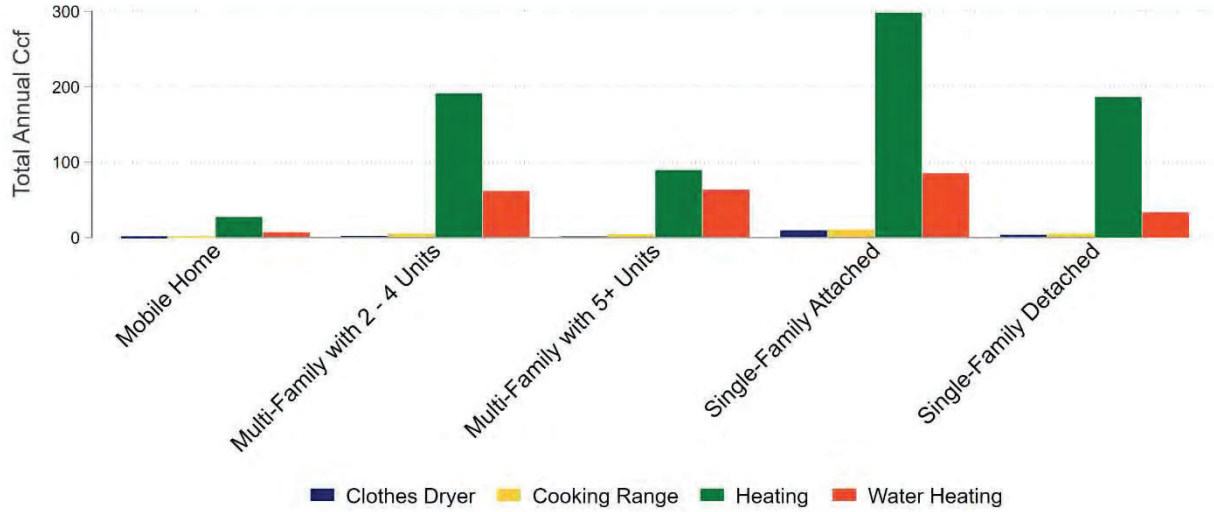
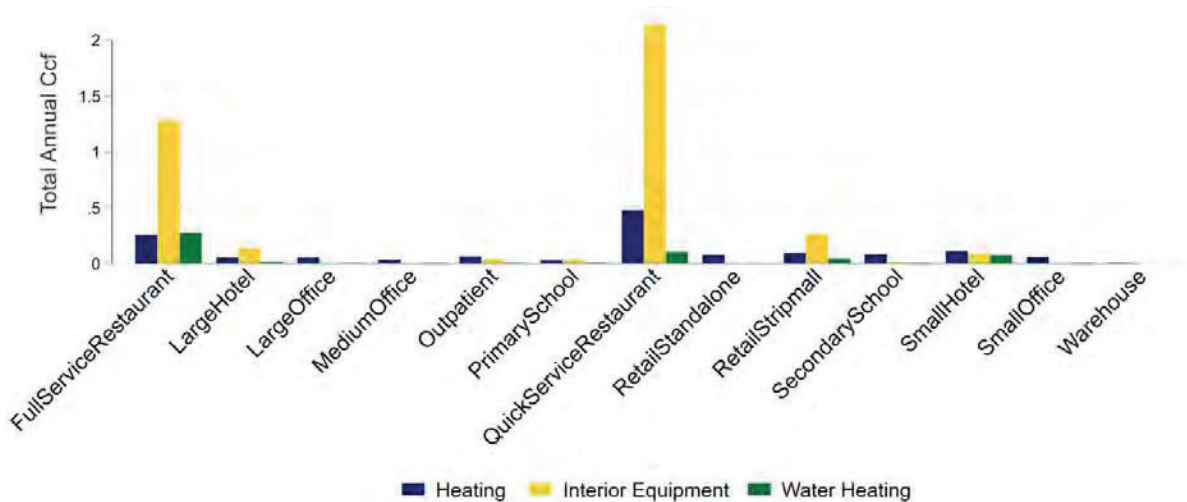


Figure 8: Commercial End Uses by Building Type in the Central Hudson Service Territory



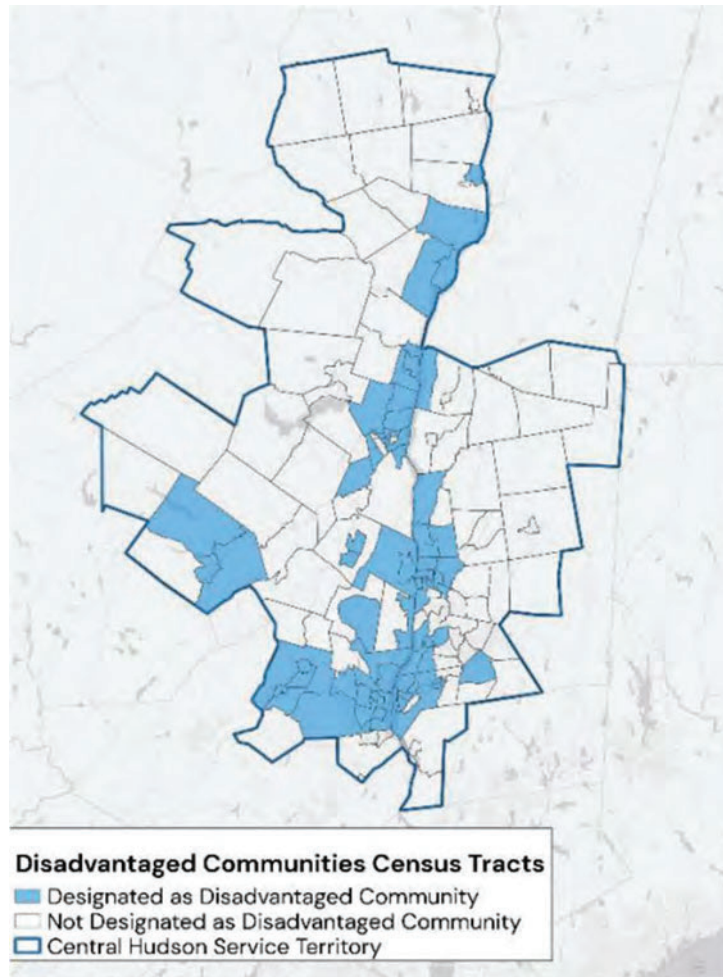
C. Disadvantaged Communities

The CLCPA established a Climate Justice Working Group (CJWG), which was charged with the development of criteria to identify DACs across the state based on socioeconomic data (e.g., energy burden, poverty rate) and to develop a process to gather public input. The CJWG identified 45 indicators and used them to classify certain census tracts as DACs, which according to the CLCPA must receive 35% (with a goal of 40%) of the benefits from clean energy program spending.¹⁴

¹⁴ CLCPA § 75-0117 Investment of funds; CLCPA § 7 Climate change actions by state agencies.

The map below highlights the identified DAC census tracts within Central Hudson service territory:

Figure 9: DAC Census Tracts in the Central Hudson Service Territory



Central Hudson estimates that 71% of its gas meters are located within a DAC. Of 34 Central Hudson NPA approval cases investigated since 2019, 23 cases are located within a DAC. Of five NPA cases that reached completion, four are in a DAC.

In addition to using the geographical indicators identified by the CJWG, the State also classifies households with annual income at or below 60% of state median income as low-income customers, which is a sub-category of DACs. Central Hudson offers funds for low-income customers and households, such as through the Home Energy Assistance Program (HEAP), which provides assistance with paying heating and cooling costs. For the 2022-2023 HEAP year, Central Hudson has distributed over 15,000 regular HEAP grants and almost 1,000 emergency grants, paying out approximately \$4.7 million to assist low-income Central Hudson customers with heating costs. Central Hudson also provides an additional bill discount to customers who are approved for HEAP by the NYS Department of Social Services. The discount is proportional to the grant allotted.

Central Hudson is engaged in the ongoing effort directed by the Commission to enhance reporting for DACs. Central Hudson filed its first DAC report on investments and energy saving benefits in DACs from 2020 through 2022 on December 28, 2023.¹⁵ DAC data is currently included in the GSLTP modeling and analysis to inform insights and planning, as is described in Section V. Going forward, Central Hudson will look to further integrate the results of its DAC reporting into its gas planning.

D. Capital Investment Plan

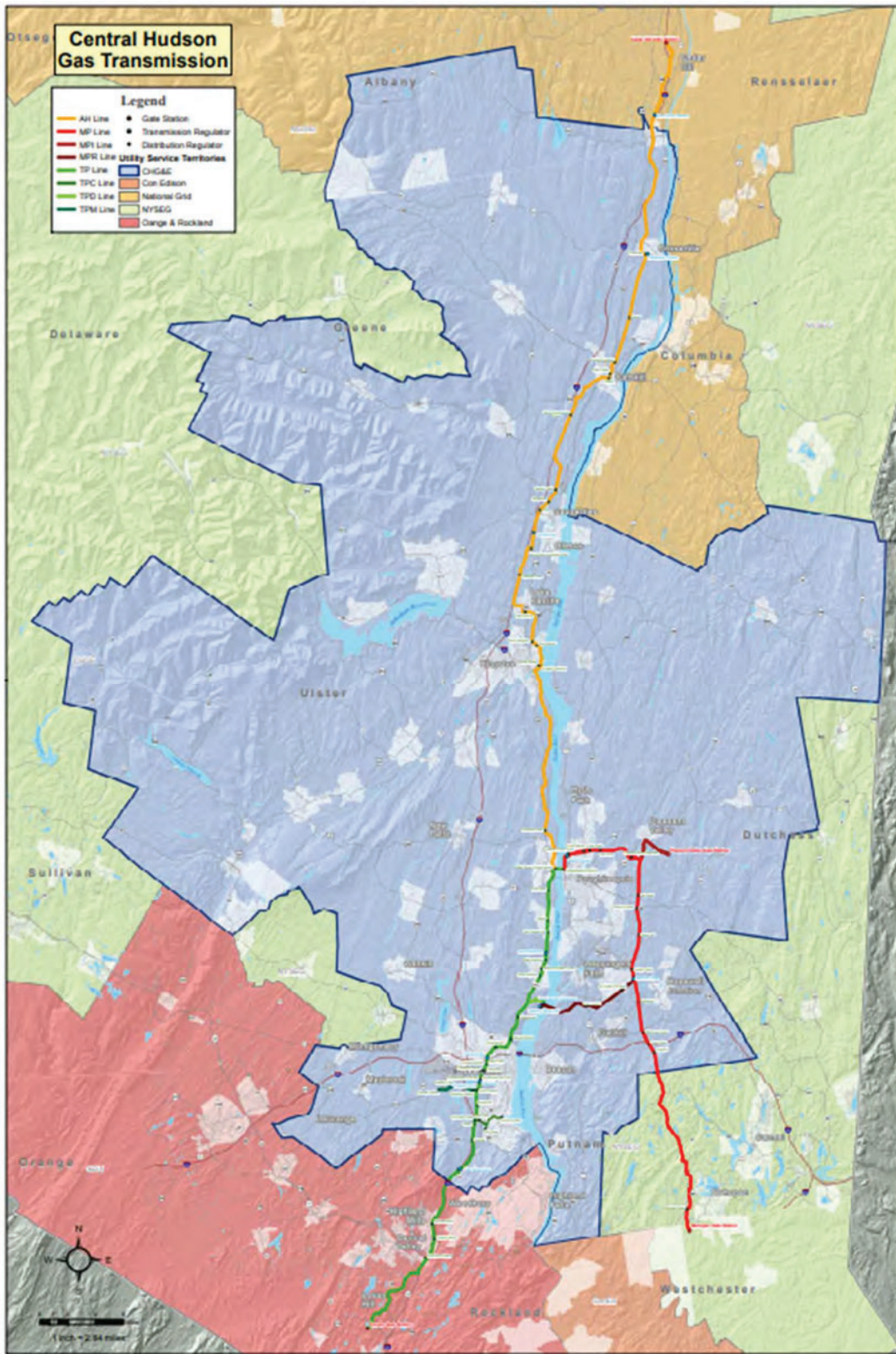
i. Distribution System Overview

Central Hudson maintains approximately 1,300 miles of mains and 67,000 services across five regions: Catskill, Fishkill, Kingston, Newburgh, and Poughkeepsie.

¹⁵ NE:NY Proceeding, In the Matter of Reporting Investments and Benefits to Disadvantaged Communities (filed December 28, 2023).

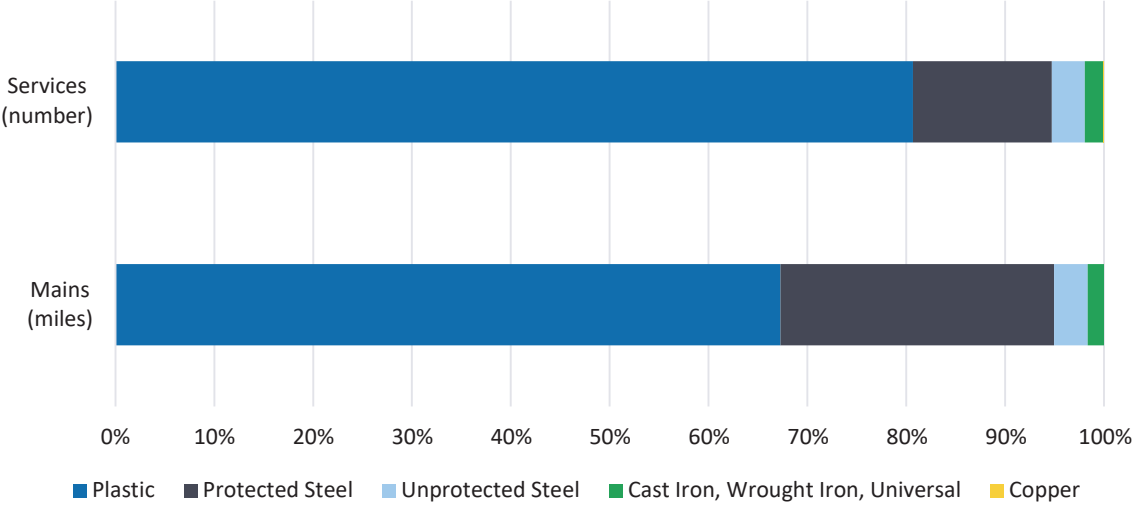
The following map depicts Central Hudson's entire gas transmission system.

Figure 10: Central Hudson Gas Transmission System



67% of mains are plastic and 31% are steel, while 81% of services are plastic. The chart below provides a breakdown of all materials.

Figure 11: Distribution Mains and Services by Material



ii. Five-Year Gas Capital Plan

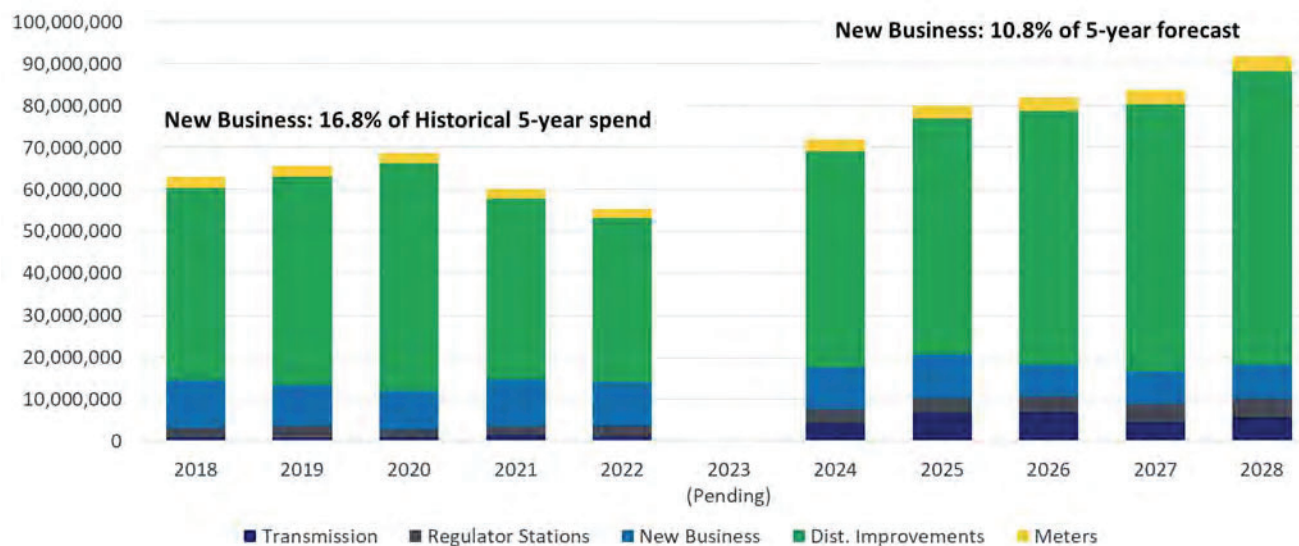
Central Hudson’s Five-Year Gas Capital Plan allocates for investments in the Company’s gas infrastructure including transmission, regulator stations, new business, distribution improvements, meters, and removals. Over the five-year period of the most recent Gas Capital Plan (2024-2028), approximately 62% of the plan budget is dedicated to replacing aging or obsolete equipment. 52% of this amount is dedicated toward the removal of leak-prone pipe (LPP), which is an essential factor in enhancing the safe delivery of gas throughout the Company’s service territory. The LPPRP also reduces the number of gas leaks in the system, which increases pipeline system safety as well. Central Hudson classifies LPP as cast iron, wrought iron, or steel that is either bare or ineffectively coated and not cathodically protected. As of the end of 2023, the Company had 66.8 miles of leak-prone mains and 66,703 services. Under its 2021 rate plan, Central Hudson must eliminate at least 15 miles of LPP per year, which means that the Company is projected to replace all LPP main as currently defined in approximately six years. In conjunction with the LPP Program, Central Hudson is currently proposing a Leak Prone Services program to replace services that are considered LPP but are not included within the LPP main program because they are not served by a leak-prone main. Central Hudson currently has 1,224 Leak Prone Services that fall outside of those to be replaced through the LPP program.

An additional replacement program, the Large Diameter Gas Welded Pipe Replacement Program, targets large diameter gas welded steel pipe, which is categorized as higher risk. Replacement of this pipe is prioritized along with LPP and accounts for 4% of the distribution improvements budget.

Approximately 6% of the total five-year budget will go towards maintenance and upgrades of the Company’s gas transmission system that operates above 125 psig. This includes replacement of transmission line valves with those that can accommodate installation of remote operators and In-Line Inspection (ILI) tools as well as replacement of an interconnection station and 1.8 miles of transmission lines to comply with a United States Pipeline and Hazardous Materials Safety Administration (PHMSA)

order. The Company is also pursuing a Line Valve Addition Program, partly to address deficiencies in spacing of transmission line valves due to population increases and addition of new buildings adjacent to the pipeline corridor. The current Line Valve Addition Program proposes the installation of three transmission valves over three years. All in all, Central Hudson’s capital budget is largely focused on maintenance, and not on system expansion projects, as shown in the following figure.

Figure 12: Gas Capital Historical Spend and Future Budget



E. Vulnerable Locations

i. Service Areas with Known Constraint Vulnerabilities

As outlined in its 2020 Supply and Demand Analysis Related to Service Areas with Known Supply Constraint Vulnerabilities,¹⁶ Central Hudson defines a “vulnerable location” as a portion of the system where gas may not be able to be delivered safely and reliably within the next five years, *i.e.*, where design day pressures are anticipated to drop below 50% maximum operating pressure (MAOP) under planning conditions in the next 5 years. In the 2020 study, four areas were identified as potentially vulnerable locations, primarily due to steadily increasing load growth that will spike projected peak demand above delivery capacity. These areas are East Fishkill & Hopewell Junction (Location A), an area in the Town of Poughkeepsie (Location B), a second area in the Town of Poughkeepsie (Location C), and Highland Mills (Location D). As described above, much of the Company’s capital investment plan is focused on infrastructure maintenance and improvement, with a small portion allotted to load growth. Central Hudson has engaged in mitigation activities at Location C, which required immediate action, and is closely monitoring the other locations as they consider the best path forward, including targeted energy efficiency and NPAs.

As part of this GSLTP Central Hudson conducted a detailed assessment of all local distribution systems and identified additional locations that are highly loaded. A 2024 report on historical trends and

¹⁶ Gas Planning Proceeding, *Central Hudson Gas & Electric Corporation Supply and Demand Analysis Related to Service Areas with Known Supply Constraint Vulnerabilities* (filed July 17, 2020).

location-specific gas distribution costs has been prepared in conjunction with this report (included as Appendix A). It identifies nine “beneficial locations” that would potentially benefit from demand or supply management, as the likelihood of triggering a growth-related infrastructure investment by 2034 in that area was 5% or greater. These areas include the Poughkeepsie-Newburgh, Highland Mills, Kingston-Saugerties (40#), Catskill LP, Poughkeepsie Medium, Carmel-Mahopac, Titusville-Pleasant Valley, Hopewell-Hughsonville, and Kingston-Saugerties (9.5#) systems.

ii. Potential Investment to Address High Loading of Select Systems

As part of its ongoing planning, Central Hudson is assessing a subset of its systems that currently have relatively higher levels of loading. This assessment includes factors such as: 1) recent trends in growth in customers and demand on each of the systems; 2) a review and updating of the planning parameters used to determine the loading calculations; and 3) potential reductions in usage on higher-loaded systems due to changes in customer behavior, including adoption of energy efficiency measures. The results of this analysis will be used to inform future planning and investments.

F. Economic Conditions

As illustrated in the sections above, Central Hudson’s gas customer growth has been slightly positive across all customer classes over the last five years, demonstrating relatively favorable overall economic conditions. The territory benefits from the downstate New York City commuting workforce that either worked from home during the COVID-19 pandemic or relocated to the Company’s service territory altogether. Many of these customers had existing familiarity with gas and an affinity for it. An ongoing housing deficit in the territory, especially for affordable housing in several counties, is driving new construction. Central Hudson’s underground residential development (URD) installation rate remains consistent, with an affordability component typically enforced by municipal planning boards. While many apartment complexes elect to forgo gas in favor of all-electric facilities, new construction of garden-style apartments, townhouses, and single-family home developments frequently elect to install gas where it is available.

It is important to note that the growth observed in commercial and industrial sectors has generally not resulted in demand for a skilled workforce with accompanying high-paying jobs. Homeowners may find it difficult to convert their heating system from gas to air- or ground-source heat pumps, which tend to be more costly. The Company understands that some customers struggle to keep up with their utility bills.

The growth in industries noted above has also been balanced by a contraction in small, private, and commercial business and bankruptcies of national big box chains. The Company’s operating district staff has observed persistent commercial vacancies or high turnover in suites of commercial plazas. Large national retailers such as Sears and Bed Bath & Beyond have closed locations in the Company’s service territory. Brick and mortar establishments continue to suffer loss of business to online retailers. Shopping malls in Newburgh, Kingston, and Poughkeepsie contain second-tier retailers and have difficulty leasing all available space. Regional and national banking institutions have reduced the quantity of branch locations. Elementary school closures and school consolidations in Kingston and Poughkeepsie public districts have accelerated.

Overall, a duality exists within the Company’s service territory where wealthier residential transplants, institutions with means, and new construction developers with a preference for gas are

maintaining customer growth, while at the same time a broad base of Central Hudson's customers, both residential and commercial, are experiencing a measurable amount of economic hardship. Gas remains the most affordable option for many, especially those whose facilities are already configured for gas. Existing gas is needed to support the economic livelihood of many in Central Hudson's service territory.

G. Climate Conditions

Central Hudson's service territory has a relatively mild climate that is consistent across the territory, with the exception of a small area in the Catskill Mountains that can experience slightly colder temperatures. In its Climate Change Vulnerability Study¹⁷ filed in September 2023, Central Hudson assessed its risk of vulnerability to extreme cold and ice as "low" for the majority of asset types and "moderate" or "not applicable" for a smaller minority. As discussed in the gas planning section below, there is a strong relationship between gas pressure drops and weather and therefore, the Company closely watches the weather to manage gas pressure drop risks. Due to the critical implication of pressure drops, the gas system is designed to withstand extreme cold conditions that occur rarely. Moreover, as weather volatility has intensified with climate change, the planning standards have been updated to withstand increased risk of extreme weather. Central Hudson currently plans its gas system for -8°F (73 HDD) daily average temperature conditions, which occurred in 1994.

Central Hudson has seen numerous extreme weather events in recent years. Those events have significantly impacted its electric transmission and distribution networks but have not had a comparable impact on Central Hudson's gas systems. This reflects that gas systems are far less susceptible to extreme weather (*e.g.*, wind, snow, and ice), and therefore have greater reliability metrics than electric networks. This is due primarily to the vast majority of electric transmission and distribution lines being above ground, where they can be impacted by extreme weather, as opposed to the gas system, which is below ground. From 2014 to 2023, Central Hudson's electric system experienced 5 weather events that resulted in 50,000 or more customer outages (*i.e.*, the number of outages associated with Class 3 events, the most severe) and 33 storms with 10,000 or more customer outages (*i.e.*, the number of outages associated with Class 2 and Class 3 events).¹⁸

In contrast, Central Hudson has experienced far fewer weather-related outage events on its gas side. Damage from severe flooding events in 2011 (Tropical Storm Irene), 2021 (Tropical Storm Ida), and 2023 (Heavy Rain event in July) caused gas lines to become uncovered and exposed to water, but none resulted in widespread interruption to customer service. Only when an exposed pipe was struck by debris and caused to break was service interrupted for a small handful of customers during emergency repairs. To enhance the safety and reliability of its gas system Central Hudson has proposed The Creek Crossing Risk Remediation Project in its recent rate filing. This project would proactively target creek crossings that pose a high risk to the Company and install a bypass by either boring or rerouting the pipeline strategically.

While such weather events have infrequently impacted Central Hudson's gas pipes and associated reliability metrics, extreme cold does have the potential to impact the delivery of gas supply

¹⁷ Case 22-E-0222, *Proceeding on Motion of the Commission Concerning Electric Utility Climate Vulnerability Studies and Plans*, Central Hudson Climate Change Vulnerability Study (filed September 25, 2023).

¹⁸ Central Hudson Electric Emergency Plan, December 15, 2023. See, Central Hudson's Incident Classification Guidelines, p. 8.

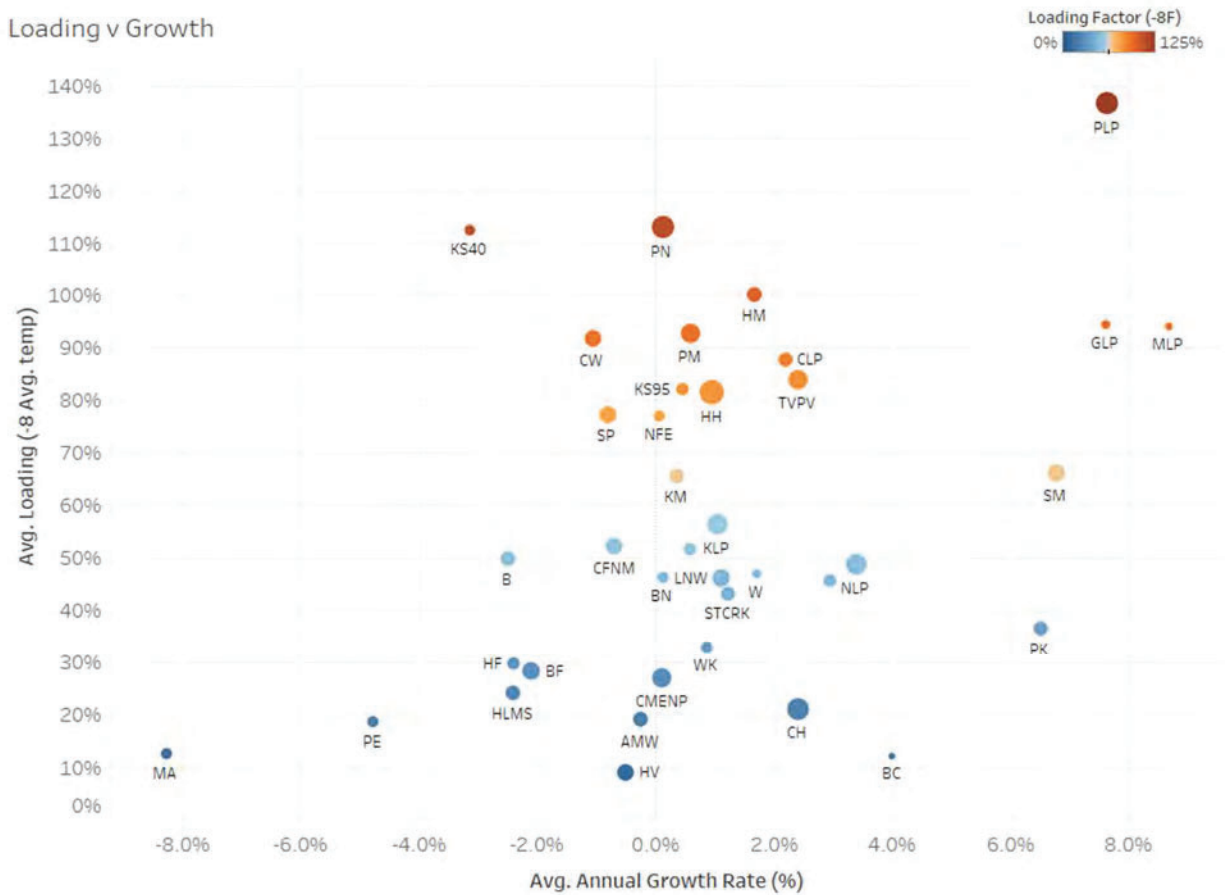
to Central Hudson's system. For example, during Winter Storm Elliott in December 2022, gas supplies coming into the state became limited as production facilities experienced issues with freezing and weather-related access issues that prevented maintenance. Other utilities in the state experienced problems with maintaining service to their customers, but Central Hudson's system remained reliable, and there was no interruption to customer service. Central Hudson's strong gas system reliability is a result of significant Company focus and investment, and the Company remains committed to ensuring such reliability going forward.

H. Capacity Constraints

Central Hudson has not historically experienced (nor does it expect to experience) issues with capacity or deliverability constraints at the interface between the interstate pipeline system and the four citygates that bring gas into the Central Hudson service territory. However, if a citygate were to experience an unexpected outage (*i.e.*, in an "n-1" scenario), it is possible that the gas system would be unable to redirect gas between Central Hudson system segments to the region most affected by the outage to effectively meet demand.

Central Hudson uses Scenario Modeling to evaluate factors such as loading and pressure on all system segments, including those that have experienced high loading on a percentage basis as compared to historical planning standards. Figure 13, below, shows the loading of systems, as compared to the growth rate over time. These assessments help the Company evaluate opportunities to maintain and enhance reliability.

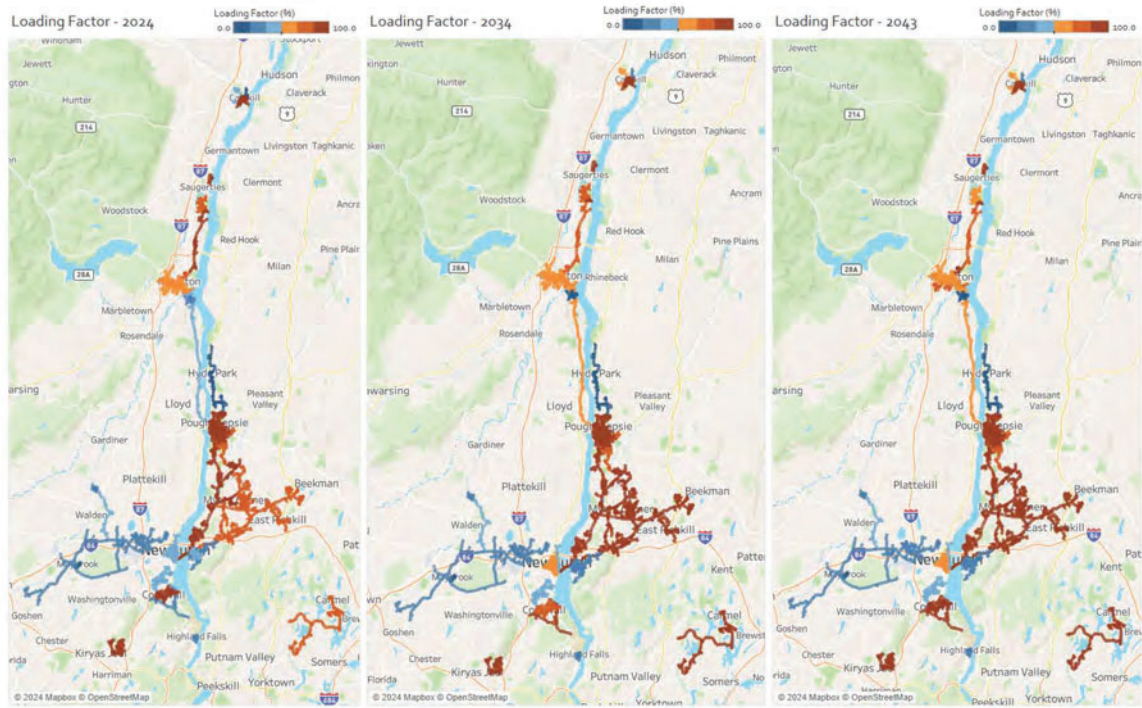
Figure 13: System Loading Factor as Compared to Growth Rate in Loading



Bubble Size is proportional to the annual peak Mcf of the gas system. The color reflect the overall loading for each gas system. The data is filtered on Gas Year, which keeps 2023.

Figure 14 provides an additional visualization of Central Hudson’s system analysis for the PUT Scenario. Understanding location-specific growth rates and the room for growth is critical for gas planning.

Figure 14: Map of Loading Conditions for the PUT Scenario



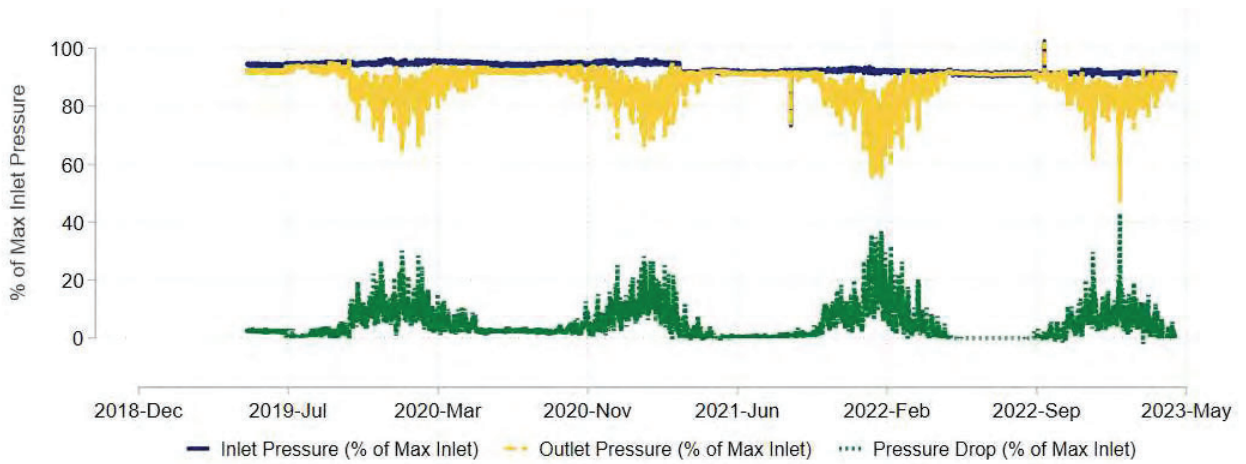


IV. Forecasting, Planning and Decarbonization Programs

A. Gas Planning Criteria

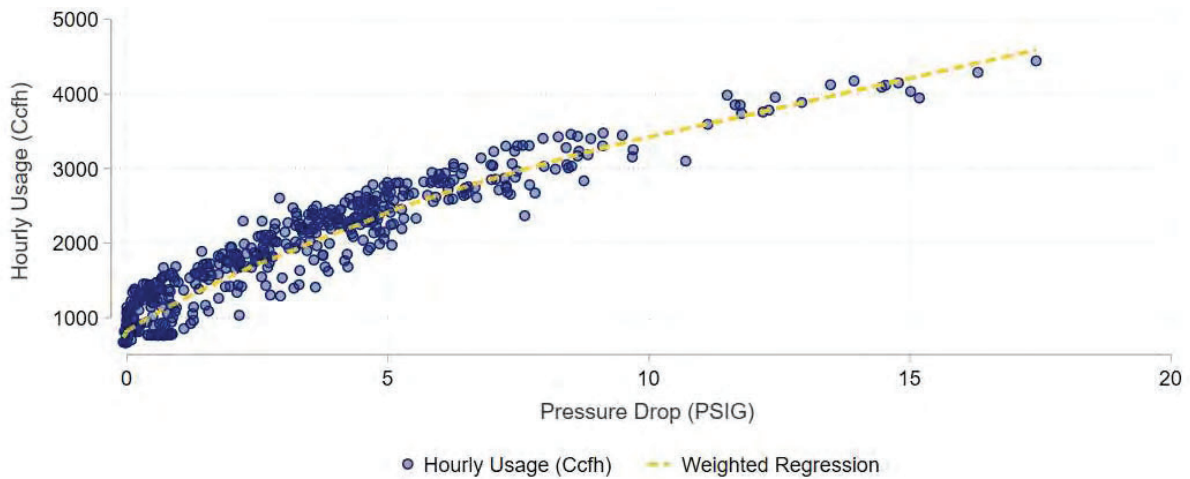
The following set of figures walks through some key concepts that frame the approach to gas planning. At a fundamental level, gas planning and infrastructure focuses on maintaining system pressure above a minimum level to ensure normal system functionality. Central Hudson reinforces distribution networks when gas pressure is projected to drop below 50% of the normal operating pressure under conditions where the average daily temperature reaches -8°F .

Figure 15: Gas Planning Requires Maintaining Pressure Above a Minimum Level



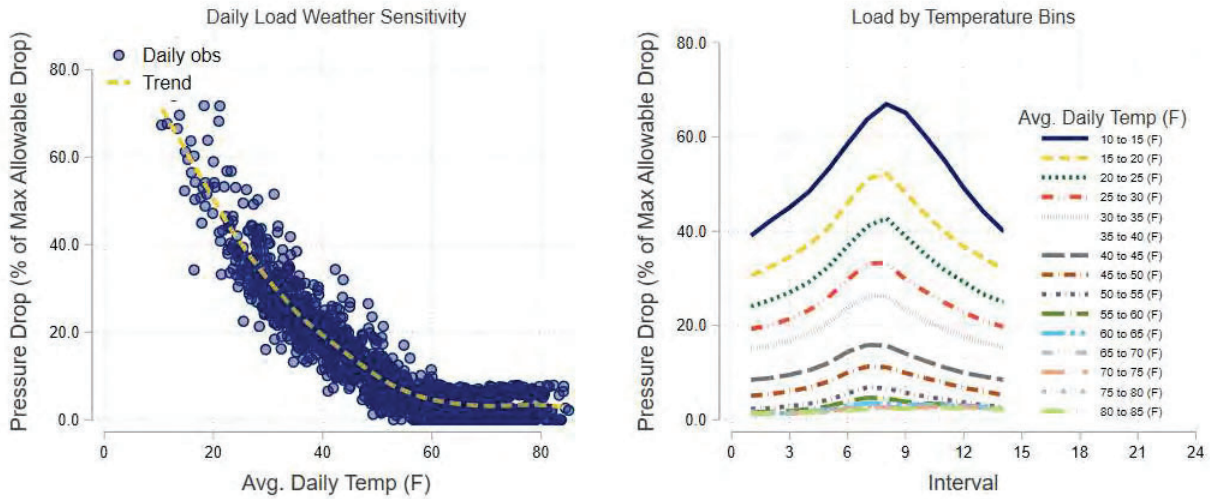
Increases in peak demand lead to pressure drops for local gas systems, as shown in Figure 16, which can affect service functionality.

Figure 16: Peak Demand Correlation to System Pressure



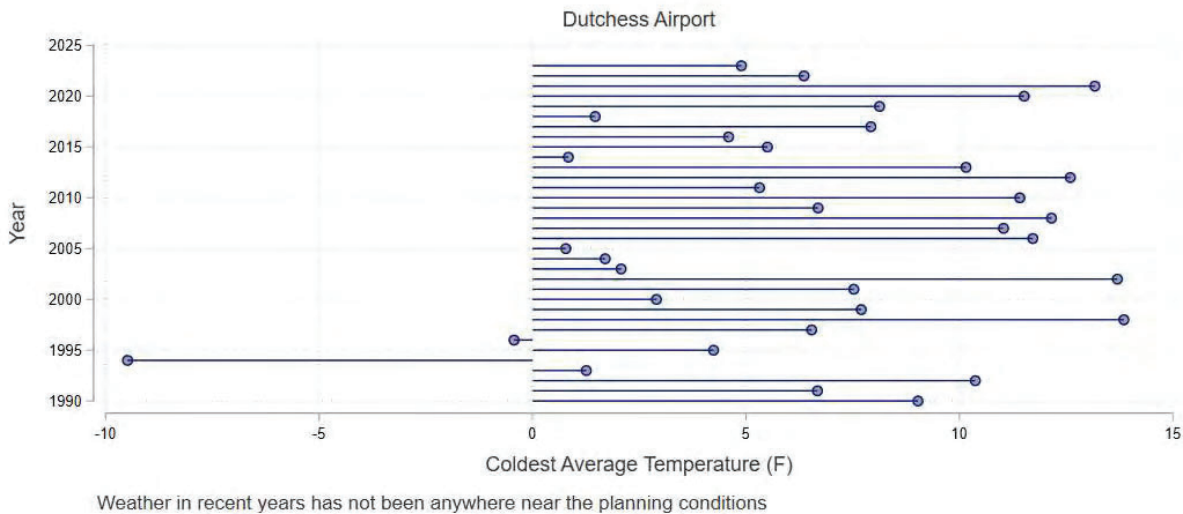
There is a strong relationship between gas pressure drops and weather, as shown in Figure 17.

Figure 17: Relationship Between Gas Pressure Drop and Weather



Therefore, gas system planning must consider extreme conditions that occur rarely, as shown in Figure 18, but have large consequences.

Figure 18: Extreme Weather Conditions



B. Sales Volumes and Peak Demand Forecast

Central Hudson develops a top-down 5-year sales volume and peak demand forecast annually for the purposes of procuring gas supplies, identifying asset needs, and implementing new rates. That analysis uses historical customer, volume and peak demand information and applies an econometric model and trend projections to develop the 5-year forecasts. For planning purposes in this GSLTP, the Company has employed a bottom-up approach to estimate historical year-to-year growth patterns and

variability in growth for individual areas of Central Hudson’s distribution system, which is distinct from the Company’s five-year forecast. The historic load growth forecasts are developed using probabilistic methods rather than straight-line forecasts. The approach takes into account the reality that there is much greater uncertainty 10 years out than a year out, and it accounts for the risk mitigation value of resources that manage local peak demand. Forecasts are inherently uncertain and become more uncertain further into the future. The historic load growth forecasts are then used to develop the 20-year forecast.

The data relied on for this analysis includes:

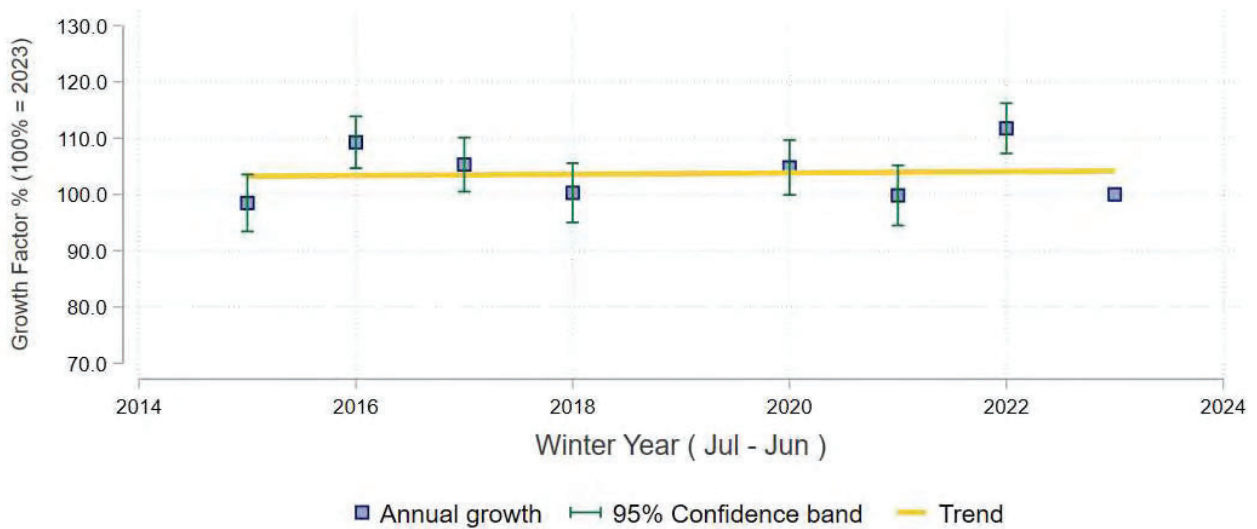
- 2014-2023 15-minute gas system pressure at inlet and outlet metering points;
- 2020-2023 monthly billing data in hundred cubic feet (Ccf), for all customers served by each gas system;
- 1990-2023 weather data from the Dutchess County Airport station;
- Planning standards – gas systems are designed to exceed the minimum allowable pressure when the average daily temperature is -8°F;
- Operational characteristics such as minimum and normal pressure levels for each gas system; and
- Cost estimates for infrastructure upgrade projects.

Ultimately, a key goal of the study is determining how growth in gas consumption during peak periods affects the change in gas pressure and, by connection, the need for infrastructure upgrades or upstream asset agreements. The analysis was implemented for 43 of Central Hudson’s gas systems to better understand the amount of growth each system could accommodate, the timing of peak loads, the concentration of peaks, and the relationship between peak demand and weather.¹⁹ Once the historic growth demands were estimated they were used to assess the growth trend, the variability of growth patterns and the degree to which growth in a given year was related to growth during the prior year – this is known as auto-correlation. The econometric models were purposefully designed to both estimate historical load growth and allow the Company to weather normalize loads for average winter conditions. The 2018-2023 winter peaks were normalized for planning conditions (daily average temperature of -8° F) based on the Central Hudson gas system design. Specifically, they estimate the annual percent change in peak loads after controlling for weather conditions and day of week effects.

Figure 19 illustrates the historical growth factor for one of Central Hudson’s highest loaded systems. First, the analysis produces year-by-year estimates of the historical growth or decline in loads after controlling for differences in weather, day of week, and season. Second, the year-by-year estimates allow us to estimate the growth trend. In the example below, loads are increasing at a rate of 0.95% per year. Third, the results enabled us to estimate the variability in year-to-year growth patterns (also known as the standard error of the forecast).

¹⁹ Central Hudson has 96 gas systems in total, but this analysis included gas systems with hourly or 15-minute gas pressure data. The 43 gas systems included cover well over 80% of the customers and gas consumption.

Figure 19: Year by Year Estimates of Historical Growth for a Local Gas System



The load growth forecasts were developed using probabilistic methods—Monte Carlo simulations—that produced the range of possible load growth outcomes by year. The model simulates the reality that the near- term forecast has less uncertainty than forecasts 10 years out. A total of 2,000 simulations were implemented for each gas system. Each simulation produced a distinct growth trajectory that took into account the historical trend, variability in growth patterns, and the fact that growth patterns are auto-correlated.

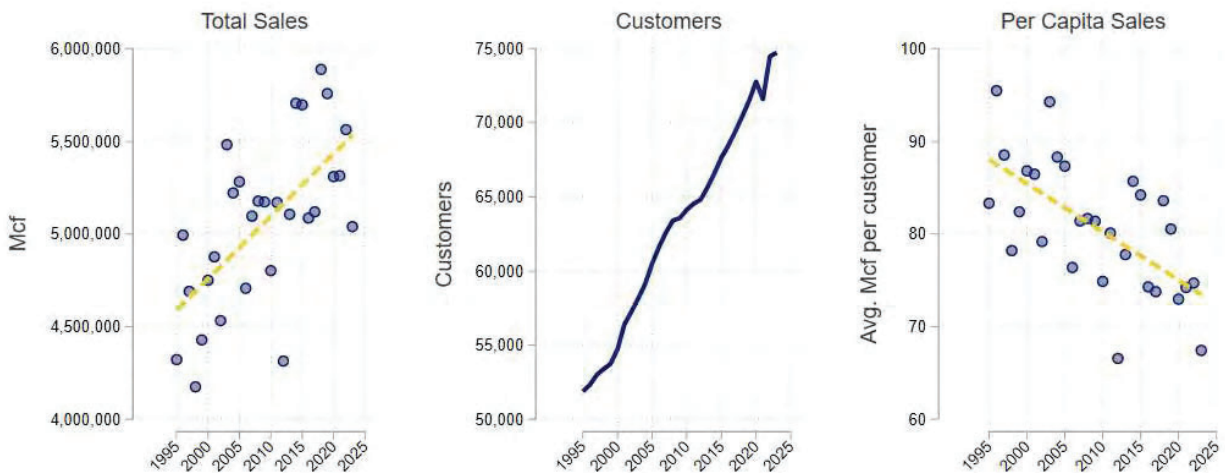
In addition, the gas usage and customer growth trends were analyzed using data from 1995-2023. Since 1995, total customers in Central Hudson have grown by 1.37% per year, with higher growth rates among commercial accounts, 1.75%, than among residential customers, 1.31%. The following chart shows the historical trend of Central Hudson’s annual weather normalized sales plus a forecast reflecting the historic trend through the GSLTP time period. As this shows there has been consistent sales growth since 1990 and it shows a projection of that continued growth if none of the policy or decarbonization activities described in this methodology section and in Section V are implemented.

Figure 20: Central Hudson Annual Sales Historical and Trend Forecast



Over the 1995-2023 period, while the residential customer counts and gas sales grew, the per capita energy use declined substantially as shown in Figure 21. Overall, controlling for weather, residential energy use declined by 7.1% on a per customer basis since 1995. During that same time period (1995-2023), the number of residential customers has grown 1.31% at a compounded annual growth rate.

Figure 21: Residential 1995-2023 Change in Per Customer Energy Use



C. Demand-Side Programs

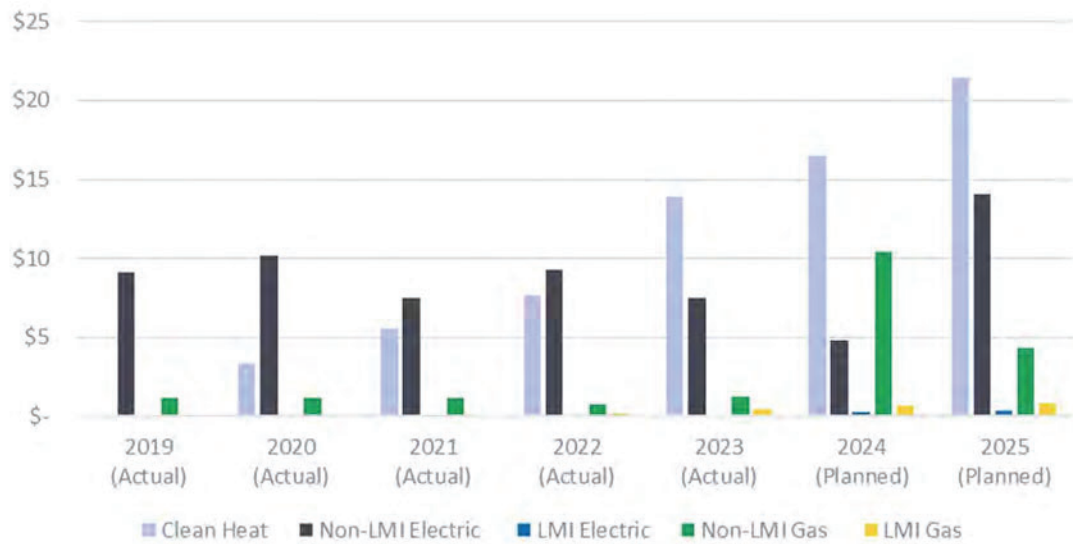
i. Energy Efficiency

Description of Program

Central Hudson currently implements a comprehensive portfolio of gas and electric energy efficiency programs, which include a variety of solutions for residential, commercial, and industrial customers, and which are described in the Company’s annual 2019-2025 System Energy Efficiency Plan

(SEEP). The Commission has authorized Central Hudson’s current energy efficiency budget and targets,²⁰ with additional 2021-2024 expanded targets authorized under a recent rate case approval order,²¹ resulting in a continued scaling up of the energy efficiency portfolio on an annual basis from prior years, as shown in **Error! Reference source not found.**, below.²²

Figure 22: 2019-2025 Gas and Electric EE Portfolios (\$, millions)



Central Hudson collaborates with the other New York State utilities and NYSERDA to develop coordinated statewide efficiency initiatives targeting low and moderate income (LMI) customers. Central Hudson has taken an active role in the initiatives presented in the LMI Implementation Plan²³ and seeks to ensure LMI customers have equal access to all programs regardless of funding sources for the full duration of the plan.²⁴

²⁰ NE: NY Proceeding.

²¹ Case 20-E-0428, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Central Hudson Gas & Electric Corporation for Electric Service et al*, Order Adopting Terms of Joint Proposal and Establishing Electric and Gas Rate Plan (issued November 18, 2021).

²² 2023 SEEP, p. 4.

²³ NE: NY Proceeding, *Statewide LMI Portfolio Implementation Plan*, November 1, 2023. Full descriptions of the LMI Portfolio are provided in this plan.

²⁴ 2023 SEEP, p. 4.

Figure 23: Air Source Heat Pump System Installed at a Central Hudson Customer Residence



The associated greenhouse gas emissions savings from these programs over this period is estimated at 197,246 metric tons of CO₂.²⁵

The Company continues to leverage opportunities to implement Energy Efficiency programs in a way that is complementary to other energy transition initiatives, including the New York Renewing the Energy Vision (REV) initiative. For example, additional incentives are being offered within Non-Pipeline Alternatives to facilitate home electrification and the strategic retirement of leak-prone pipes.²⁶

While Central Hudson’s budgets and targets governed by the SEEP cover the years 2019-2025, Central Hudson has also filed its Energy Efficiency/ Building Electrification Proposal (EE/ BE Proposal)²⁷ which provides proposed budgets and targets for the period 2026-2030. A central element of the Commission’s EE/ BE Proposal Order²⁸ and Central Hudson’s EE/ BE Proposal is the adoption of a framework of categorizing measures as “strategic,” “non-strategic,” and “neutral,” with the Order requirement of at least 85 percent of budget supporting strategic measures, with no budget for non-strategic measures, with a possible exception for LMI measures.²⁹ Central Hudson’s EE/ BE Proposal allocates 92 percent of the budget to strategic measures, with the key shift of supporting the rollout of weatherization measures and building electrification continuing funding the Clean Heat programs. This also reflects the shifting away from the traditional lighting measures (recognizing the market transformation to efficiency lighting (*i.e.*, LEDs)) as well as the significant reduction in gas measures (*e.g.*, including away from traditional major natural gas measures such as replacements of older oil, gas, and propane furnaces and boilers with new efficient gas ones.)

Figure 24, below, shows the project budgets and targets for 2026-2030 from Central Hudson’s EE/ BE Proposal. It is noted that, consistent with the EE/ BE Proposal Order’s shift away from most gas measures, Central Hudson’s budget focus is shifted more to electric programs. For the 2026-2030

²⁵ 2023 SEEP, tables 3A-3E and 4A-4E.

²⁶ 2023 SEEP, p. 4.

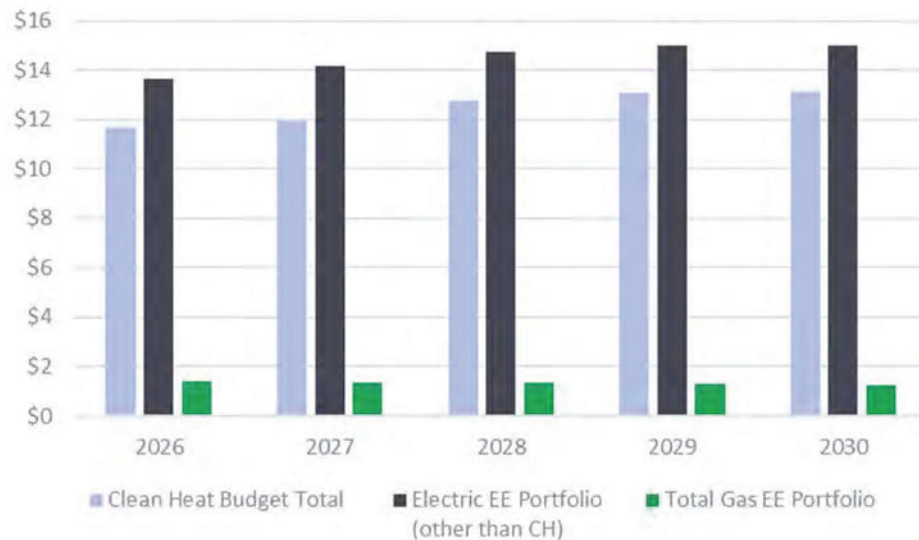
²⁷ NE:NY Proceeding, Central Hudson EE/BE Proposal (“EE/BE Proposal”, filed November 1, 2023). Given their recent filing, these proposed budgets and targets have not yet been ruled on.

²⁸ NE:NY Proceeding, EE/BE Order.

²⁹ *Ibid.*

Portfolio, \$121.8 million is allocated to electric programs, including \$62.5 million to Clean Heat and \$39.4 million to weatherization; an additional \$2.6 million in weatherization budget is allocated for the gas programs.³⁰ For the period 2026-2030, the funding for LMI EE programs is being shifted to NYSERDA, and so Central Hudson does not have LMI EE budgets beyond 2025.

Figure 24: Central Hudson Electric and Gas Portfolio Budgets 2026-2030 (\$, millions)³¹



ii. Clean Heat Program

Description of Program

Central Hudson is one of the utility program administrators of the New York State Clean Heat Program (Clean Heat), which was launched on April 1, 2020, and supports the adoption of efficient electric heat pump systems for space heating and water applications throughout New York. Through the Clean Heat Joint Management Committee, Central Hudson coordinates with the other electric utility program administrators and NYSERDA in all aspects of program administration, including the core incentive program to support adoption. The Clean Heat Program was authorized by the 2020 NE: NY Order³² for the period 2020-2025, with Central Hudson a budget of \$43.2M to achieve 255,292 Gross MMBtu of savings beginning April 1, 2020, through December 31, 2025.³³

Figure 25 below shows the spending and savings achieved through 2022.

³⁰ See *supra*, note 27.

³¹ *Ibid.*

³² NE:NY Proceeding, Order Authorizing Utility Energy Efficiency and Building Electrification Portfolios Through 2025 (“2020 NE:NY Order”) (issued January 16, 2020).

³³ In the development of this initial GSLTP, Central Hudson supports the analysis of many decarbonization approaches including those that are not yet available. One of these approaches is a natural gas heat pump. Central Hudson’s parent company, Fortis Inc., is also piloting natural gas heat pumps in its other service territories.

Figure 25: Clean Heat Program Spend and Achievement 2020-2022³⁴

Category	Spend (\$)	Savings (MMBtu)
Cumulative 2020-2022 Spend/ Achievement	\$43,839,088	447,752
Cumulative NE:NY 2020-2025 Budget/ Target	\$43,221,312	255,292
Share of NE:NY Budget/ Target Realized Through 2022	101%	175%

In February 2023, Central Hudson filed a petition for additional funding to support the Clean Heat program and avoid a market pause; due to high activity and increased adoption rates, Central Hudson surpassed cumulative Clean Heat savings goals and needed additional funding to support continued activity. On June 22, 2023, the Commission authorized additional funding of \$25 million for the program along with stipulations for closer collaboration with DPS Staff and stakeholders moving forward.³⁵

As described above, Central Hudson has also filed its EE/ BE Proposal³⁶ which provides a higher-level planning proposal for the period 2026-2030. The budgets and targets from the EE/ BE Proposal have not been authorized to date, but this information is appropriate for planning and modeling in this GSLTP. Central Hudson proposes to allocate over 50 percent of its electric energy efficiency portfolio 2026-2030 budget (~\$62.5M) (incentives and administration) to Clean Heat.³⁷ This is reflective of Central Hudson's Clean Heat Program having been successful, exceeding targets at lower than projected unit cost.³⁸ The EE/BE Proposal outlines strategies to improve/ increase the effectiveness of the Clean Heat program for 2026-2030.³⁹

As noted above, Central Hudson is using a model that includes analysis of each segment of its gas distribution system as well as each circuit on its electric system. Central Hudson has conducted analysis of customer adoption of heat pumps in its service territory through the Clean Heat Program. This enables the Company to have a view on adoption of its electric system as shown below.

³⁴ NE:NY Proceeding, New York State Clean Heat Program 2022 Annual Report (filed April 3, 2023), p. 16.

³⁵ NE:NY Proceeding, Order Approving Funding for Clean Heat Program (issued and effective June 23, 2023). The additional \$25 million in funding consisted of nearly \$4 million of previously collected and unspent funds, reallocation of \$13.5 million of previously authorized non-LMI electric energy efficiency budgets, \$1.7 million of accrued interest on Clean Energy Fund collections, and spend up to an additional \$6 million in Continuity Funding, if needed, to support Central Hudson's Clean Heat program.

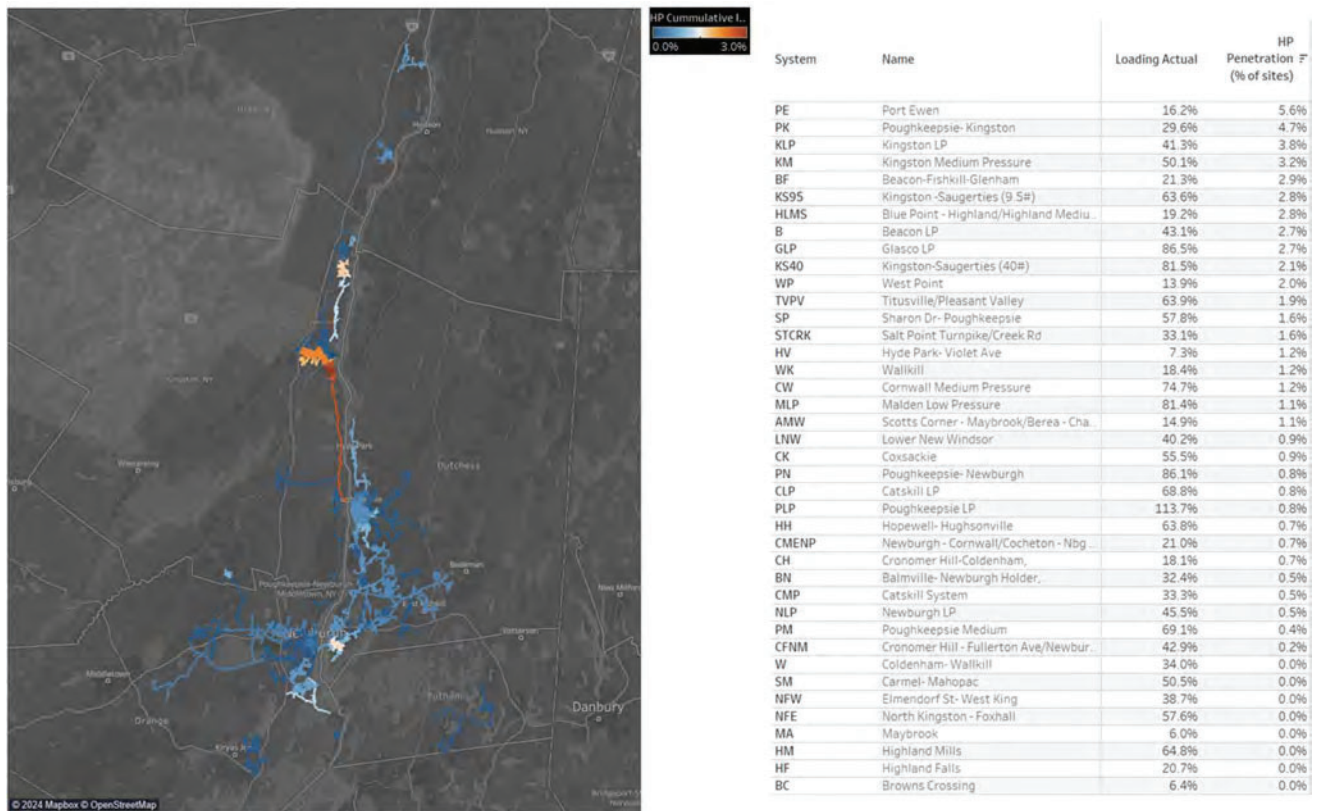
³⁶ NE:NY Proceeding, EE/BE Proposal.

³⁷ *Ibid*, pp. 9, 27

³⁸ *Ibid*, p. 9.

³⁹ *Ibid*, p. 9-10.

Figure 26: Geographic Location of Heat Pump Adoption (As of 2023)



Further analysis and conclusions are identified in the Company’s 2023 DSIP Filing, but key findings for the purposes of this GSLTP include that most customers who adopted Heat Pumps through Clean Heat were served by a heat fuel other than gas, by approximately 2:1 margin. While this does not deter Central Hudson’s efforts at reaching gas customers, it does provide a notable data point for planning of conversion of current gas customers to beneficial electrification. Importantly, this is not a negative comment on the Clean Heat program and its benefits, since the greenhouse gas emissions benefits and dollar savings are generally higher for customers switching to heat pumps from fuels such as propane and oil, as compared to gas. Thus far heat pumps have not been targeted at highly loaded local gas systems.

iii. Non-Pipe Alternatives

Description of Program

Non-Pipeline Alternatives (NPAs) are projects designed to displace the need for traditional gas infrastructure investment. Since its 2017 Rate Case filing, Central Hudson has proposed and pursued incorporating NPA projects in its system planning processes, consistent with the Commission’s Order

Adopting Terms of Joint Proposal and Establishing Electric and Gas Rate Plan.⁴⁰ The Company is pursuing two categories of NPA projects, both of which employ non-traditional solutions to avoid traditional infrastructure construction: Transportation Mode Alternatives (TMA) and Load Growth-Based Projects.

Transportation Mode Alternatives

Central Hudson's transportation mode alternatives projects are designed for strategic abandonment of leak prone pipe through electrification where it is more cost effective than replacement and system reliability is not negatively impacted. LPP is any gas distribution piping that is not made of either plastic or "protected" steel pipe. Common leak-prone materials are wrought iron, cast iron, and unprotected steel. In order to improve safety and reduce ongoing maintenance costs, LPP that cannot be protected or abandoned must be replaced with new plastic pipe.

Through electrification of customers' heating and appliances, LPP can be retired permanently in strategic locations. The approach is ideal for low customer saturation areas with high LPP replacement costs. For a TMA initiative to be successful, all the gas customers served by the designated infrastructure must agree to retire their gas service, and this level of customer adoption can be difficult to achieve.

To date, the Company has identified over 40 separate TMA project locations throughout its service territory where it is potentially feasible and cost-effective to permanently retire sections of LPP. These project locations, referred to as "cases", include more than 100 customers in total.⁴¹ These have been filed in annual filings since 2019, with additional projects being identified each year. Cases have been designated as high priority when they have heightened time constraints due to concurrent Company or municipal initiatives. Central Hudson pursues TMA cases based on a determined priority, as opposed to their chronological identification. Additional information is provided on each of these cases in the Company's most recent NPA Annual Report.⁴² It should be noted that to complete most of these projects an increase in incentives will be needed as well as 100% participation from customers. Customer adoption will be critical to the success of these programs.

⁴⁰ Case 17-G-0460, *Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Central Hudson Gas & Electric Corporation for Gas Service* ("2017 Rate Proceeding"), Central Hudson Gas & Electric Corporation's Non-Pipeline Alternatives Annual Report ("NPA Annual Report"), (filed December 1, 2022) p. 2.

⁴¹ Central Hudson Gas & Electric Corporation's Non-Tariff Implementation Plan & Compliance Filing for Non-Pipe Alternatives: Three Transportation Mode Alternatives" ("2019 Implementation Plan"), filed in June 2019. The first three cases were submitted in 2019 Implementation Plan. In 2020, the Company broadened its scope for potential projects and identified 37 additional cases as potential TMA candidates. Five of these new cases were identified as "high priority" and included in Central Hudson's "2020 Implementation Plan," filed in June 2020. On September 15, 2021, the Company filed its "2021 Implementation Plan Update." Thirteen additional NPA project opportunities were included in this update; seven cases from 2020 which did not proceed with NPA conversions at that time, and six new cases being initially pursued in 2021. On October 24th, 2022, the Company filed its "2022 Implementation Plan Update." Six additional NPA project opportunities were included in the update; five cases from the 37 potential projects identified in 2020, and one new case identified in 2022.

⁴² 2017 Rate Proceeding, 2023 Central Hudson Non-Pipes Alternative Annual Report (filed to DMM December 1st, 2023)

Load Growth-Based Projects

Load Growth Based Projects would be designed to manage locational constraints that are associated with peak demand. Central Hudson commissioned and completed an avoided gas distribution study to determine if there are imminent constraints on the gas distribution system that would warrant the development of such an NPA at this time. This study determined that all potential avoidable distribution cost or deferral value is concentrated in a single gas distribution system, referred to as the PN Line, which is located in the Town of Poughkeepsie. The study concluded that the potential for future investment in the PN line is not certain enough to warrant the development of a NPA at this time.

Nonetheless, Central Hudson has considered this an opportunity to leverage existing initiatives to manage the potential for a future load constraint. With a focus on the PN Line, Central Hudson evaluated its existing portfolio of energy efficiency and electrification technologies in conjunction with “kickers” in a peak load management application. Kickers provide a flexible, low-cost solution that can be implemented on an as-needed basis. Six energy efficiency and electrification measures currently offered within Central Hudson’s Demand Side Management program were considered. These measures are all currently deployed within Central Hudson’s programs and have been determined to be broadly cost effective. To assess the use of kickers, Central Hudson conducted a Locational Benefit-Cost Analysis which indicated that smart thermostats⁴³ are the most cost-effective measure to deliver targeted load reductions. Central Hudson implemented a “kicker” incentive to promote ENERGY STAR certified smart thermostats to customers served by the Vassar Road portion of the PN Line with the goal of providing more concentrated load relief to that system. Central Hudson will implement this initiative on an as needed basis and set incentive levels based on consideration of existing portfolio budgets. The Company continues to monitor the PN line for operating within the system’s design parameters.

iv. Utility Thermal Energy Networks (UTEN)

Description of Program

Thermal energy networks offer numerous potential benefits for customers and communities, including reductions in GHG and other climate emissions through the decarbonization of buildings and communities. Pursuant to requirements in the CLCPA and the Utility Thermal Energy Network and Jobs Act, Central Hudson designed its Thermal Energy Network pilot (Thermal Pilot) to test the feasibility and economics of using thermal network applications to replace gas, which will consequently inform the Commission's future promulgation of regulations governing thermal energy networks. The Thermal Pilot supports the climate justice and emissions reduction mandates of the CLCPA by providing thermal energy to participating customers in a designated disadvantaged community. In addition, it tests financial and technical approaches to equitable and affordable building electrification that, among other attributes, may mitigate up-front cost barriers to individual customers while investing in clean energy infrastructure. Furthermore, the pilot is expected to create benefits to participating customers and to society at large, including public health benefits in areas with disproportionate environmental or public

⁴³ A smart (learning) thermostat controls HVAC equipment to regulate the temperature of the room or space in which it is installed, communicates with sources external to the HVAC system for remote adjustment and has the ability to reduce overall gas consumption by performing automatic adjustments in response to occupant behavior.

health burdens, job retention or creation, reliability, and increased affordability of renewable thermal energy options.⁴⁴

The Company conducted a Service-Territory-Wide Geothermal Potential Study which underpins the selection of a site for Central Hudson’s proposed UTEN.⁴⁵ In this Study, the Company’s service territory was evaluated at a high level to identify potential suitable pilot sites, including identifying sites with adequate thermal resources, building diversity, and population densities. Using this information, numerous potential host sites were identified with the potential for hosting a large district geothermal system with surrounding infrastructure that lends itself to future expansions of the district geothermal system. Weighted criteria were developed to objectively select the highest ranked sites to be evaluated in more detail. Central Hudson designed the pilot’s screening criteria to encourage the installation of thermal energy networks in its service territory, while focusing on the key criteria related to: Customer, Location, Facility Type, Facility Status, Stakeholders, Space and Geology.⁴⁶

The Thermal Pilot has identified the designated site as the Project Youth Opportunity Union (YOU) and an adjoining neighborhood in Poughkeepsie, NY. The site features 17 non-residential and 38 residential buildings in a densely populated area, which provide great diversification of thermal loading and value, and is located in a DAC. Figure 27 provides a project rendering of The You and Figure 28 shows a layout of the site and its proposed customers.

Figure 27: Project Rendering of “The YOU” (Courtesy of Dutchess County and MASS Design Group)

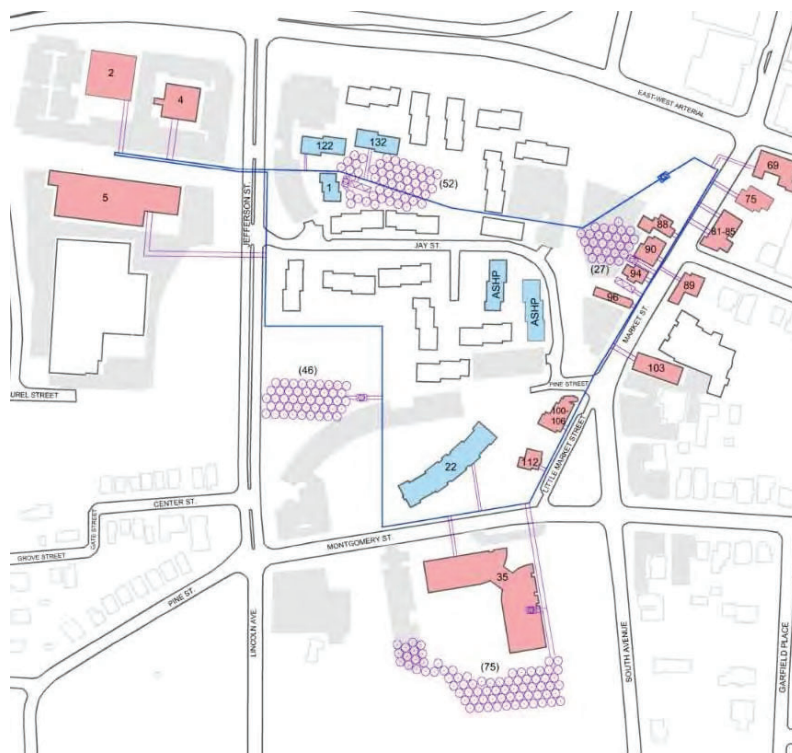


⁴⁴ Case 22-M-0429, *Proceeding on Motion of the Commission to Implement the Requirements of the Utility Thermal Energy Network and Jobs Act* (“UTEN Proceeding”), Central Hudson Thermal Energy Pilot Proposal, October 2022.

⁴⁵ See Appendix F.

⁴⁶ See Appendix F, pp. 5-7. For the pilot period and future potential projects, Central Hudson will evaluate potential projects based on these criteria and the weighted criteria identified in the study.

Figure 28: Project Youth Opportunity Union Proposed Thermal Energy Network Pilot



This project will be working with both existing customers and planned construction projects, local municipalities, community groups and Central Hudson’s local union. The project will test concepts on utilization of community green space, phasing, scalability, and expansion of UTENS, and impacts on varying levels of weatherization. The Thermal Pilot will support new construction that will have both social and economic benefits far outreaching the immediate area of the project. In addition, the pilot provides the opportunity to serve Low-Income Housing. The proposed pilot will have a Net Cost of \$17.6 M after discounting for potential incentives from the Inflation Reduction Act, with expected annual operating and maintenance costs of \$343,400.⁴⁷

v. Demand Response Programs and Interruptible Customers

Description of Program

As noted above, Central Hudson is implementing a “kicker” incentive to promote ENERGY STAR certified smart thermostats to customers served by the Vassar Road portion of the PN Line with the goal of providing more concentrated load relief to that system. In addition, Central Hudson offers interruptible rate options which allow large customers’ gas service to be paused for select hours under certain high demand conditions as part of the overall rates structure. The interruptible customers account for 20% of Central Hudson’s total sales and are required to curtail in full when called upon. This means that 20% of gas load could be curtailed as needed, which achieves the same purpose and goals as

⁴⁷ UTEN Proceeding, Central Hudson Thermal Energy Network Supplemental Plan Update (December 2023).

a demand response program. These interruptible customers effectively represent substantial demand response resources for Central Hudson.

Central Hudson does not offer any additional demand response programs that are focused on gas usage at this time. The Company explored program options in a potential study released in 2020, including both residential and non-residential direct load control as well as non-residential load curtailment options.⁴⁸ The study concluded that gas demand response programs would be cost-effective to implement and would slightly reduce system peaks. In addition, the overall focus of shifting gas usage to electricity may suggest a decreased focus on pursuing new gas demand response efforts in general, noting that gas demand response efforts may be suitable on a more targeted basis, *e.g.*, if there is both a gas and an electric constraint.

Central Hudson administers several demand response programs on the electric side. For Commercial & Industrial (C&I) customers, Central Hudson offers a Commercial System Relief Program (CSR) and a Targeted Demand Response (TDR) program. The CSR offers two tiers of participation options for C&I customers to curtail their electric load when called upon by Central Hudson. The TDR program is open to C&I customers located in certain constrained areas and offers a higher incentive for usage reductions. Central Hudson also participates in a Dynamic Load Management (DLM) process in which applicants can bid to provide load relief either through a Term- or Auto-DLM program.

⁴⁸ Cadmus, Central Hudson Gas and Electric Assessment of Potential Report, August 2020.

D. Supply Planning

Central Hudson’s gas system is served by four citygate stations that feed one contiguous service territory, providing for both operational flexibility and supply diversification. These citygates provide interconnection to the Millennium pipeline at the Tuxedo gate in the southwest corner of the territory, the Tennessee 200 leg pipeline at the Cedar Hill gate in the northwest corner of the territory, the Iroquois pipeline at the Pleasant Valley gate in the east central part of the territory, and the Algonquin pipeline at the Somers gate in the southeast corner of the territory. This configuration provides significant planning and operating flexibility, as well as supply availability. Central Hudson procures and delivers various supply resources to customers through a combination of owned infrastructure and contracts with third parties.

i. Supply Portfolio

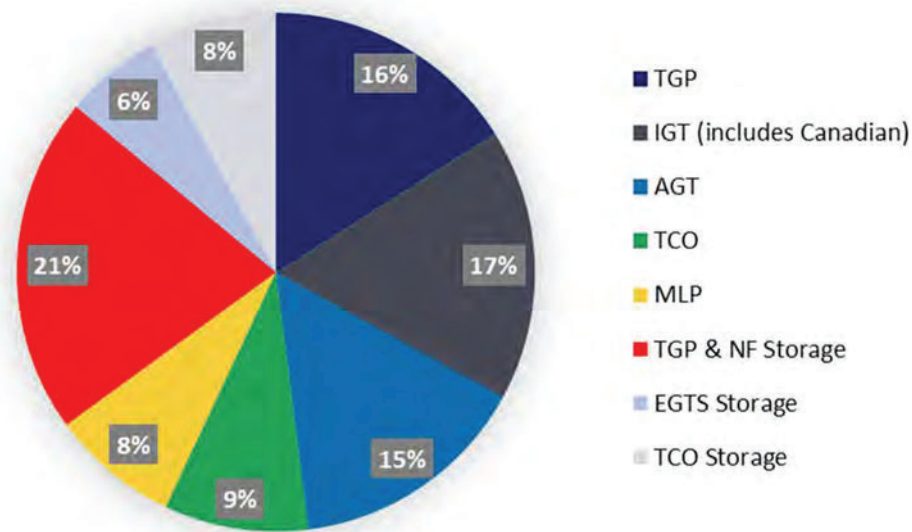
Central Hudson’s supply portfolio consists primarily of interstate pipeline transportation contracts (both gate delivered and upstream) and storage contracts with interstate pipeline transportation agreements. This supply portfolio is relatively straight-forward and provides for a combination of seasonal base, storage injection, and winter peaking supplies, for which the Company issues Requests for Proposals (RFPs) to procure. These supplies are supplemented with occasional daily spot purchases with firm delivery to any one of the company gate stations to satisfy daily forecast send-out requirements.

Most supply resources are planned for and contracted to meet demand behind a particular citygate. Central Hudson’s transportation and storage portfolio is almost entirely made up of short-haul transportation assets from the Marcellus shale region and Eastern Canada (Dawn Hub). Figure 29 lists the entities with which Central Hudson has gas supply contracts and Figure 30 depicts the diversity of total firm transportation and storage contracts expressed as a relative percentage of the overall portfolio. The supply stack shown in Figure 30 has been relatively static in recent years and Central Hudson does not expect much variation in the near term. This will change, however, when it becomes necessary to implement a de-contracting strategy as explained in further detail later in this section.

Figure 29: Firm Pipeline and Storage Resources

Firm Pipeline Transportation Capacity	Firm Storage Capacity with Transportation Service
<ul style="list-style-type: none"> • Millennium Pipeline (MLP) • Columbia Gas Transmission (TCO) • Tennessee Gas Pipeline (TGP) • Iroquois Gas Transmission (IGT) • Algonquin Gas Transmission (AGT) 	<ul style="list-style-type: none"> • Eastern Gas Transmission and Storage (EGTS) • Columbia Gas Transmission – Columbia Storage • Tennessee Gas Pipeline – Tennessee Storage and National Fuel (NF) Storage

Figure 30: Firm Transportation and Storage Capacity



ii. Gas Supply Strategy

The annual gas supply planning process begins with sales and peak demand forecasts prepared each spring. A system load duration curve is constructed based on recent historical send-outs and that curve is adjusted to align with the forecasts. Transporter and Aggregator volumes are separated from full-service customer requirements. Base, storage, and peaking supplies are then ‘stacked’ against the load duration curve to ensure that adequate supply is available to meet the sales forecast and forecasted design-day peak send-out. Typically, adequate supplies are available to Central Hudson citygates to meet the forecasts.

Prior to each winter season, the Company develops the Winter Supply Plan. The forecasted gas requirement for each winter season month, November through March, is based on the average of the most recent three-, four- and five-year average send outs. The estimated send out for each month is then broken down by supply: Central Hudson supply, marketer supply, storage, and peaking. This process sets the “base” gas supply by month. Once the supply volumes by type are determined, competitive RFPs are used to procure the necessary supplies for the season.

On a daily basis Central Hudson uses a short-term forecasting model to estimate day-ahead gas supply requirements. The model is based on proprietary mathematical analysis that combines past weather and send-out data with current weather forecasts to provide a rolling gas demand forecast. The forecast is based on a base usage (non-weather sensitive) component and a heating usage (weather sensitive) component. Heating usage is calculated as the product of the forecast of effective degree days (EDD) obtained from an independent weather service and usage per EDD. The daily system supply requirements, including an operating reserve, are determined and scheduled based on this forecast.

iii. De-contracting Strategy

As firm peak demand slows and begins to decrease, Central Hudson will begin reducing the supply portfolio to match the changing needs of customers. While the Company is still in the planning stages of developing the methodology for unwinding or “retiring” portfolio assets, the process will most

likely look similar to, but the inverse of, the process used to determine recommendations to increase portfolio firm transportation or storage services. This will include a combination of long-term sales and demand forecasts that demonstrate lower levels of utilization, combined with opportunities to reduce customer cost burden while retaining supply reliability and diversity. The Company does not presently see any opportunities to eliminate firm transportation or storage assets for at least the next five years.

E. Other Planning Methodologies

i. GHG Accounting

Central Hudson currently reports GHG emissions under the US Environmental Protection Agency's Mandatory GHG Reporting Program, which requires various industries to report GHG emissions annually. For the natural gas industry, these regulations are found at 40 CFR Part 98, Subpart W. Under this program, gas distribution emissions sources are limited to mains, services, metering and regulating (M&R) stations, and certain types of combustion units; and there is a 25,000 MT CO₂-e/year reporting threshold.

If approved by the Commission, Central Hudson will follow the approach to GHG accounting that is described in the Joint Utilities' December 1, 2022, Proposal for an Annual Greenhouse Gas Emissions Inventory Report⁴⁹ and the Joint Utilities' May 31, 2023, Supplement to Proposal for an Annual Greenhouse Gas Emissions Inventory Report.⁵⁰ The GHG Inventory Proposal and Supplemental GHG Inventory Proposal present a statewide framework each New York investor-owned gas utility plans to use to report on its GHG emissions. GHG emissions are estimated for the entire supply and delivery chain from gas production through gas consumption for all customers to provide a comprehensive understanding of the emissions associated with supply and demand.

ii. Low-Carbon Fuels

Low-Carbon Fuels (LCF) typically refers to RNG and clean hydrogen, although synthetic natural gas may be included in certain contexts. These LCFs offer the opportunity to significantly contribute to decarbonizing gas consumption, particularly for difficult-to-electrify customers. These fuels can enable material progress toward achieving New York's clean energy goals.

In preparation for integrating RNG into its system, Central Hudson contracted with a third-party expert to conduct a study of RNG potential within the counties that overlap its territory from various feedstocks. The study also estimated the greenhouse gas (GHG) emissions reduction potential from RNG development. Based on the RNG production potential identified in this study, it was estimated that RNG could offset 218,152 metric tons CO₂e per year if fully developed and directed towards Central Hudson customers, taking into consideration the emission from feedstock transportation.⁵¹

⁴⁹ Case 22-M-0149, *Proceeding on Motion of the Commission Assessing Implementation of and Compliance with the Requirements and Targets of the Climate Leadership and Community Protection Act* ("CLCPA Implementation Proceeding"), Joint Utilities' Proposal for an Annual Greenhouse Gas Inventory Report (December 1, 2022) ("GHG Inventory Proposal").

⁵⁰ CLCPA Implementation Proceeding, Joint Utilities' Supplement to Proposal for an Annual Greenhouse Gas Emissions Inventory Report (May 31, 2023) ("Supplemental GHG Inventory Proposal").

⁵¹ Guidehouse, *Renewable Natural Gas Analysis, Final Report*, Prepared for Central Hudson Gas & Electric, January 9, 2024. Please see Appendix D.

As discussed in Section V, blending hydrogen into the gas stream is included in the GSLTP scenarios. Central Hudson has completed a Hydrogen Blending Study of a subset of its pipeline distribution systems to estimate the amount of hydrogen Central Hudson can blend without any pipeline modifications or reduction in loading. The analysis found that 72% of the systems that were studied can run hydrogen today with blends up to 20% hydrogen without any need for modification from a flow and pressure perspective on typical winter day. The systems that cannot currently support hydrogen have already been identified by previous traditional system studies that have identified reinforcements. The analysis found that gas velocity was the major limiting factor, however the upgrades necessary to improve the velocity of a system are more economical than to improve the system pressure.⁵² In addition, there may be specific opportunities to use hydrogen above the 20% level at targeted locations for certain C&I customers whose operations can accommodate higher levels of hydrogen.

In its current rate case, Central Hudson has proposed developing a Clean Hydrogen Feasibility Study. The objectives of the study are to identify portions of its distribution system where hydrogen blending activities could be successful and identify project sites that can utilize hydrogen for both gas heating and industrial process load. The goals of the Clean Hydrogen Feasibility Study include: 1) To study the feasibility of various industrial sites and determine the capability to introduce hydrogen production and blending equipment; 2) Identify hydrogen project costs and benefits, and additional potential use cases; 3) Identify the safety requirements for blending and transportation of hydrogen; 4) Provide recommendations for the startup, operations, maintenance and monitoring for both pipeline facilities and customer equipment of a hydrogen blended network; 5) Develop recommendations for gas quality monitoring; 6) Develop the scope and size of a clean hydrogen production facility; 7) Estimate GHG emission reduction benefits and any potential negative changes in the emission characteristics such as Nitrogen Oxide levels; 8) Understand the challenges associated with installing and maintaining a hydrogen production system and blending equipment; 9) Understand the siting constraints, technical and interconnection challenges, and overall scalability.

Finally, in the current rate case, Central Hudson has proposed an enhanced utilization of Responsibly Sourced Gas (“RSG”). RSG is natural gas obtained from suppliers that proactively manage their methane emissions through an independent third-party measurement and certification to attest that the gas was produced under specified best practices for methane mitigation as well as best practices for other vital environmental categories, such as water use, land use or community engagement. The Company has determined through a recent pilot project that the procurement and distribution of RSG has a significant impact on reducing GHG emissions compared to traditionally sourced natural gas. In the current rate case, Central Hudson is seeking to expand its ability to purchase RSG even when it is not identified as the lowest cost supply option. This will allow greater utilization of RSG in serving system gas loads, leading to further reduction of fugitive methane emissions.

⁵² See Appendix C.



V. Decarbonization Scenarios

A. Model Overview

Central Hudson has taken a bottom-up approach to modeling the decarbonization scenarios and associated impacts on distribution planning, customer demand, and pressure drops. At a high level, the analysis included 4 principal steps:

- 1. Analyze the Central Hudson territory-wide historical sales and customer growth patterns.** This information is used to understand the trends, absent interventions, for the Central Hudson system. It is designed to reflect what the expected gas consumption would be absent interventions to electrify heating and actively reduce carbon emissions.
- 2. Evaluate each local gas system with 15-minute gas pressure data.** The analysis focuses on pressure data, which is critical for gas distribution planning to maintain safe and reliable operations. The objectives of local system assessment are to:
 - ✓ Quantify the relationships between weather and pressure drops.
 - ✓ Quantify the relationship between gas demand and pressure drops.
 - ✓ Identify highly loaded regions within the Central Hudson service territory.
 - ✓ Estimate location-specific growth rates for each local gas system.
 - ✓ Produce probabilistic 20-year forecasts of pressure drops and demand (flow) assuming no additional interventions occur. The baseline forecasts reflect pressure drops and demand levels absent policies to electrify heating and absent new codes and standards.

They are used to quantify the infrastructure investments and carbon emissions that would occur *absent* the interventions included as part of the GSLTP.

- ✓ Estimate the likelihood of need for growth-related distribution investments at each location.
 - ✓ Estimate costs associated with reinforcing localized regions, absent interventions. These estimates reflect costs absent policies to decarbonize, electrify heating, and weatherize buildings.
 - ✓ Calculate the location-specific avoided distribution costs associated with a decrease (or increase) of gas flow for each local gas system.
 - ✓ Assess the overlap between highly loaded gas systems and corresponding electric grid components— circuit feeders, substations, and utility transmission areas— to understand the available capacity for electrification of heating.
- 3. Estimate historical costs associated with new gas connections.** The objective is to understand the savings associated with avoiding additional connections to the gas system by residential and commercial customers.
- 4. Model the energy, demand, and emissions reductions associated with each intervention and compare them to outcomes absent intervention.** This component of the study applies a dynamic, bottom-up tool. When user inputs are modified, granular results are updated. This will allow Central Hudson to modify assumptions when Staff or stakeholders have questions. It will convey greater understanding of the implications of inputs and assumptions. Please see Appendix B for more information about the assumptions for each of the scenarios discussed below.

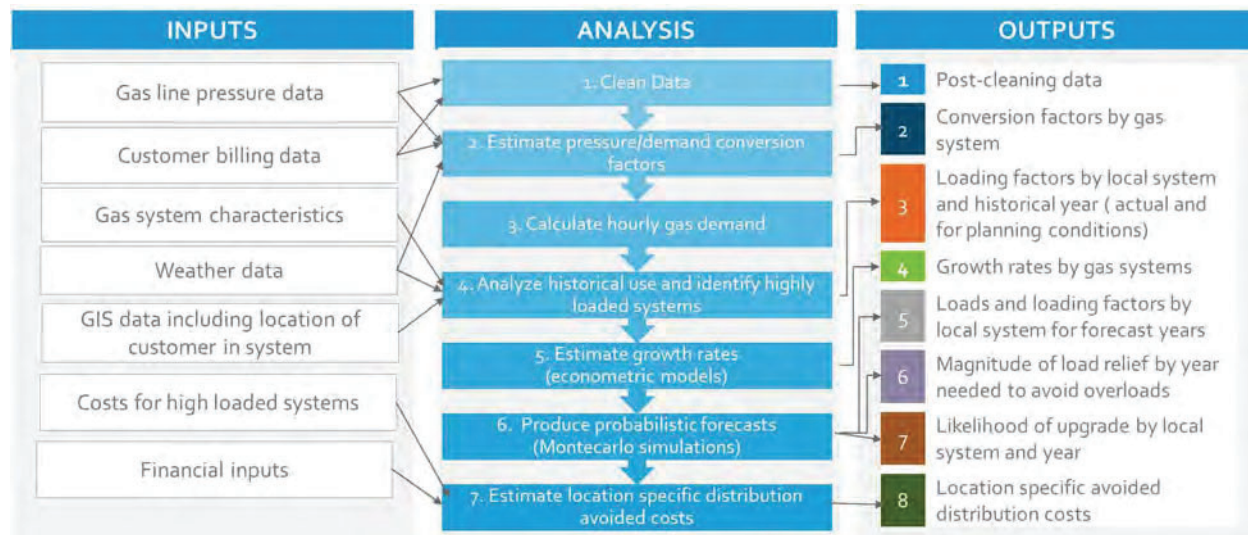
The model Central Hudson has used includes modules for beneficial electrification (heat pumps), energy efficiency (weatherization), hydrogen, and RNG. It also assesses impacts on rates and includes impacts on rates and customer bill impacts. The electrification and weatherization module includes a granular achievable potential study that produces results for the combination of 42 local gas systems, 18 customer segments, and 52 measures for each of the 20 years. It includes the ability to modify budgets, set incentives, modify technology cost curves, assess the impact of incentives of heat pump and energy efficiency adoption rates, produce adoption curves with and without incentives, implement cost-effectiveness screening, and produce supply curves. It also assesses impacts on rates and customer bill impacts.

One of the most important inputs is whether or not budgets are capped. The model can accommodate a pre-specified budget (with inputs in a different tab), elect an unlimited budget, or set a threshold for portfolio cost-effectiveness, in which case the model selects the beneficial electrification and energy efficiency measures until the portfolio cost-effectiveness threshold is met. Currently, the model is capped. It elects measures from most to least cost-effective as long as the portfolio is cost-effective. This leads to more cost-effective outcomes but less gas savings. In developing the scenarios for this GSLTP, the Company currently models parameters to keep costs at reasonable levels.

Central Hudson has incorporated data analysis from the electric Distribution System Implementation Plan where and when possible and will continue to refine the integration of gas and electric planning studies. A key feature of the Central Hudson model is the ability to quantify the impact

of policy changes on pressure drops and the likelihood of the need for distribution reinforcements. Figure 31 provides an overview of the local gas system analysis.

Figure 31: Overview of Local Gas System Analysis



Central Hudson’s approach to gas system modeling and the scenarios it has evaluated in this GSLTP are informed by several key features of its service territory and distribution system. These include the composition of customers and sources of demand, and the geographic regions in the gas system that experience the highest demand in relation to capacity (*i.e.*, “loading”).

As discussed in Section III, above, a large proportion of the total annual demand for gas in the Company’s service territory is concentrated among a very small proportion of customers. (See Figure 6, which shows that industrial and interruptible customers account for approximately 40% of Central Hudson’s sales. The Company has only 263 industrial customers.) This suggests that achieving material reductions in gas sales and associated carbon emissions will require measures that either specifically address the transition of industrial load or that provide compelling incentives for a significant population of customers to pursue alternatives (*e.g.*, electrification).

Additional details on planning specifications that apply to each scenario can be found in Appendix B.

B. Scenario Overview

Central Hudson has developed four scenarios: a Current Clean Agenda Scenario that reflects the current legal and policy framework and three additional scenarios. A description of each of the four scenarios is presented below. The Company will work with Stakeholders on adjusting and updating each scenario’s assumptions as the process progresses. For instance, the level of incentives drives the rate of electrification in all of the scenarios. If those incentives are increased, electrification will increase. In some instances, forecasted performance for the modeled scenarios are compared to a “Historic Trend” trend, which is an estimate of performance for a given metric based on historical data and historical

initiatives and funding levels (*i.e.*, no incremental interventions). The historic trend forecasts do not incorporate higher funding levels for 2024-2026 or yet-to-be-enacted policies such as upcoming building codes for heat pumps.

i. Current Clean Agenda (*i.e.*, current policy/statutory framework)

The Current Clean Agenda Scenario reflects the legal and policy framework that applies today at current funding levels. It presents the expected trajectory for the gas system (in terms of customers, footprint, volumes, *etc.*) that can be projected under current policies that apply to the gas system, including investments the Commission has approved. This is the Company's current base case which includes substantial decarbonization actions.⁵³ Under these assumptions, customer growth will continue as described in further detail below. The Current Clean Agenda Scenario assumes that gas business or market transformations that occur naturally during the next two decades reflect the current set of laws that direct Central Hudson's investments and operations, and the existing funding mechanisms for energy efficiency programs (*i.e.*, heat pump incentives). It reflects a higher level of investment in clean heat and weatherization and incorporates not-yet-enacted policies such as code requirements for heat pumps for new buildings. RNG and hydrogen will be integrated into the supply portfolio to the extent they are cost-competitive with conventional natural gas resources. The Current Clean Agenda Scenario assumes continuation of Central Hudson's Clean Heat and energy efficiency programs while recognizing ongoing shifts in energy efficiency policy in the state, including an increased emphasis on weatherization programs.

ii. CLCPA Approach Scenario

The CLCPA Approach Scenario generally incorporates programs and policies that Central Hudson expects will be needed to meet the economy wide GHG reductions envisioned in the CLCPA, though this does not seek to achieve a specific level of emissions reductions for the gas utility sector. The CLCPA Approach Scenario entails doubling (2x) heat pump incentives to convert current customers to the electric system. It relies on technological advancements (*e.g.*, improvements in the economics of ground source heat pumps, a decline in heat pump system costs, *etc.*) and a system-wide transition approach rather than one targeting specific regions within the Company's service territory. It also assumes efforts progress in incorporating hydrogen (5% by 2043) and renewable gas (5%) into the supply mix. It also caps new connections starting in 2030.

Each of the scenarios the Company has evaluated requires deep collaboration among gas and electric system planning organizations within Central Hudson. The electric system has sufficient capacity to accommodate projected winter peaking loads over the next five to ten years but would experience overloads thereafter. As a result, the CLCPA Approach Scenario will require a large investment in the electric transmission and distribution system to support incremental electric load and provide assurances of safe, reliable, and resilient service, including upsizing poletop and pad mount transformers and reinforcing circuit feeders, substations, and the utility transmission system (69-115kV).

⁵³ The CCA Scenario is a "business-as-usual" scenario. Central Hudson has given the scenario a different name in this GSLTP because it does not believe the common industry usage of business-as-usual accurately reflects what is included in its the forecast. The CCA Scenario includes decarbonization at current funding levels while the other three scenarios rely on additional funding.

iii. No New Infrastructure

The No New Infrastructure (NNI) Scenario represents the profile of the gas system under policies that prevent growth-related investment in the gas system. Note, however, that the NNI Scenario does not entail the elimination of capital spending altogether: under any scenario Central Hudson will continue to make the investments necessary to ensure that safe and reliable gas distribution service remains available to customers that continue to rely on the system. This includes infrastructure investment needed to address safety and reliability in highly loaded segments of our system.

Efforts to limit capital investment in gas infrastructure will be supported by an assertive effort to identify highly loaded areas and develop NPAs where possible, consistent with State policies (pertaining to, *e.g.*, NPA suitability, benefit cost analyses for alternatives to traditional infrastructure, *etc.*). It includes an up to five-fold increase in incentives for heat pumps and weatherization in local gas systems that are highly loaded and caps new connections starting in 2030. In addition, energy efficiency and building electrification program design will emphasize decarbonization through electrification. Electrification-oriented incentives will focus on targeted areas of the system where load presents challenges and would otherwise require infrastructure investments to meet safety and reliability requirements.

iv. Pipe Use Transformation

The Pipe Use Transformation (PUT) Scenario features a focused transition of Central Hudson's gas supply resources to the extent feasible and practicable. Conventional natural gas resources will be displaced with alternative, low-carbon fuels (LCFs) that will produce a net reduction in GHG emissions to a greater focus than other scenarios. Central Hudson will continue to pursue the integration of responsibly sourced gas. Central Hudson will pursue RNG including in situations in which RNG interconnections prevent the need for investments in distribution infrastructure. Green hydrogen will be blended with conventional supply resources in a manner consistent with safety and reliability guidelines (*i.e.*, at an expected level up to 20% of the gas stream by volume).⁵⁴ In addition, the scenario assumes increased use of renewable gas (20% by 2043) from feedstock and livestock.

The PUT Scenario includes the same concerted and targeted effort to identify highly loaded gas systems and target resources to avoided infrastructure upgrades as in the NNI Scenario. Clean electricity and LCFs will be used to contribute to the State's economy-wide GHG emissions goals. The PUT Scenario also envisions the use of existing pipeline infrastructure to help decarbonize industrial facilities that currently rely on more carbon intensive fossil fuels such as oil and propane. This scenario provides the most emissions savings as it builds on the assumptions from the NNI Scenario.

C. Modeling Assumptions/Inputs

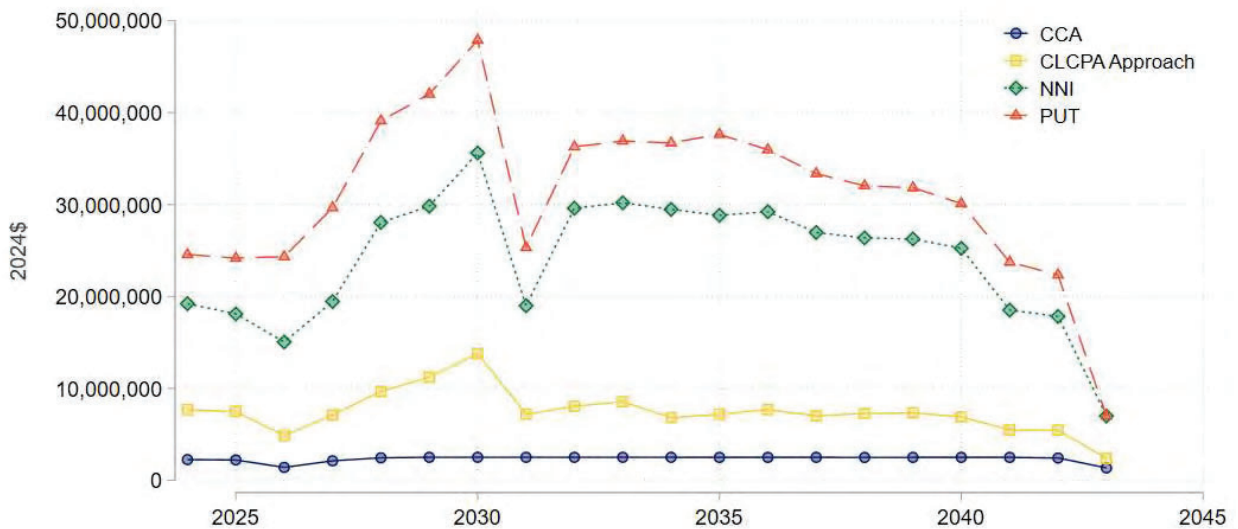
The subsections that follow illustrate the key assumptions that inform expected future Central Hudson gas system performance in key areas (*i.e.*, outputs), which are described below in subsection D of this Section V. More detailed descriptions of the planning scenario specifications can be found in Appendix B.

⁵⁴ Note that the CLCPA Approach Scenario and the NNI Scenario also include some levels of RNG and hydrogen but substantially less than the PUT Scenario.

i. EE, DSM, and Heat Pump Incentives

Annual DSM and heat pump incentive funding, illustrated in Figure 32, is modeled to increase through 2032 to stimulate installation of building electrification systems. Funding is then assumed to moderate before settling into a plateau as heat pump penetration approaches its peak levels. As Figure 32 indicates, incentive funding is highest for the PUT Scenario. The scenarios feature targeted incentives in regions of the gas system that experience the highest loading (*i.e.*, to mitigate or eliminate the need for growth-oriented investment). The NNI Scenario has the most significant targeting of incentives to remain consistent with meeting the Gas Planning Order’s requirement that the Company evaluate a scenario with no growth-related infrastructure investment.

Figure 32: Annual DSM and Heat Pump Incentive Funding Levels (2024-2043)



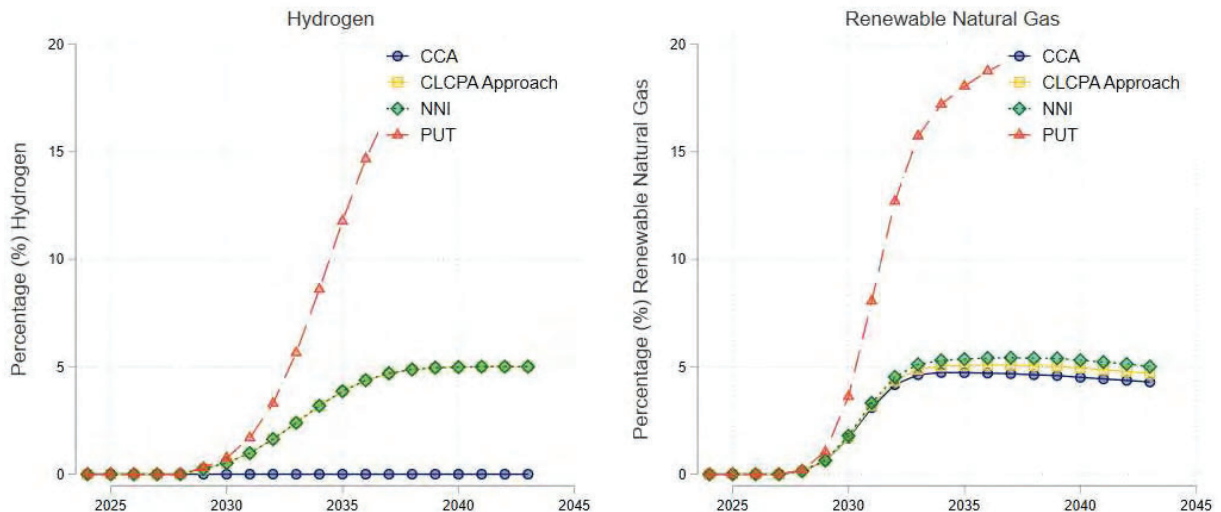
ii. Composition of Gas Commodity

Assumptions concerning the introduction and accelerated use of low-carbon fuels (*i.e.*, hydrogen and RNG) are presented in Figure 33, below. The PUT Scenario assumes that hydrogen is initially introduced in 2028, with steady increases to a peak level of 20% of the gas stream by 2040. It is conventionally believed that utilities can only safely blend hydrogen up to this 20% threshold using available pipeline technologies. Even if targeted pipeline retrofits were to be made, Central Hudson assumes that current consumer end-use appliances will not be able to handle hydrogen content above 20% (by volume) in the gas stream.⁵⁵ However, pursuant to the Central Hudson hydrogen study discussed above, the percentage of hydrogen that could be blended into the system may be higher than 20% in some instances like if a blending station is near a specific customer. There may be specific opportunities to use hydrogen above the 20% level at targeted locations for certain customers whose operations can accommodate higher levels of hydrogen.

⁵⁵ Some manufacturers are designing consumer end-use products that can accommodate higher levels of hydrogen beyond 20%.

The CLCPA Approach and the NNI Scenarios also reflect a similar, albeit more muted, assumption pertaining to Hydrogen. Both scenarios assume that hydrogen will reach a peak level of 5% of the gas stream by 2040.

Figure 33: Hydrogen in the Gas Stream (2024-2043)



Central Hudson assumes that RNG is deployed in the Current Clean Agenda, NNI, and CLCPA Approach Scenarios at levels at which RNG remains cost-competitive with conventional natural gas resources. RNG is introduced to the system beginning in 2028 and ramps to a sustained maximum level of 25% of the assessed Central Hudson RNG potential level⁵⁶ (*i.e.*, 5.9 million Ccf/year) by 2034. The PUT Scenario assumes a greater emphasis on LCFs in general, including RNG. The PUT Scenario assumes RNG is introduced in 2028 and reaches a maximum of 75% of the assessed Central Hudson RNG potential level (*i.e.*, 17.9 million CCF/year) by 2036.

iii. Customer Counts

Current modeling does not include significant levels of customer attrition following retrofits to electric space heating technologies. Observed residential customer growth trends are generally assumed to continue through 2043 under the Current Clean Agenda Scenario, in which Residential accounts will increase by approximately 17% over the evaluation period. The NNI, CLCPA Approach, and PUT Scenarios restrict the deployment of growth-related capital, meaning that customer accounts are prevented from increasing in highly loaded regions of the Central Hudson system. Residential customer growth under these scenarios is held to approximately 6% over the 20-year planning period. Commercial accounts growth figures are assumed to mirror residential account growth.

Industrial account change occurs much more slowly. Central Hudson assumes for this GSLTP analysis that 263 industrial customers will remain on the system in all years, for all scenarios.

⁵⁶ See *supra*, note 51.

iv. Other Independent Variables Used in Modeling

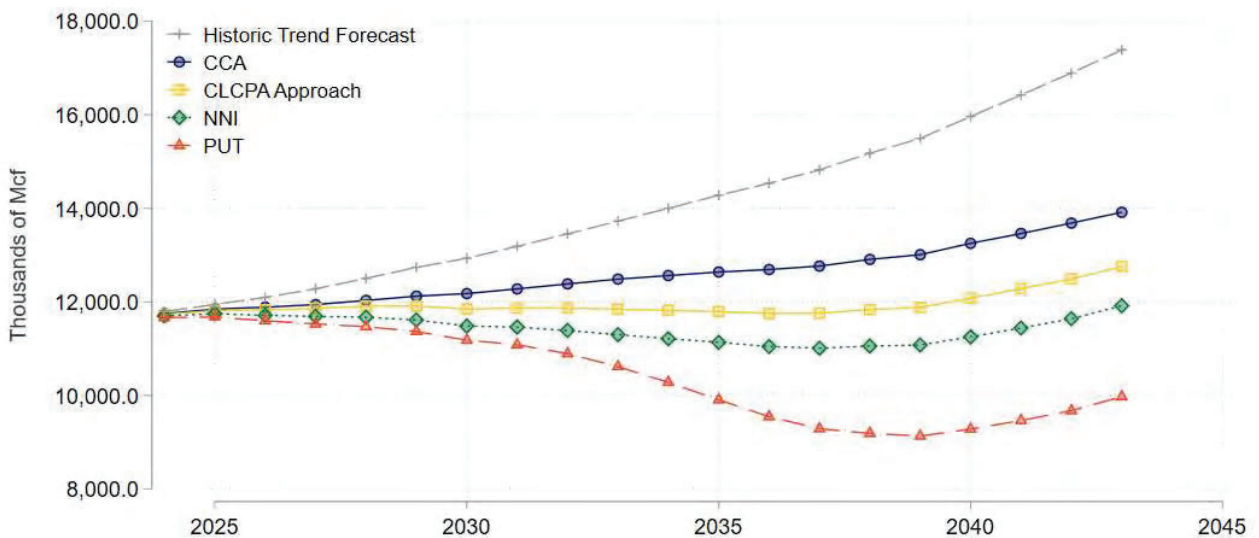
Central Hudson’s scenario evaluation methodology is extremely flexible, enabling customization of many market and system configuration features. Other input specifications that drive model outcomes are addressed in greater detail in Appendix B.

D. Comparison of Modeling Results by Scenario

i. Net Sales

The trajectory of sales under each of the GSLTP planning scenarios is illustrated in Figure 34, below. Note that net sales under the Current Clean Agenda, NNI, and CLCPA Approach Scenarios are expected to grow in the immediate term before declining as efficiency and electrification programs reach maturity. Growth under the Current Clean Agenda Scenario reflects expected customer growth based on an analysis of historic and projected economic trends (discussed above). Residential sales plummet dramatically in all of the scenarios.

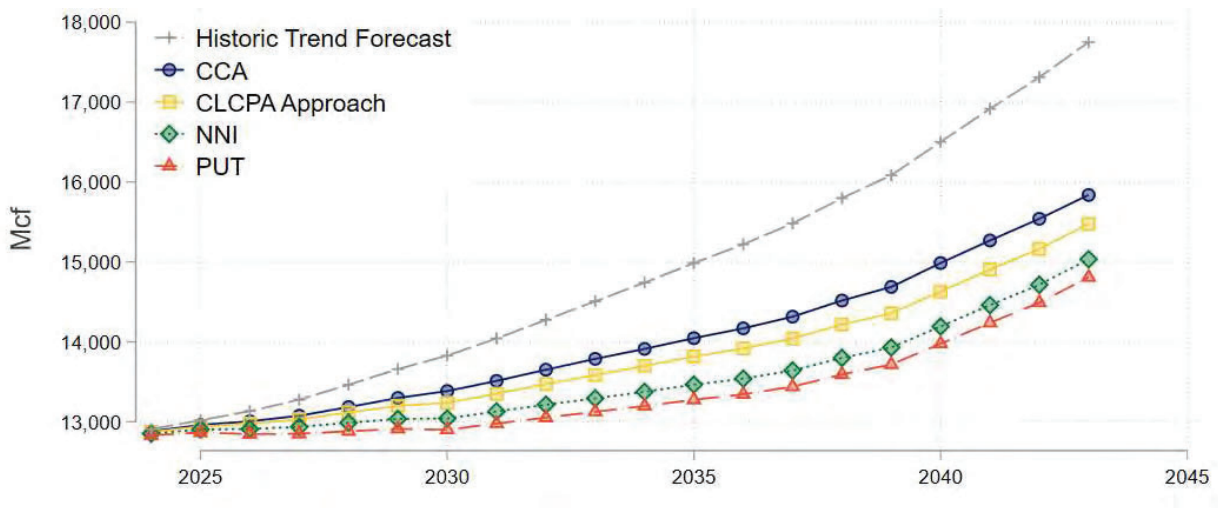
Figure 34: Net Sales (CCF) for GSLTP Scenarios (2024-2043)



ii. Peak Demand

Peak demand is projected to continue to grow in all scenarios, as illustrated in Figure 35, below. Note that for the NNI Scenario, the increase in peak will occur on regions of the Central Hudson system that will not require investment to accommodate new capacity.

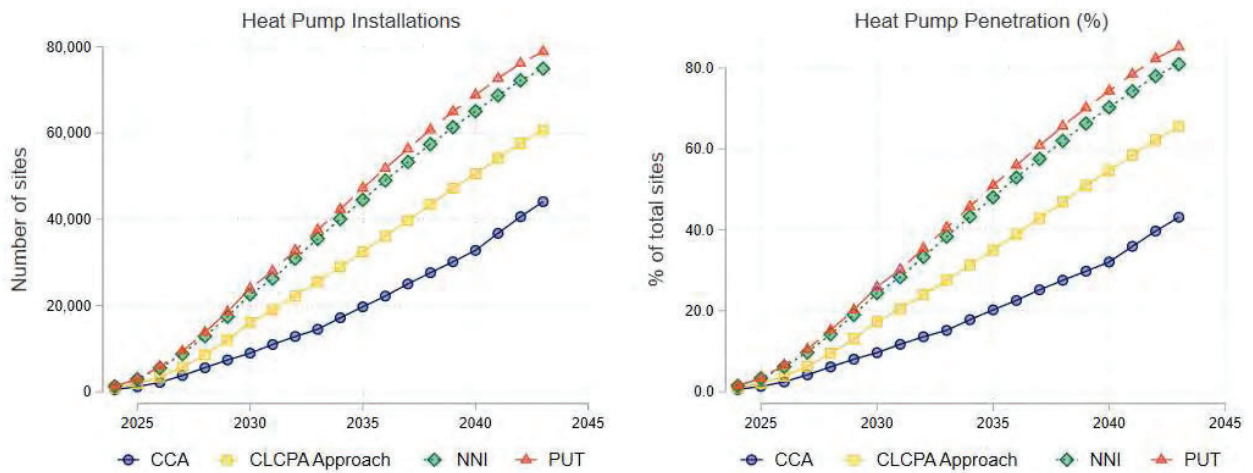
Figure 35: Peak Demand (CCF) for All Scenarios (2024-2043)



iii. Heat Pump Penetration Level

Modeled heat pump penetration levels for each planning scenario are illustrated in Figure 36, below.

Figure 36: Heat Pump Installations and Penetration Levels (2024-2043)



Some Multi-family is commercially owned and can have multiple dwellings. Thus, the estimate may undercount dwellings.

iv. GHG Emissions

Central Hudson continues to achieve CO₂-equivalent emissions reductions, building on the momentum the Company has established through its existing energy efficiency and clean heat programs. The CLCPA Approach, NNI, and PUT Scenarios' reductions separate from the CCA reductions in approximately 2028, when low-carbon fuels (specifically hydrogen) begin to displace conventional natural gas in the supply mix. The PUT Scenario's acceleration is most pronounced, consistent with its progressively higher proportion of hydrogen in the fuel mix, as is discussed in subsection C, above. Total

emissions are presented in Figure 37. Annual and cumulative emissions reductions are depicted in Figure 38 and Figure 39.

Figure 37: Annual CO₂e Emissions as Percentage of 1990 Levels

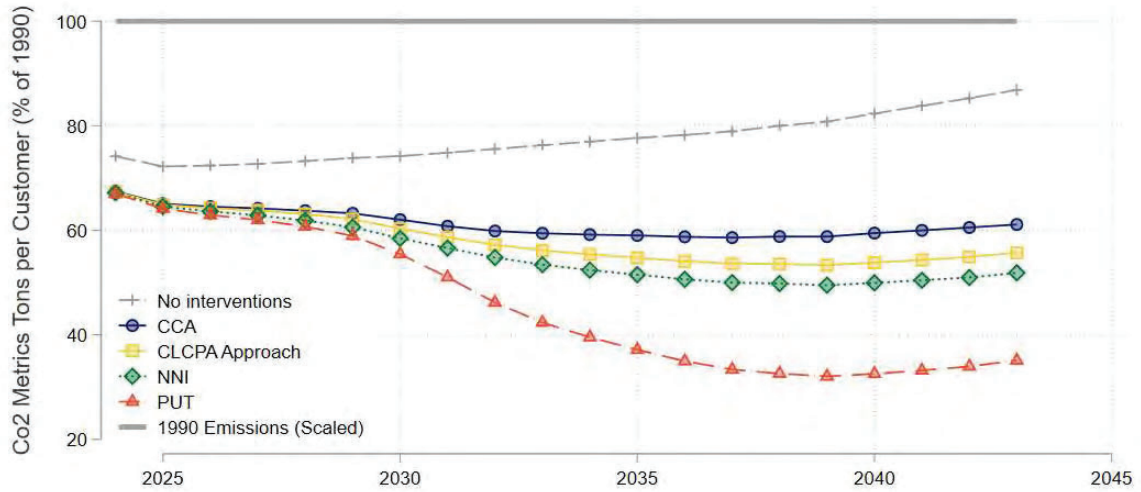


Figure 38: Calendar Year CO₂ Emissions Reductions (2024 Baseline)

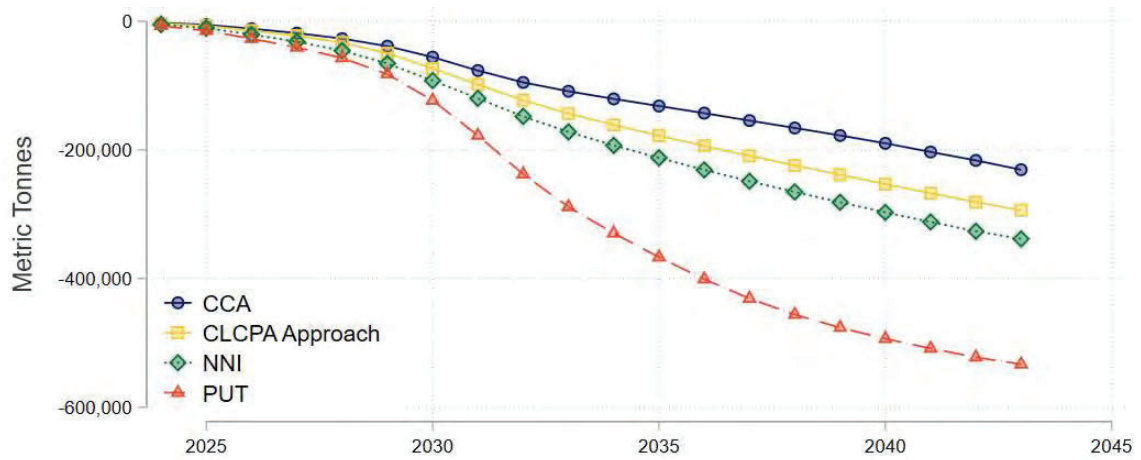
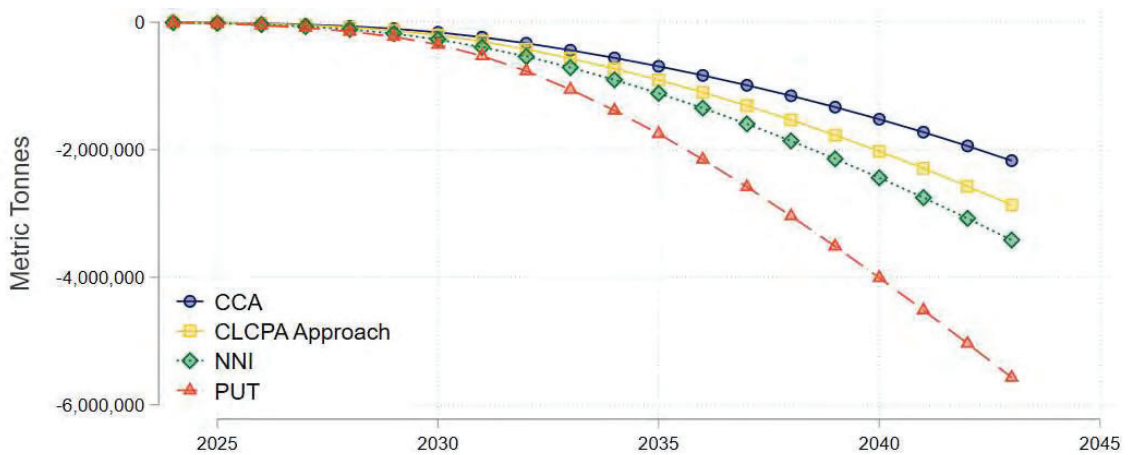


Figure 39: Cumulative CO₂ Emissions Reductions (2024 Baseline)



v. Impact on Local Gas Systems

The higher penetration of heat pump technology and weatherization is expected to limit or reduce demand for local gas systems, which, in turn, reduces the magnitude of pressure drops and the need for growth related gas system reinforcement. In practice, the exact trajectory of growth is uncertain, especially over 20 years. Thus, Central Hudson adopted a probabilistic approach to measure the likelihood of the need for local gas system upgrades on a year-by-year basis for each scenario. In addition, both the NNI and the PUT Scenarios incorporate higher incentive levels at locations that are highly loaded.

For each local gas system, the study assesses how scenario assumptions impact the likelihood of distribution reinforcement upgrades over time (Figure 40). An advantage of this approach is that it enables Central Hudson to quantify avoided capital costs based on the change in probability, while factoring in the inherent uncertainty in a 20-year forecast.

Figure 40: Example of Change in Upgrade Probability for a Single Location

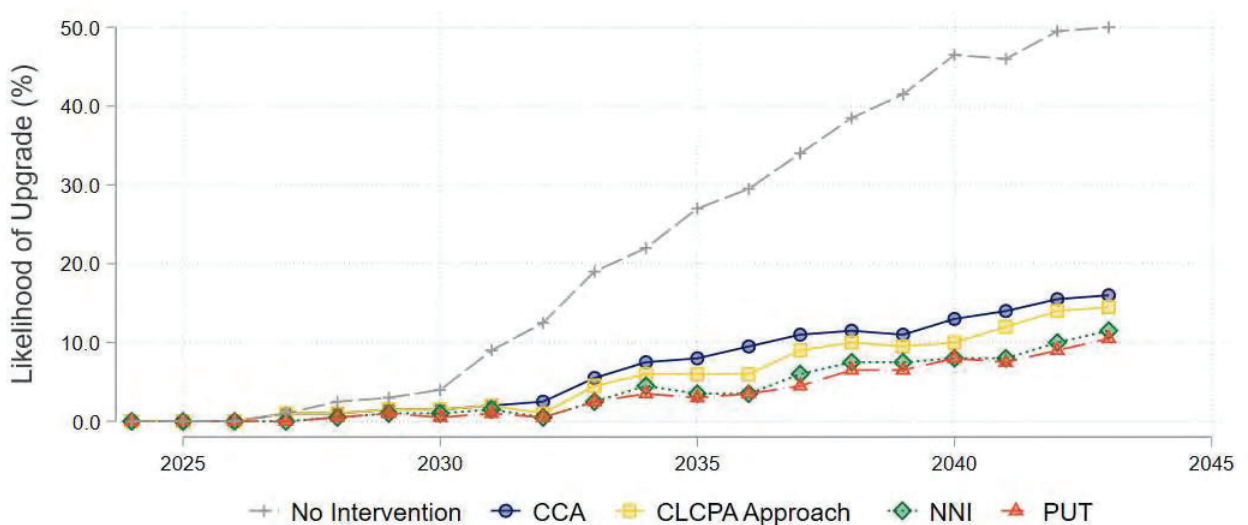
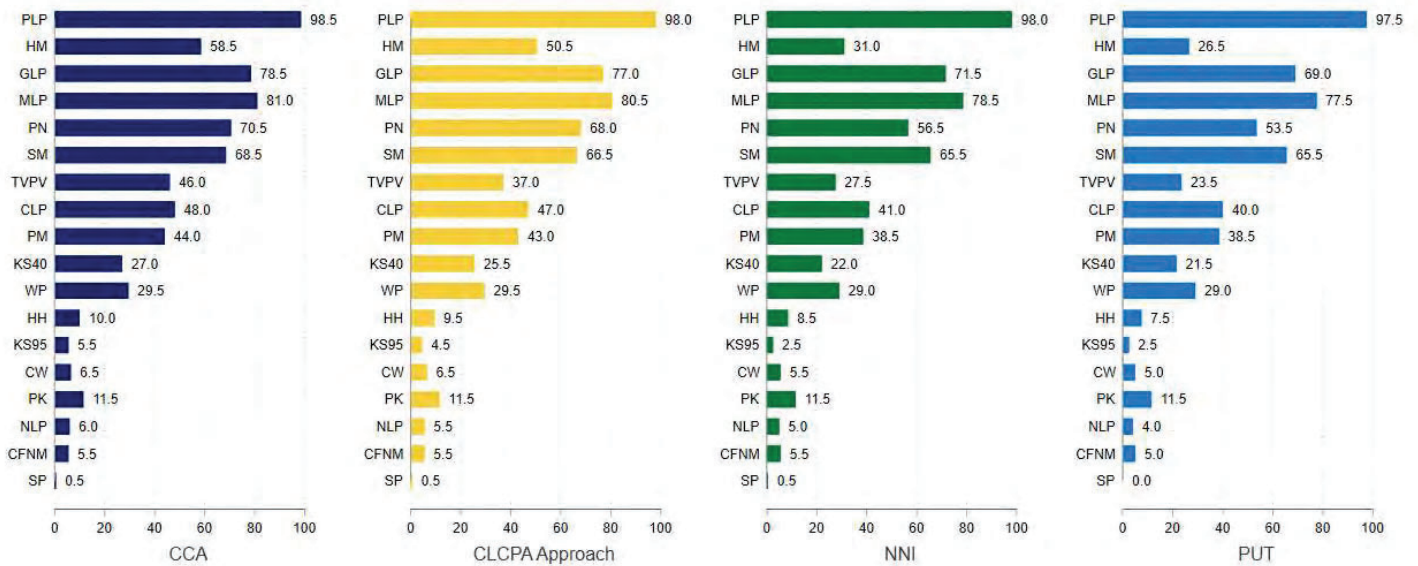


Figure 41 provides a ten-year outlook (*i.e.*, through 2033) on the likelihood of the need for upgrades for specific portions of the Central Hudson system under the policies and funding levels that apply to each planning scenario.

Figure 41: Probability of Need for Distribution Infrastructure Upgrades to Maintain Safe and Reliable Service (2024-2033)



vi. Rate & Bill Impacts

There is a close and clear relationship between average gas rates (*i.e.*, \$/CCF) and customer bill impacts (*i.e.*, total dollar impacts). As revenue requirements rise and net volumes decline, rates increase. Changes in monthly gas bills for residential, commercial, and industrial customers under the scenarios evaluated in this GSLTP are captured in Figure 42, below. The change in the rates (\$/Ccf) are shown in Figure 43. The decline in average residential customer bills reflect each scenario's reductions in consumption per customer as heat pump program uptake accelerates. However, the costs per units of gas delivery and supply are increasing. Central Hudson assumed that new construction that installed heat pump would not connect to gas system. However, based on the empirical data thus far, most customers who retrofit their heating system to heat pumps do not entirely stop use of the gas system.

Figure 42: Percent Impact on Gas Bill for Commercial, Industrial, and Residential Customers (2024-2043)

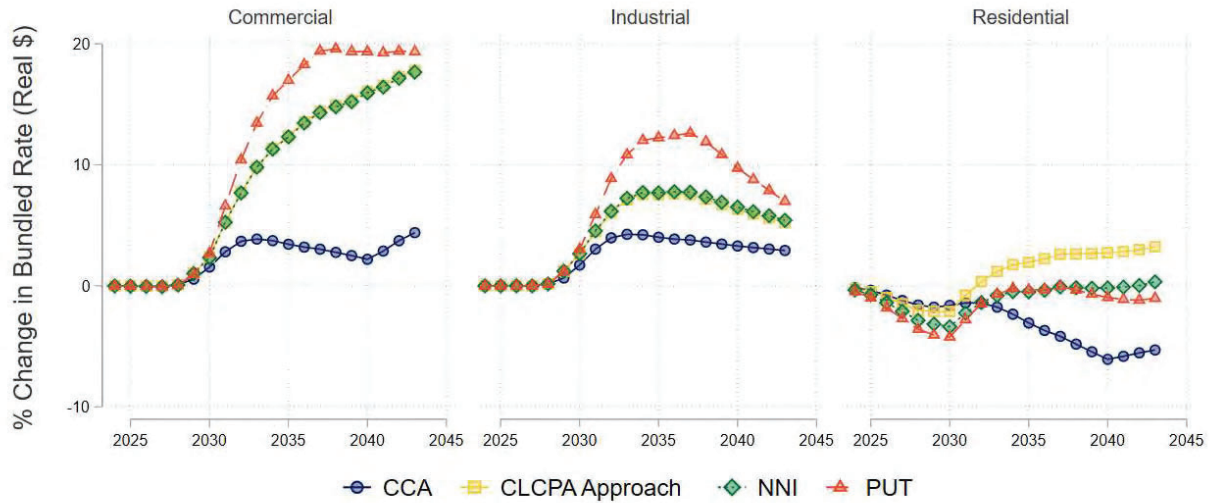
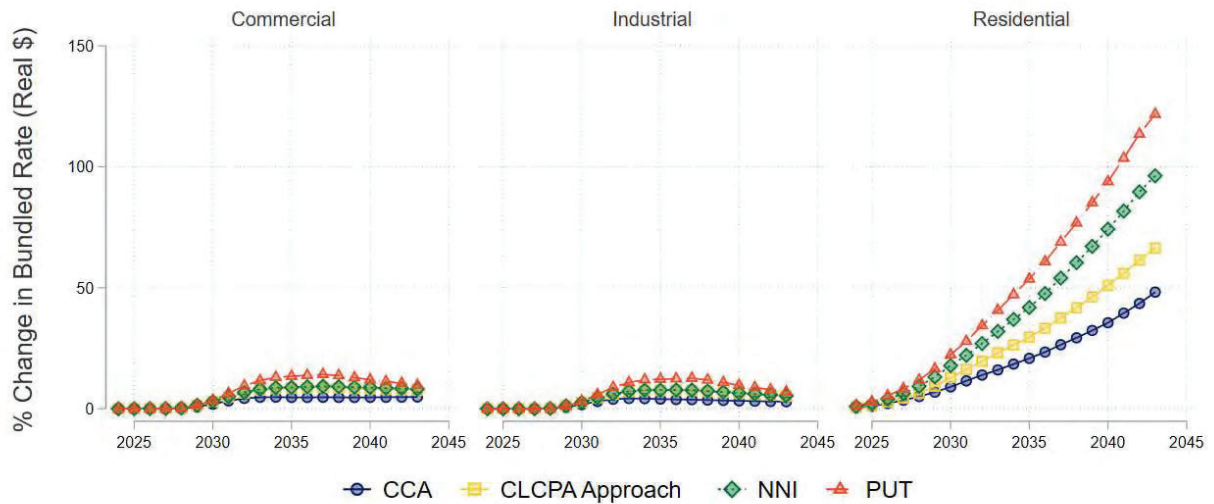


Figure 43: Percent Impact on Bundled Gas Rates for Commercial, Industrial, and Residential Customers (2024-2043)



Commercial and industrial customers face significant bill impacts in the early years of the evaluation period, but with net impacts only totaling between approximately 4% and 14%. These impacts decline in the early 2030s concurrent with assumed declines in DSM and clean heat funding mechanisms.

The comparison of average bill totals by customer segment presented in Figure 44 allow comparison of estimated bills in 2030 and 2043 to bills expected to apply to 2024.

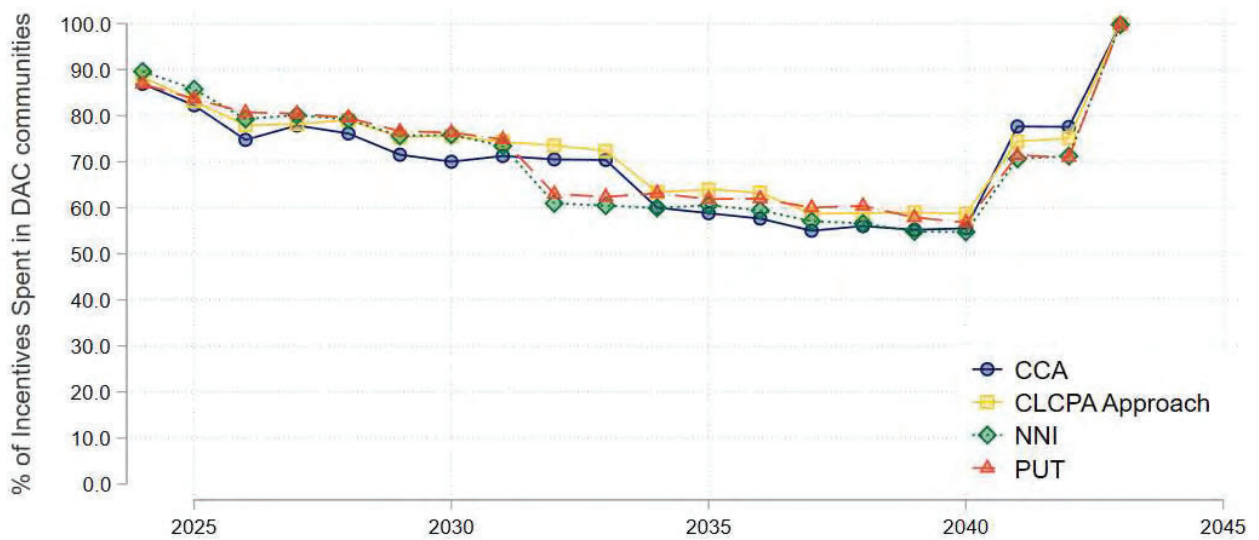
Figure 44: Annual Customer Bill Impacts by Scenario (\$ 2024)

Customer Category	Scenario	Annual Average Usage (CCF)			
		2024	2030	2043	
Residential	CCA	902	\$1,463	\$1,420	\$1,334
	CLCPA Approach	900	\$1,462	\$1,413	\$1,452
	NNI	896	\$1,460	\$1,394	\$1,411
	PUT	891	\$1,458	\$1,382	\$1,360
Commercial	CCA	6,325	\$6,023	\$5,944	\$5,870
	CLCPA Approach	6,325	\$6,023	\$5,991	\$6,622
	NNI	6,324	\$6,023	\$5,988	\$6,614
	PUT	6,323	\$6,022	\$6,006	\$6,140
Industrial	CCA	316,641	\$301,508	\$298,844	\$289,922
	CLCPA Approach	316,641	\$301,508	\$301,513	\$296,450
	NNI	316,641	\$301,508	\$301,609	\$296,979
	PUT	316,641	\$301,508	\$302,703	\$275,560

vii. Impact on DACs

All of the scenarios envision larger incentives for customers in disadvantaged communities, though this represents a shift to current practice. Across all scenarios, the heat pump incentives for customers in DACs are 1.5x to 1.67x larger than for customers outside DACs. However, the general strategy modeled was to start with higher incentives when adoption rates are lower and progressively phase them out as the market transforms. The share of heat pump incentives projected to be spent on disadvantaged communities starts high, around roughly 90%, and declines over time.

Figure 45: Heat Pump Incentives in DACs



viii. Benefit Cost Analysis

BCA calculations using the Societal Cost Test are contained in Figure 46. None of the Central Hudson GSLTP scenarios as a BCA above 1.0 for the 20-year evaluation period. Raising the cost of carbon would increase the BCA ratios under all four scenarios, as would introducing a method of internalizing non-quantifiable benefits of decarbonization (*e.g.*, health measures, improved air quality, economic development, *etc.*).⁵⁷

⁵⁷ See *supra*, note 11. See Appendix E of Central Hudson's 2023 DSIP.

Figure 46: Benefit Cost Analysis – Comparison of Scenarios (\$ Millions)

Resource Type	Category	Metric	CCA	NNI	CLCPA Approach	PUT
Beneficial Electrification	Electric Impacts	Avoided Electric Supply Costs	-\$34.0	-\$58.5	-\$45.8	-\$60.2
		Electric Distribution Capacity	\$29.9	\$66.1	\$47.2	\$71.1
		Electric Generation Capacity	\$115.7	\$168.6	\$142.8	\$167.9
		Electric Transmission Capacity	\$15.1	\$33.3	\$23.8	\$35.8
		Utility Revenue Loss Electricity	-\$226.6	-\$372.4	-\$297.2	-\$381.3
		Electric Poletop Transformer Resizing	\$56.4	\$56.4	\$56.4	\$56.4
		Feeder Circuit Upgrades ⁵⁸	\$137.0	\$137.0	\$137.0	\$137.0
	Environmental	Avoided CO2 Value	\$54.2	\$78.3	\$65.9	\$79.1
	Gas Impacts	Avoided Gas Distribution Capacity	\$203.7	\$277.7	\$231.4	\$280.3
		Avoided Natural Gas Supply Costs	\$94.8	\$136.5	\$115.0	\$137.9
		Avoided New Connection Costs	\$24.2	\$101.4	\$101.4	\$101.4
		Utility Revenue Loss Natural Gas	\$272.3	\$389.2	\$329.3	\$393.1
	Other	Admin Fixed	\$13.2	\$11.8	\$11.9	\$9.2
		Admin Volumetric	\$1.4	\$13.3	\$4.2	\$14.3
		Incentive Payments	\$28.2	\$266.4	\$84.8	\$286.4
		Incremental Equipment and Installation Costs	\$142.4	\$263.5	\$203.7	\$271.5
Energy Efficiency	Environmental	Avoided CO2 Value	\$35.4	\$54.0	\$43.0	\$67.3
	Gas Impacts	Avoided Gas Distribution Capacity	\$74.5	\$118.5	\$87.5	\$148.1
		Avoided Natural Gas Supply Costs	\$56.9	\$86.5	\$69.3	\$106.8
		Utility Revenue Loss Natural Gas	\$167.4	\$253.1	\$202.9	\$310.0
	Other	Admin Fixed	\$2.5	\$3.9	\$3.9	\$6.6
		Admin Volumetric	\$3.3	\$4.4	\$1.4	\$10.3
		Incentive Payments	\$5.5	\$87.9	\$27.7	\$205.7
		Incremental Equipment and Installation Costs	\$20.8	\$78.4	\$59.8	\$134.6
	Participant Bill Savings	\$224.3	\$339.7	\$272.2	\$416.9	
Hydrogen	Environmental	Avoided CO2 Value	\$0.0	\$11.3	\$11.8	\$40.8
	Other Energy Costs	Hydrogen Blending Stations	\$0.0	\$3.9	\$3.9	\$11.2
		Hydrogen Fuel Costs	\$0.0	\$47.0	\$48.9	\$26.9
Renewable Natural Gas	Environmental	Avoided CO2 Value	\$22.6	\$22.6	\$22.6	\$65.1
	Other Energy Costs	RNG Fuel	\$121.9	\$121.9	\$121.9	\$212.4
Societal Cost Test		Benefits	\$532.3	\$828.4	\$702.0	\$966.6
		Costs	\$656.6	\$1,009.5	\$866.9	\$1,165.2
		Net Benefits	-\$124.4	-\$181.2	-\$164.9	-\$198.6
		Benefit Cost Ratio	0.81	0.82	0.81	0.83



VI. Near-Term Actions for Future Decarbonization

Central Hudson has developed this GSLTP and associated analytic and modeling capability as described herein to align with directives from the Gas Planning Order and to provide the Commission, Staff, and stakeholders with detailed information and analysis regarding the Company’s gas planning. The Company looks forward to receiving input and feedback and will seek to respond to and integrate such feedback, including on an iterative basis, as appropriate. The Company appreciates that the GSLTP proceeding process takes time, largely due to extensive stakeholder interaction and iterative planning stages. The Company emphasizes that while this regulatory proceeding unfolds, Central Hudson will continue to advance numerous efforts that further the overall objectives of the proceeding on a parallel path.

As is reflected in this GSLTP, Central Hudson is charting a new direction in gas (and electric) planning. The scenarios presented over a 20-year horizon provide detailed information regarding options for how the Company can maintain reliability and safety, while “bending” the demand curve down and mitigating system investment/ costs through the deployment of many tools and solutions. Central Hudson has not selected any specific scenario as its chosen path forward at this time because of the changing dynamics of the gas planning process and the energy transition. While the Company fully supports the CLCPA goals and the energy transition, there are many factors that are unknown and

⁵⁸ This value is external to the model and will be studied further as the process progresses.

unresolved. Therefore, we look forward to working with the Commission, Staff, and Stakeholders on a feasible path forward.

While such planning necessarily includes a long-term horizon, it also includes the continuation and initiation of numerous near-term actions and strategies. Reflective of this GSLTP as a whole, these near-term actions are described below.

A. Leveraging GSLTP Modeling Analysis for NPAs and Other Program Initiatives

The innovative modeling and analytic tools foundational to GSLTP are central to such ongoing and near-term Company efforts. The Company is leveraging these capabilities beyond just the Gas Planning Proceeding scope to enable innovation and transform its own planning process. This is illustrated, throughout the GSLTP, in the granular analysis of gas system segment loading, electric system circuit loading, and penetration of DSM measures and heat pumps. This granular, system- and location-specific analysis enables the Company to assess, test, and implement initiatives and programs such as targeted heat pump deployment efforts, increased incentives, NPA solutions, and storm hardening investments. The analysis provides rich information for the Company to identify and assess opportunities for NPAs or other programs and pilots, which the Company will continue to advance, including in coordination with stakeholders. Such efforts have inherent challenges and constraints, including inducing customers to participate in NPAs, but the increased analytical tools provide increased visibility about how and where to target efforts (*e.g.*, to target sections of high growth and loading). This modeling capability also provides a potential roadmap to change the paradigm of how NPAs are designed and implemented. In particular, the modeling may allow for system benefits to be achieved through a higher technology (*e.g.*, heat pump) adoption and program participation rate, that do not require the 100% customer participation/ conversion for NPAs. Such 100% participation rates, which are characteristic to traditional NPA programs, are often prohibitively difficult to achieve, particularly on a larger scale.

B. Emissions Reductions Research and Development (“R&D”)

i. Cosponsor of R&D with NYSEARCH

Central Hudson’s ongoing and near-term efforts include a focus on R&D. For example, Central Hudson is part NYSEARCH as a cosponsor with other utilities across New York, the United States and Canada on R&D projects to enhance leak detection and to assess measures to reduce GHG emissions from the gas sector. This includes sponsoring projects that will help the industry potentially move towards the adoption of renewable gases including renewable natural gas (RNG) and hydrogen. The NYSEARCH renewable fuel studies focus on the use of different fuels and how they can be leveraged within the pipeline network.

Sponsored projects include:

- Development of Small Unmanned Aerial Systems (sUAS) to perform inspections of both submerged pipelines and aerial inspections of the natural gas network.

Figure 47: Aquatic Drones Perform Inspections of Submerged Pipelines



Figure 48: Aerial Drones Perform Inspections of Pipelines on Land



- Development of an autonomous robotic system for above ground leak detection.
- A study to reduce methane emissions at threaded connections.
- An odor detection study to measure the effect of hydrogen blends on odorizing natural gas.
- A study on renewable natural gas and its impact on natural gas grids and consumer appliances.
- A hydrogen living lab demonstration project: Aims to validate the feasibility of blending and injecting hydrogen starting at 20 percent by volume or more into the existing natural gas infrastructure by simulating system operations. The project will evaluate safety, maintenance, and emergency response changes on gas distribution infrastructure.

- A study on the Impact of blended hydrogen on threaded connections: The objective is to determine if blended hydrogen in natural gas causes any change in the presence or absence of leaks in threaded connections and if blended hydrogen can change the flow rate of a leak in a threaded connection.
- A study of natural gas dispersion with blended hydrogen in residential structures: This will support a better understanding of the physics of hydrogen dispersion regarding buoyancy and will observe any gas separation post leakage.

ii. Sponsor of Low Carbon Resource Initiative (“LCRI”)

Central Hudson is a sponsor of the LCRI, which was established by the Electric Power Research Institute and the Gas Technology Institute (a leading independent non-profit research, development, and training organization addressing global energy and environmental challenges) to evaluate pathways for deployment of alternative energy projects in support of decarbonization across the energy economy. The multi-year initiative will cover development of demonstration projects in the technical areas of renewable fuels, hydrocarbon-based solutions, electrolytic processes, storage and delivery, power generation, renewable generation, nuclear, transportation and buildings, integrated energy analysis, and safety and environmental aspects.

C. Ongoing and Near-Terms Efforts Described in this GSLTP

This GSLTP describes current efforts which the Company will continue to advance throughout the Gas Planning Proceeding. These include the following:

- **System Investment for Safety, Reliability, Environmental Benefits:** Central Hudson will continue investing in its system to maintain reliability, safety, and environmental benefits. This planning includes but is not limited to removal of leak prone pipe through its LPP Program. In conjunction with the LPP Replacement Program, Central Hudson is currently proposing a Leak Prone Services program to replace services that are considered LPP but are not included within the LPP main program because they are not served by a leak-prone main. The Company’s Large Diameter Gas Welded Pipe Replacement Program targets large diameter gas welded steel pipe, which is categorized as higher risk. The Company’s proposed Creek Crossing Risk Remediation Project would proactively target creek crossings that pose a high risk and install a bypass by either boring or rerouting the pipeline strategically. Additional investment programs address the Company’s gas transmission system. (See Section III.D and III.G)
- **Hydrogen and RNG:** The Company has numerous ongoing efforts regarding RNG and Hydrogen, including assessment of viability, benefits, costs, and strategies and steps. (See Section IV.E.ii)
- **Clean Heat Program:** The Company will continue its administration of the Clean Heat program, including but not limited to expand technology options, increase the effectiveness of marketing and outreach, and enhance installation contractor network capacity and excellence. (See Section IV.C.ii)
- **Energy Efficiency Programs:** The Company will continue administration of its energy efficiency programs, including for market rate and LMI customers. (See Section IV.C.i)
- **EE/BE 2026-2030 Proposal:** The Company is advancing its proposed planning for the EE/BE interim review process as the EE/BE portfolio continues to focus on electrification and electrification readiness primarily through weatherization. (See Section IV.C.i.-ii.)
- **Non-Pipe Alternatives** – The Company will continue to advance its two categories of NPA projects, which employ non-traditional solutions to avoid traditional infrastructure construction. TMAs will continue to advance strategic abandonment of leak prone pipe through electrification where it is

more cost effective than replacement and system reliability is not negatively impacted. Load growth-based projects will continue to be advanced to manage locational constraints that are associated with peak demand, including through tools such as kicker incentives. The Company will continue to advance such efforts through increased analytical tools, innovative solutions, stakeholder engagement, and annual reporting. (See Section IV.C.iii)

- **Thermal Energy Networks** – As part of its thermal energy network activities, the Company will continue the implementation of its thermal energy network pilot program to test the feasibility and economics of using thermal network applications to replace gas, and inform future actions, as well as provide social and economic benefits. (See Section IV.C.iv)
- **Demand Response** – The Company will continue to explore options for traditional demand response to reduce gas system peak load, including its initiative to reduce demand on highly loaded feeders. The Company offers several electric demand response programs, which will become increasingly important as fossil end uses are electrified. (See Section IV.C.v.)
- **GHG Accounting** – The Company will continue to actively participate in state and federal GHG accounting efforts to estimate GHG emissions for the entire supply and delivery chain from gas production through gas consumption for all customers to provide a comprehensive understanding of the emissions associated with supply and demand (See Section IV.E.i)
- **DACs** – The Company will continue to advance analysis and programs to support the investment in and benefits of DACs in the energy transition. (See Section III.C)



VII. Conclusions and Report Implications

Central Hudson is pleased to provide this GSLTP to advance the goals identified in the Gas Planning Order, including to evaluate opportunities to improve gas system planning and operational practices and to enable LDCs to meet evolving policy goals and customer expectations transparently and equitably. The Company has undertaken rigorous modeling and analysis with the goal of educating and involving stakeholders regarding demand and supply and forecasts, demand side investments and programs – including electrification and Non-Pipe Alternatives, while maintaining reliability, and affordability. This GSLTP provides four scenarios for policies, investments and activities to achieve goals beyond historical trends, including: Current Clean Energy Agenda, CLCPA Approach, No New Infrastructure, and Pipe Use Transformation. These scenario analyses include estimates of GHG emissions, bill and rate impacts, and benefit cost analyses. This GSLTP provides a basis to assess the potential impacts of the Company’s long-term plans and alternatives, both benefits and burdens, on disadvantaged communities.

The Company notes that the Current Clean Agenda Scenario will not accomplish the goals set out in the CLCPA. Central Hudson’s unique modeling approach and the scenario development advanced for this GSLTP provide the tools needed to work with stakeholders to move closer toward CLCPA goals while understanding the full costs of these programs to customers. In developing the scenarios for this GSLTP, the Company currently models parameters to keep costs at reasonable levels. The Company is already moving forward with numerous decarbonization actions as noted in Sections IV and VI and is further developing its LFCs capabilities. The purpose of the GSLTP is to quantify and assess the

implications of different tactics, but currently all possible actions discussed herein are important for the Company to meet CLCPA goals.

The following are key takeaways for the scenario development:

- All four scenarios result in significant GHG savings. The PUT Scenario achieves the greatest level of GHG savings due to a blending of lower GHG fuels added to increased targeted electrification. The CCA Scenario, which assumes approved program funding, planned upgrades to codes, and other “current” assumptions, provides more limited impacts in decarbonizing Central Hudson’s system.
- On a per customer basis, the Company projects significantly lower GHG emissions relative to 1990 for all scenarios.
- None of the scenarios show cost effectiveness due largely to the resulting cost increases on the electric side of the business of shifting heating usage from the gas system to the electric system over time (including the shift from lower-cost gas to higher-cost clean electricity).
- Customer bill impacts generally decrease over the next several years across scenarios. A major reason for this is that the gas usage can be shifted to the electric system over this period without incurring additional costs on the electric side from higher generation costs or increased electric system upgrade costs due to increase in electric peak load from electrification. Over time, such higher/ incremental electric system costs do materialize resulting in bill increases.
- The modeling assumes a constant customer count after a short period of relative customer count increases in all scenarios except CLCPA Approach. This assumption has implication on bill impacts, as the overall gas revenue requirement continues to be allocated across a fixed number of customers over the bulk of the period of the analysis. Going forward, the Company welcomes input from stakeholders on this (and other) assumptions and can modify scenario modeling as appropriate.
- The NNI Scenario shows the benefits of having the most targeted approach to deployment of programs such as increased heat pump incentives and NPA development. This comes with higher costs but does avoid new infrastructure. Customer adoption will be key to the success of the NNI Scenario and with all the scenarios.
- LCFs are key to decarbonizing the system to a rate that could meet CLCPA goals.
- Safety and reliability will remain paramount through the implementation of any scenario.

As discussed above, Central Hudson has not selected any specific scenario as its chosen path forward at this time because of the changing dynamics of the gas planning process and the energy transition. While the Company fully supports the CLPCA goals and the energy transition, there are many factors that are uncertain, unknown, and/or unresolved. For this reason, the Company files this initial GSLTP with its foundation of an adjustable modeling platform that is open to modifications to assumptions based on ongoing stakeholder input. The Company looks forward to working with the Commission, Staff, and Stakeholders on a feasible path forward.